





THE NATIONAL COLLEGE OF ART AND DESIGN

"THE INDUSTRY OF HUMAN HAPPINESS"

AN ANALYSIS OF THE HISTORY AND DEVELOPMENT OF  
THE GRAMAPHONE

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## INTRODUCTION

In 1877 Thomas Edison turned the crank on his latest invention and heard it repeat a nursery rhyme he had just recited into its mouthpiece. He had invented a means of recording sound and reproducing it at will and the world has never been quite the same since. He became the founder of an industry which has been called, not without some justification, the 'industry of human happiness'.

In the days when Industrial Design was unheard of as a profession, scientists, engineers, artists, financiers and merchants co-operated to satisfy an almost universal demand for musical entertainment by a population, enjoying for the first time, the leisure to appreciate it. That rudimentary 'talking tinfoil' launched a musical and social revolution that is still in progress. Over the decades Edison's invention has been called the gramophone the Victrola, the hi-fi, the stereo, and the integrated home entertainment centre, but whatever its name, it has succeeded in bringing the miracle of recorded sound to millions of people, profoundly influencing not only musical tastes but even the life-style of entire generations.

This thesis deals with the whole event filled story from the phonographs first scratchy sound of 1877 to today's multi-billion pound industry. It is an account of the great diversity of musicians and musical trends, the history of an invention and its industry, the effects of social change and industrial design on the development of a musical instrument and finally an analysis of the latest developments and a look at what the future holds. Taste and technology have changed but the miracle of recorded sound remains the same. We have come a long way



since Edison's invention and this thesis "The industry of human happiness" is a comprehensive study of the entire wonderful journey.



## THE INVENTION OF THE PHONOGRAPH

The first talking machine was constructed by Thomas Edison, Fig. 1 late in 1877. He had recorded and reproduced human speech for the first time in July of the same year. On this occasion he had a telephone diaphragm mounted in a mouth-piece of rubber in his hand, and he was sounding notes in front of it and feeling the vibrations of the centre of the diaphragm with his finger. Turning to his associate he said: "If we had a point on this, we could make a record on some material which we could afterwards pull under the point and it would give us the speech back". The experiment was tried, using a waxed strip of paper as the recording medium, and it was successful.

Edison had thus constructed a very crude talking machine and the news received an enthusiastic reaction Fig.2 He engaged himself on improving the paper strip phonograph and the result of his work was the tinfoil phonograph Fig. 3 which was sketched in his notebook on 29 November, successfully constructed by his mechanic, then modified and completed to his satisfaction on 6 December.

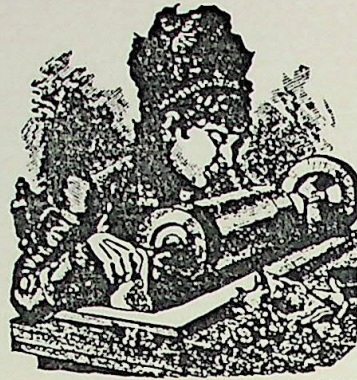
The instrument thus constructed consisted of a brass drum, about four inches in diameter, on the circumference of which was incised a helical groove with a pitch of one tenth inch. The drum was mounted on a axle so threaded and supported that one rotation of the handle at the end moved the drum laterally through one tenth inch. On one side of the drum was the recorder consisting of a mouthpiece terminating in a diaphragm having at its centre a stylus in contact with the tinfoil the pressure of this contact being variable by means of a lateral adjustment of the recorder. On the other side of the drum was the



# The Miracle of the 19th Century.

The Talking

WONDER.



WONDER.

The Talking



Thomas A. Edison

FIG. 1

## Edison's Phonograph.

THE DREAM OF THE INVENTOR REALIZED.  
It will Talk, Sing, Laugh, Crow, Whistle, Repeat  
Cornet Solos, imitating the Human Voice, enunciating and pronouncing every word perfectly,  
**IN EVERY KNOWN LANGUAGE.**

This wonderful machine, which has attracted the attention of thinking men all over the civilized world, and who have pronounced it without a dissenting voice, the most Marvelous Acoustical Phenomenon of the Century. Will be exhibited in Grand Rapids, at

**FRIEDRICH'S MUSIC HALL,**  
No. 80 CANAL STREET,  
Commencing WEDNESDAY, JULY 3d,  
Exhibited Daily July 3d, 4th, 5th and 6th.

To accommodate those who desire not only to hear the Phonograph speak, but to inspect and examine it closely, it will be exhibited every day from 10 to 12 a. m., from 2 to 6 p. m., and from 8 to 10 evenings. The operator will fully explain the machine and test its powers at every entertainment.  
Special attention paid to Ladies and Children.

**ADMISSION, only 25 Cents, Children, 10 Cents.**

Eagle Steam Job Rooms—W. C. Dennis & Co.

FIG. 2

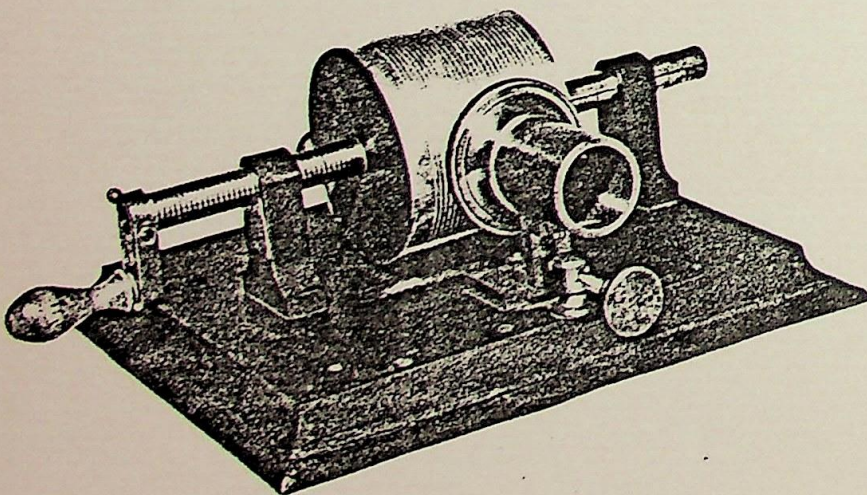


FIG. 3



reproducer with the same general construction as the recorder, but having a more flexible diaphragm. To record, the speaker adjusted the position of the drum until the stylus of the recorder was near one end of it and above the groove and then spoke into the mouthpiece while rotating the handle as uniformly as possible. The process produced indentations in the tin foil corresponding to the sound vibrations of the speech. To reproduce, the recorder was withdrawn and the drum, counter-rotated until the reproducer stylus could be set in contact with the beginning of the indented groove. The handle was again rotated and the diaphragm of the reproduced, vibrating forth a distorted reproduction of the original speech,

This solution gains its strength as a design from its functional simplicity. As a purely functional solution it works quite well, but it is obviously a mechanical engineers solution with very little if no attention paid to its visual impact. But in this early stage as it was just the intention to prove the principle of the machine it is hardly fair to make a critical design analysis of this first phonograph. It was among the first pieces of uniquely twentieth-century equipment with no analogue in any previous age. This is one of the very first examples of its kind and its clumsiness and lack of visual coherence illustrate the principle that when a technology is young there is no aesthetic means of handling it. Only when systems are no longer novel can they consciously be 'designed'.



## THE TINFOIL PHONOGRAPH IN ENGLAND

The original tinfoil phonograph was seen, possibly before it was demonstrated to the American public, by Henry Edmunds a British Engineer then engaged on a study tour in the U.S.A. On his return to England he wrote to The Times about it and the British public learned of the intention from an article in that newspaper published on January 17, 1878. Mr. W. H. Preece, Fig. 4 immediately arranged for a tinfoil phonograph to be constructed under the guidance of Edmunds and this instrument was demonstrated to an audience at the Royal Institution on February 1. For a lecture on February 27, Preece had three instruments at his disposal. The first was a copy of the original Edison instrument Fig. 5, the second was an improved model sent by Edison which was provided with a heavy Flywheel to secure greater uniformity of rotation, and it had only a single diaphragm and stylus, used both for recording and reproduction. This model signified the start of improvements in this area which are still going on today. As well as the technical improvements we can see the beginning of an awareness of the machines visual impact. A certain visual uniformity is achieved by giving the sharp corners a generous radius and by placing a light inlaid border on the dark flat surfaces. No attempt has been made yet to conceal the mechanism within a casing and therefore the overall appearance is an imbalance collection of parts mounted on a base. The third instrument demonstrated by Preece, Fig. 6 was constructed by his colleague and also employed a single diaphragm, but the drum was driven by a clockwork motor operated by a falling weight, the speed being governed by means of a fan mechanism. With the inclusion of these extra parts in the design to improve the performance and still no attempt to hide the mechanism, the effect visually is one of a



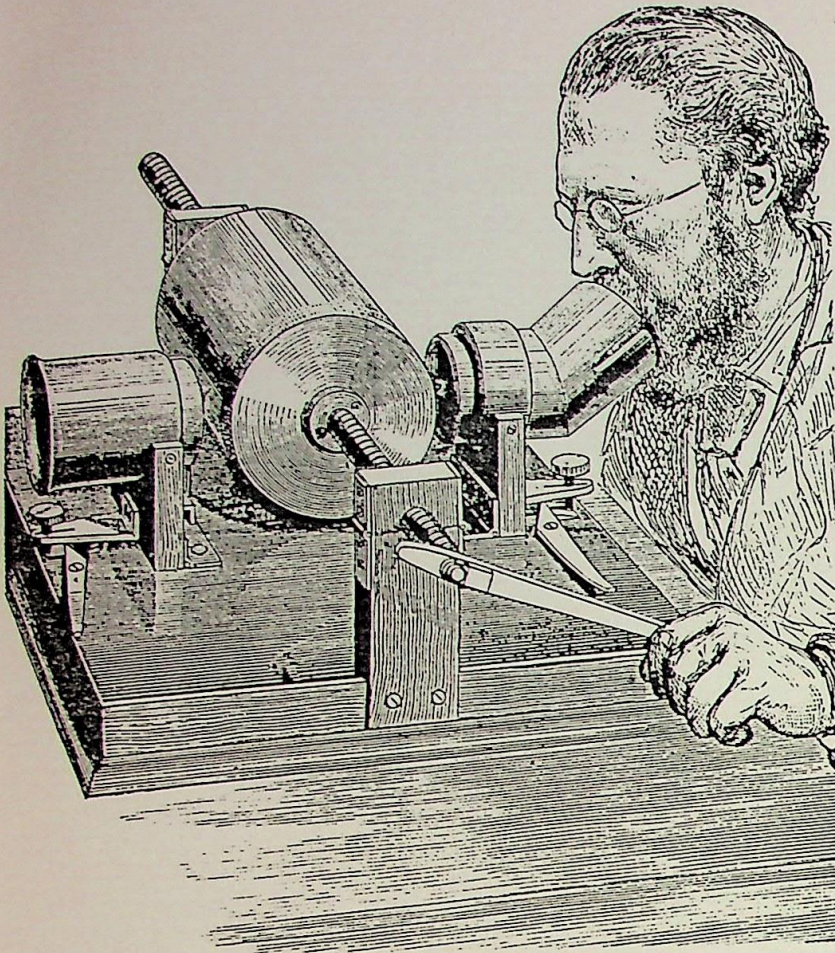


FIG. 4

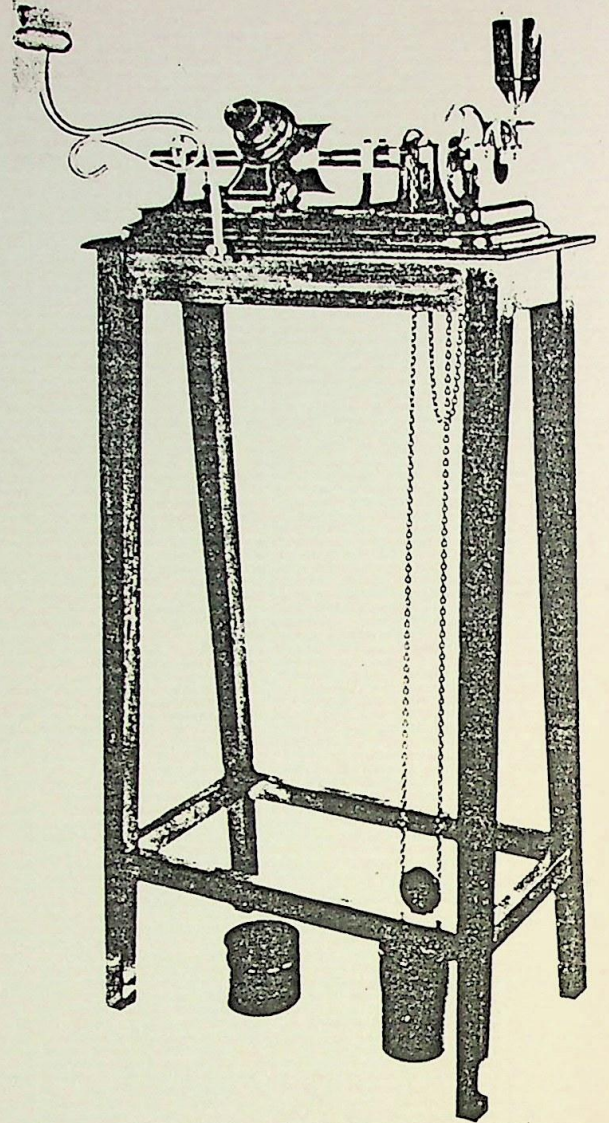


FIG. 6

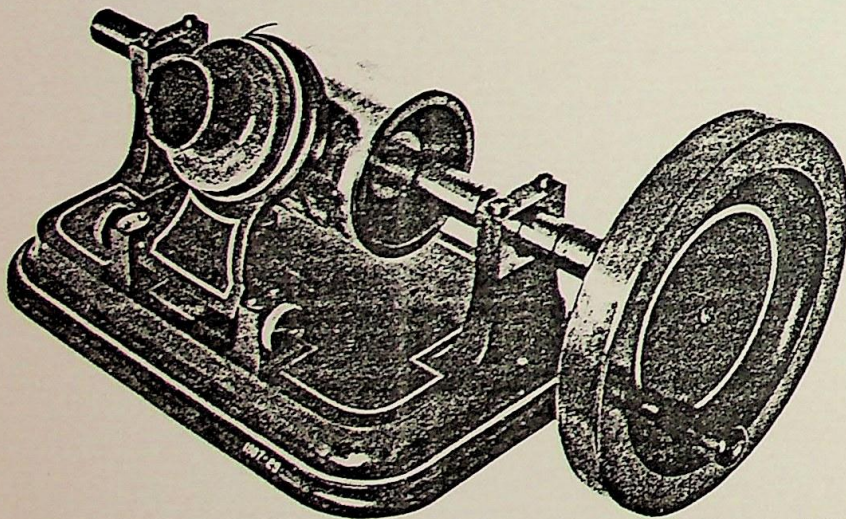


FIG. 5



confusing disorganised arrangement of lines and shapes. The phonograph was hailed in England and in Europe generally as a scientific instrument rather than a scientific toy.

The London Stereoscopic Company was licensed to exploit the Edison patent in Great Britain and an instrument dealer's catalogue of 1886 lists three models supplied by this firm; the first, hand-cranked and without Flywheel at £5, the second with a Flywheel at £10 and the third, driven by a falling weight, at £25.

The respect of the British public for the great inventor was stimulated by the fact that for many years they were unable to inspect the original phonograph until it joined Edison's stand at the Paris Exhibition on 1889.

The obviously advantageous step of fitting a spring motor to the phonograph proved to be unexpectedly difficult. It was not until 1893, that J. E. Greenhill, a London inventor and lecturer on scientific matters, had the satisfaction of seeing a spring motor of his design, manufactured by William Fitch of Clerkenwell as an alternative source of power for the Edison wax cylinder phonograph,

#### THE ADVENT OF THE GRAPHOPHONE

It was natural that Alexander Graham Bell, the inventor of the telephone, should have been interested in the phonograph. In 1881 Bell established the Volta Laboratory in Washington and invited his cousin Chichester Bell to work there with him.



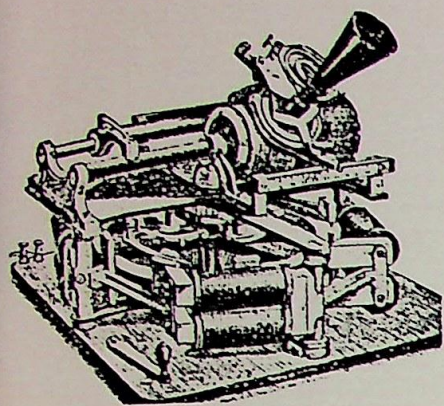


FIG. 8

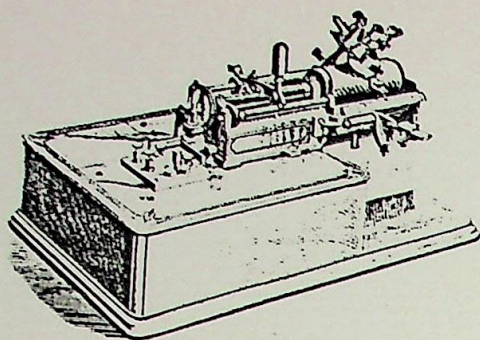


FIG. 9

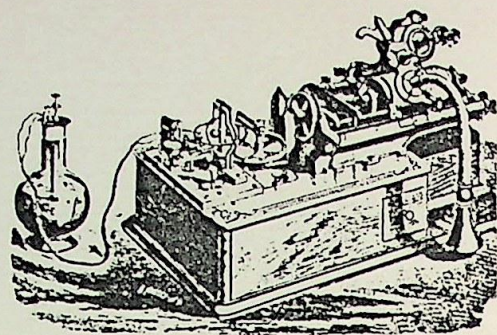


FIG. 10

FIG. 7

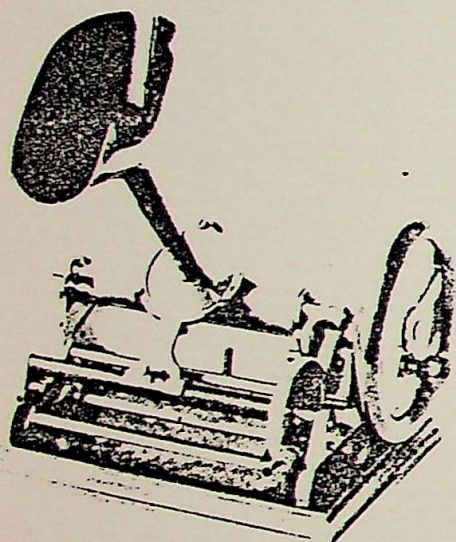
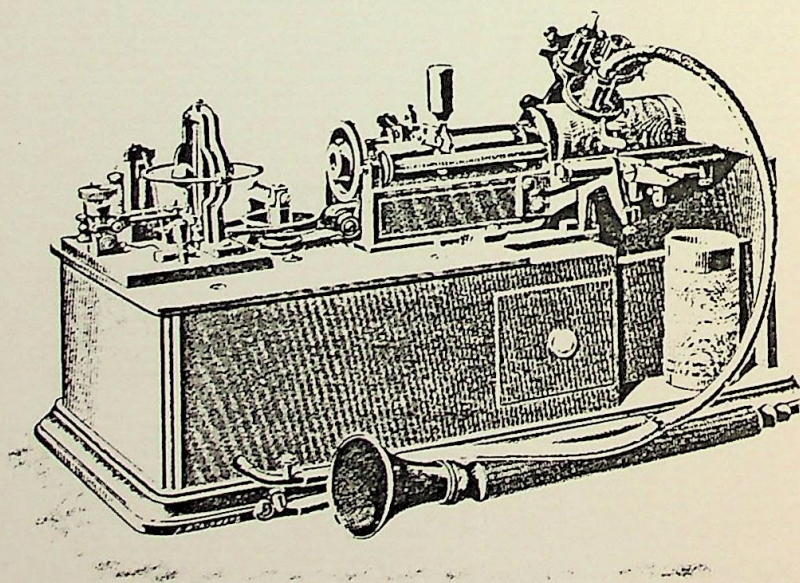
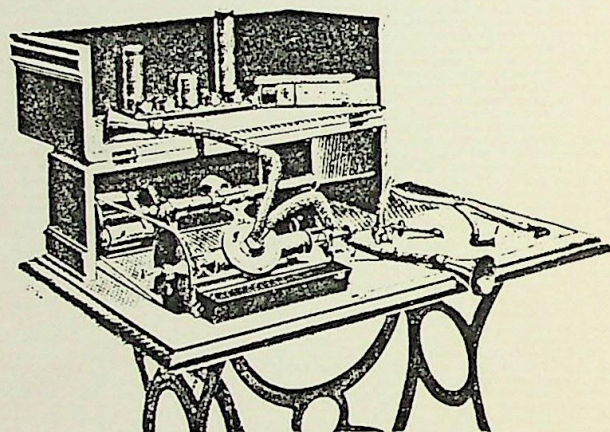


FIG. 11





As regards the talking machine the result of their efforts was not revealed until 1885 as they did not at first confine their investigations entirely to the talking machine. The principle of their 'graphophone' Fig. 7 was substantially the same as that of the phonograph but the sound impressions were incised on the wax-coated surface of a cardboard cylinder. The cylinder did not move linearly as it rotated, but the recorder was moved along it by means of a feed screw. The former improvement was of importance for the future of the talking machine.

Meanwhile Edison worked on improving his phonograph which resulted in the new phonograph Fig. 8 the improved Phonograph Fig 9 and finally the perfected Phonograph Fig. 10 which first appeared 19 June, 1888. The principles of the phonograph and the graphophone Fig. 11 were identical: both incised the sound impressions in some form of wax layer on a cardboard cylinder. The advantages of a dictating machine were obvious, and it was in this guise that the talking machine made its commercial debut.

#### EARLY EXPLOITATION OF THE TALKING MACHINE IN AMERICA

Between 1888 and 1894 Edisons Phonograph and Bells Graphophone were commercially exploited exclusively by the North American Phonograph Company organised by J. Lippincott. The enterprise was a failure because of production difficulties, technical limitations, defects in the instruments, the company's policy of renting rather than outright sale but mainly because the industry was not ready for the dictating machine. It was considered a luxury and until recently just an alternative to stenography.



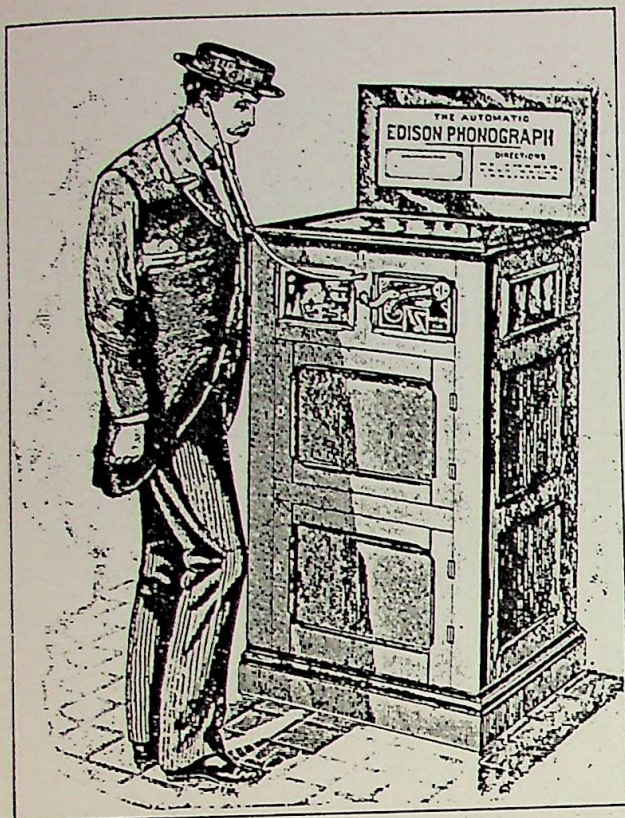
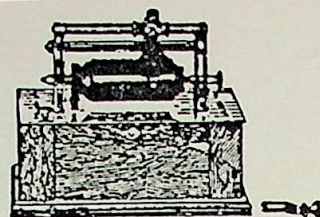


FIG. 12



BABY GRAND GRAPHOPHONE

**THE BABY GRAND GRAPHOPHONE**  
Runs with Spring Motor. Weight, 15 lbs. Described in outfit No. 3.

No. 3.

**BABY GRAND GRAPHOPHONE.**  
OUTFIT FOR EXHIBITION OR HOME ENTERTAINMENT.

1 Baby Grand Graphophone; weight, 15 lbs .....	\$75.00
9 records .....	9.00
3 blanks.....	.75
3 hearing tubes .....	3.00
Large horn and stand for concert room	5.50
Canvas case for holding records and tubes.....	6.75
Regular price.....	\$100.00

FIG. 13

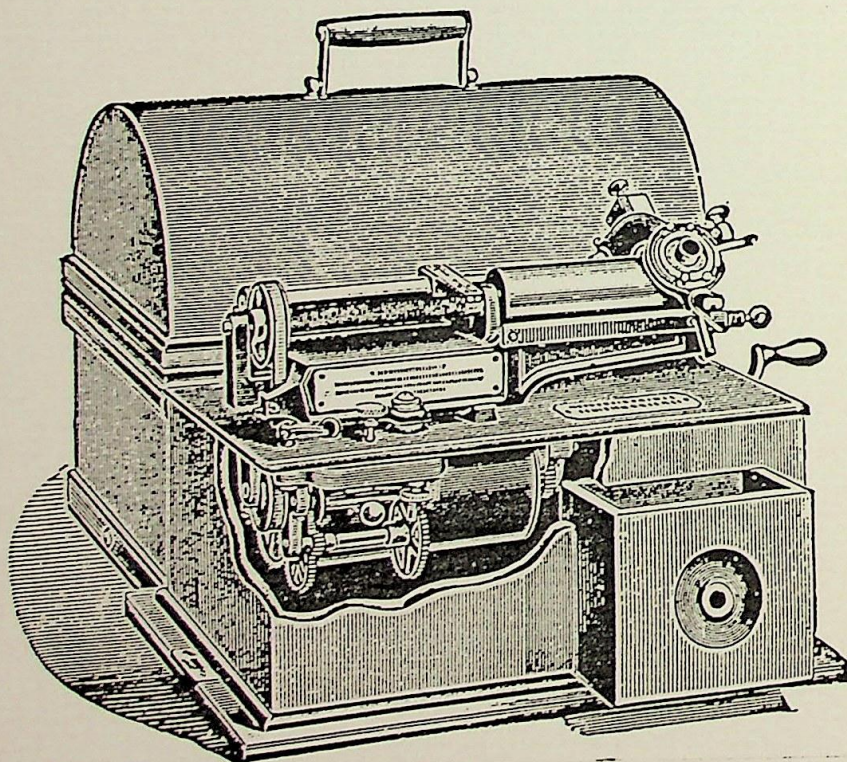


FIG. 14



It became obvious that the phonograph had considerable potential for entertainment. By connecting hearing tubes an operator could have up to 17 customers listening to a pre-recorded cylinder Fig. 12. It could also be made automatic with the addition of a coin slot-mechanism. To prosper as a public entertainer the recording process had to be improved and standards and the instrument itself simplified and made cheaper to put it within reach of the average citizen.

The Columbia Phonograph Company was first in the field in 1894 with a spring driven graphophone Fig. 13 suitable for domestic use. Edison followed in 1896 with his \$100 spring motor Phonograph, Fig. 14, with very basic attempts to conceal working parts in an unstylised box.

#### BERLINER AND THE GRAMOPHONE

By 1896 a third competitor had appeared along with the phonograph and graphophone. This was the gramophone, invented by Emile Berliner, Fig. 15. One of Berliner's sources of inspiration was an instrument called the phonautograph Fig. 16 which was invented by Leon Scott de Martinville in 1857. It consisted of a large horn terminating in a broad membrane to the centre of which was connected a stylus with the remote end in contact with a sheet of smoke-blackened paper wrapped round the surface of a cylinder having a threaded arc mounted in threaded bearing. Berliner considered that the uniform resistance of the smoke-blackened surface to the stylus movement offered a greater chance of faithful recording than the variable resistance offered by a soft surface to a stylus vibrating perpendicularly to the surface.



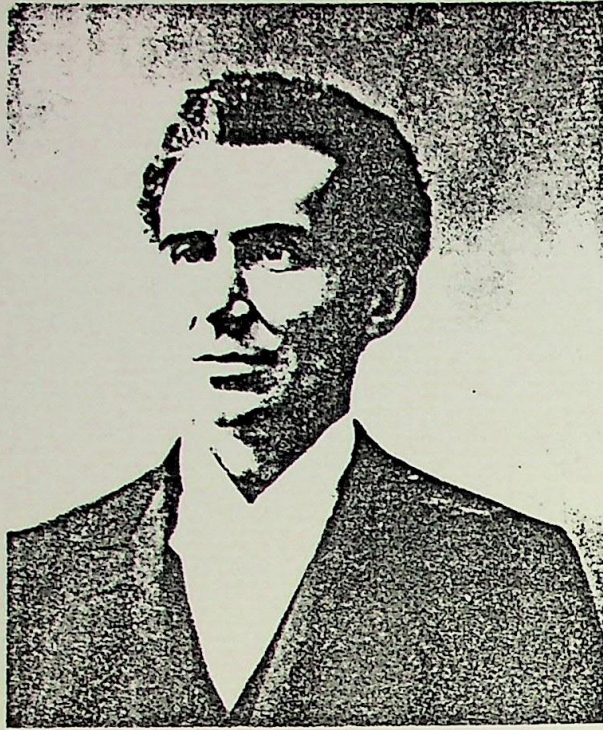


FIG. 15

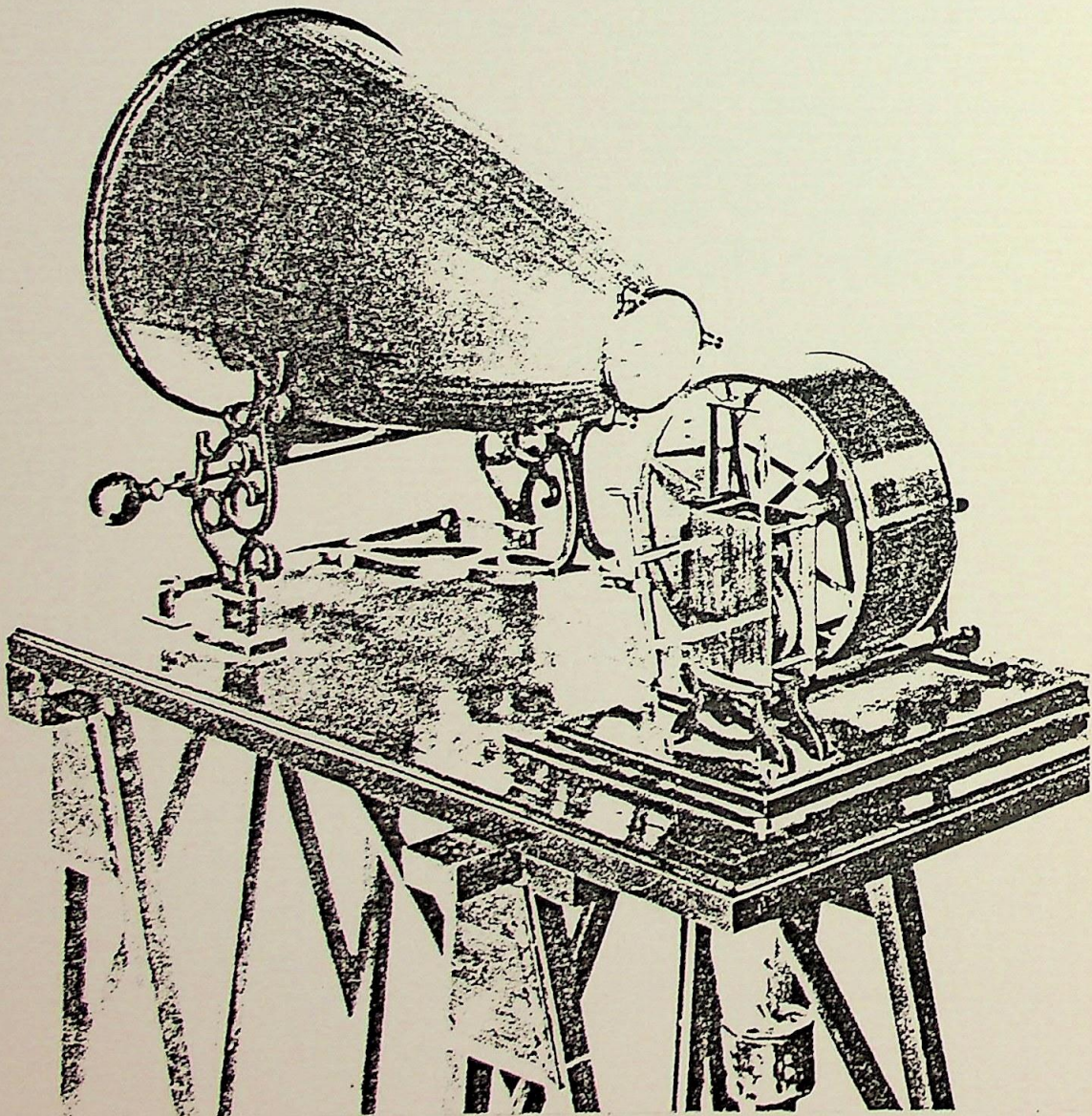


FIG. 16



He first constructed a very simple form of phonautograph Fig. 17 having a narrow drum with no motion of translation as it rotated. He fixed the resulting trace with shellac and then employed a photo-engraver to transform it into an etched groove on a thin metal plaque, which he wrapped round the cylinder. Later he abandoned the cylinder for the disc Fig 18. To make a recording a polished zinc plate was first covered with a solution of beeswax in benzene; evaporation of the benzene left a thin layer of the wax. The recording stylus cut an undulatory spiral into this wax, exposing the metal beneath. Application of a solution of chromic acid etched a corresponding groove in the exposed metal. When recording the wax was kept moistened with alchol. In 1893 the United States Gramophone Company of Washington began small-scale production of hand-driven models playing 7" discs pressed in hard rubber, In 1895 the Berliner Gramophone Company began manufacturing instruments and plates. In 1896 with the formation of the National Gramophone Company of New York the gramophone became a serious competitor to the phonograph and graphophone.

The quality of reproduction was poor and the gramophone made no provision for home recording, but the instrument was cheap, the reproduction was loud and many plates could be produced from a single master. Fig. 19.

In 1901 Berliner and Eldridge Johnson, formed the Victor Talking Machine Company. They began using a new recording process whereby a groove of constant depth was incised in the surface of a thick wax blank. The recording surface was then rendered electrically conducting and a metallic negative was deposited on it by electrolysis. This negative was then used for stamping the records, using now the shellac-based material that had been introduced in 1887. This process was the forerunner of the process used



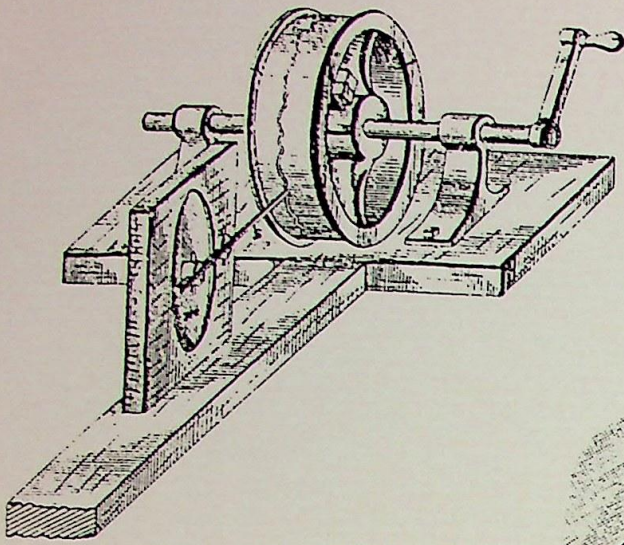


FIG. 17

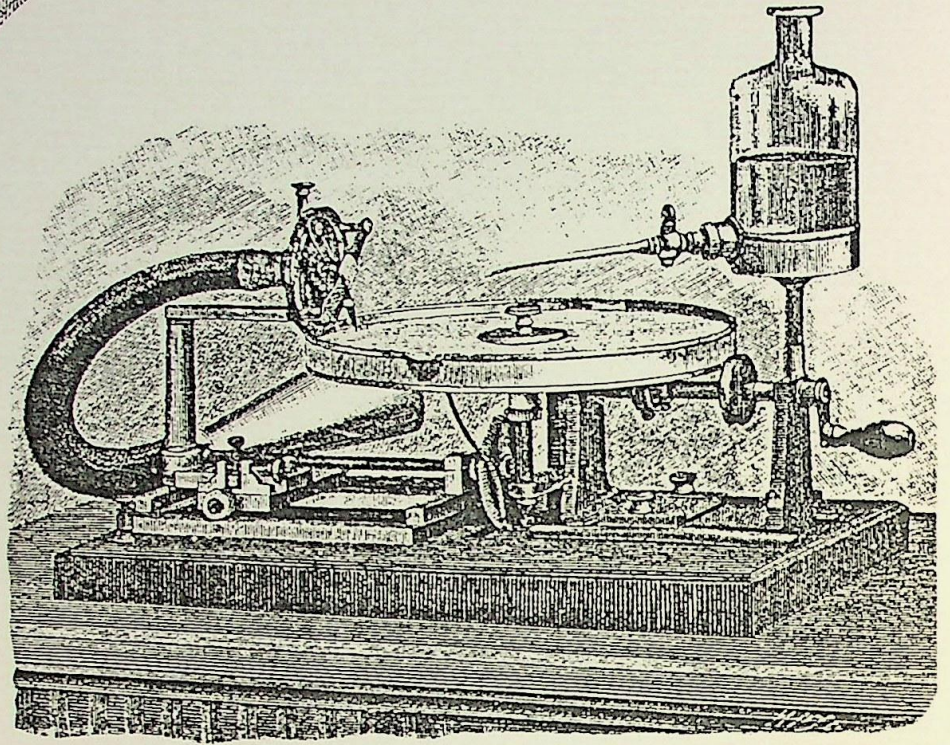


FIG. 18

FIG. 19

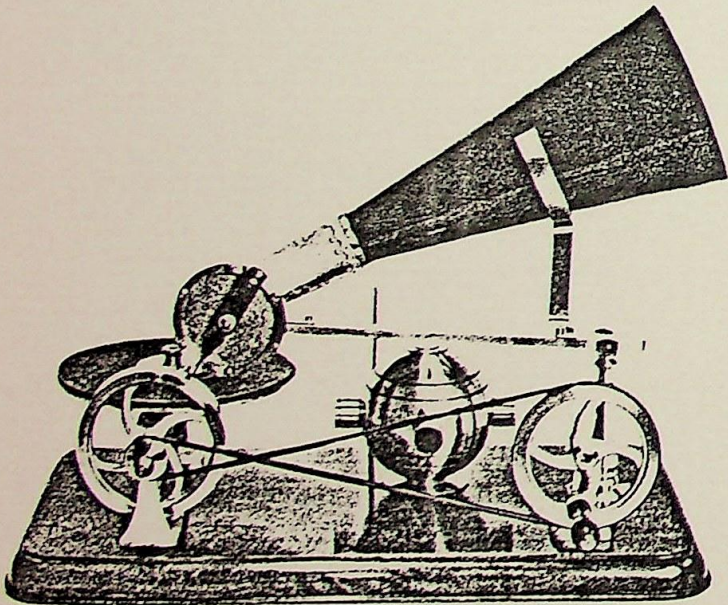
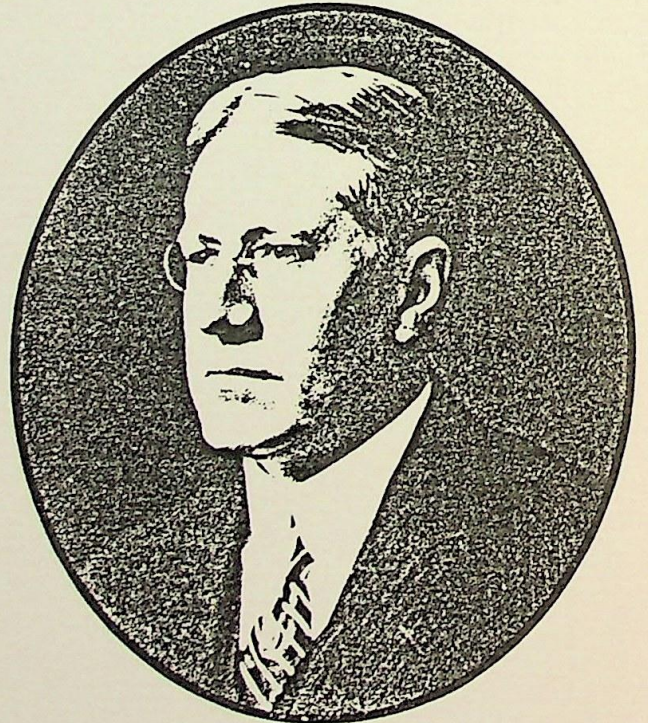


FIG. 20





today in the manufacture of records.

### THE TALKING MACHINE INDUSTRY IN BRITAIN

The first significant appearance of the phonograph in Britain was in 1892 when the Edison Bell Phonograph Corp. was set up to hire phonographs at a rental of £10 per annum as office dictating machines. At first the policy was a success but after a few years it failed.

J. E. Hough had set up the London Phonograph Company a few years earlier and he imported phonographs and made records for outright sale. This practice was against the new licensing laws given to the Edison Bell Phonograph Corporation, but an agreement was reached whereby Hough obtained the right to sell phonographs for domestic entertainment Fig . 21 while Edison retained control of the instrument as an office dictation machine Fig.22. In 1897 Hough set up the firm of Edisonia Limited which in 1898 became Edison Bell's manufacturing and sales outlet

The first major challenge to the Edison Bell monopoly was when in 1898 the Gramophone Company was established by W. B. Owen, who had been a director of the National Gramophone Company in the U.S., to manufacture and sell records and instruments in the U.K. Negotiations for a pressing plant in England failed and this was eventually set up in Hanover.

The phonograph business was highly seasonal and sales of instruments rose from September to December then dropped almost to zero, continued after Christmas but fell away



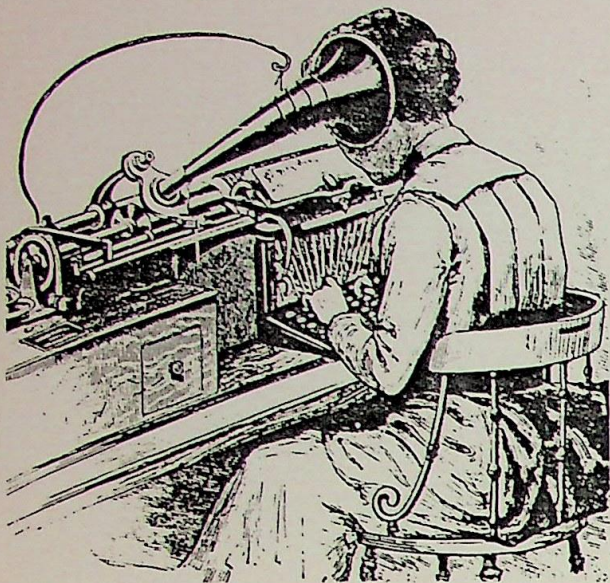


FIG. 22



FIG. 21

FIG. 23

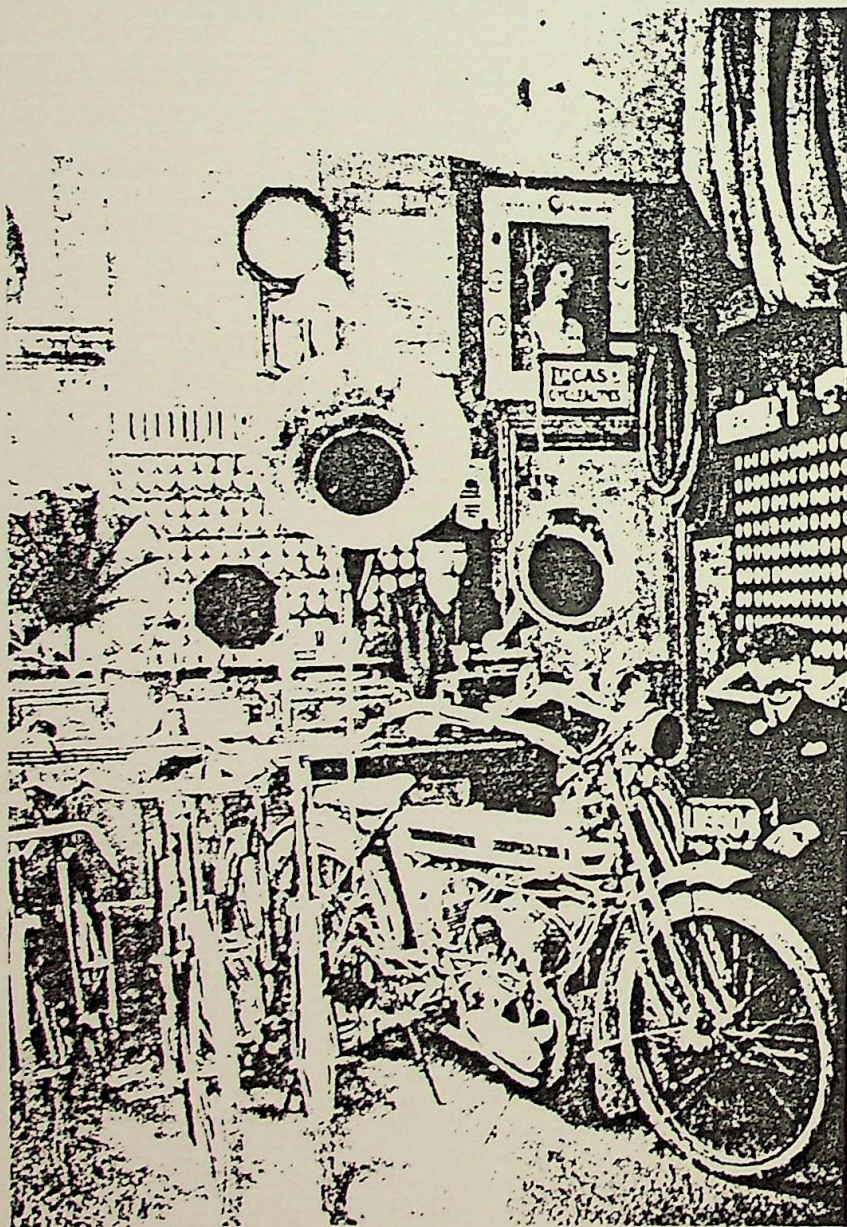
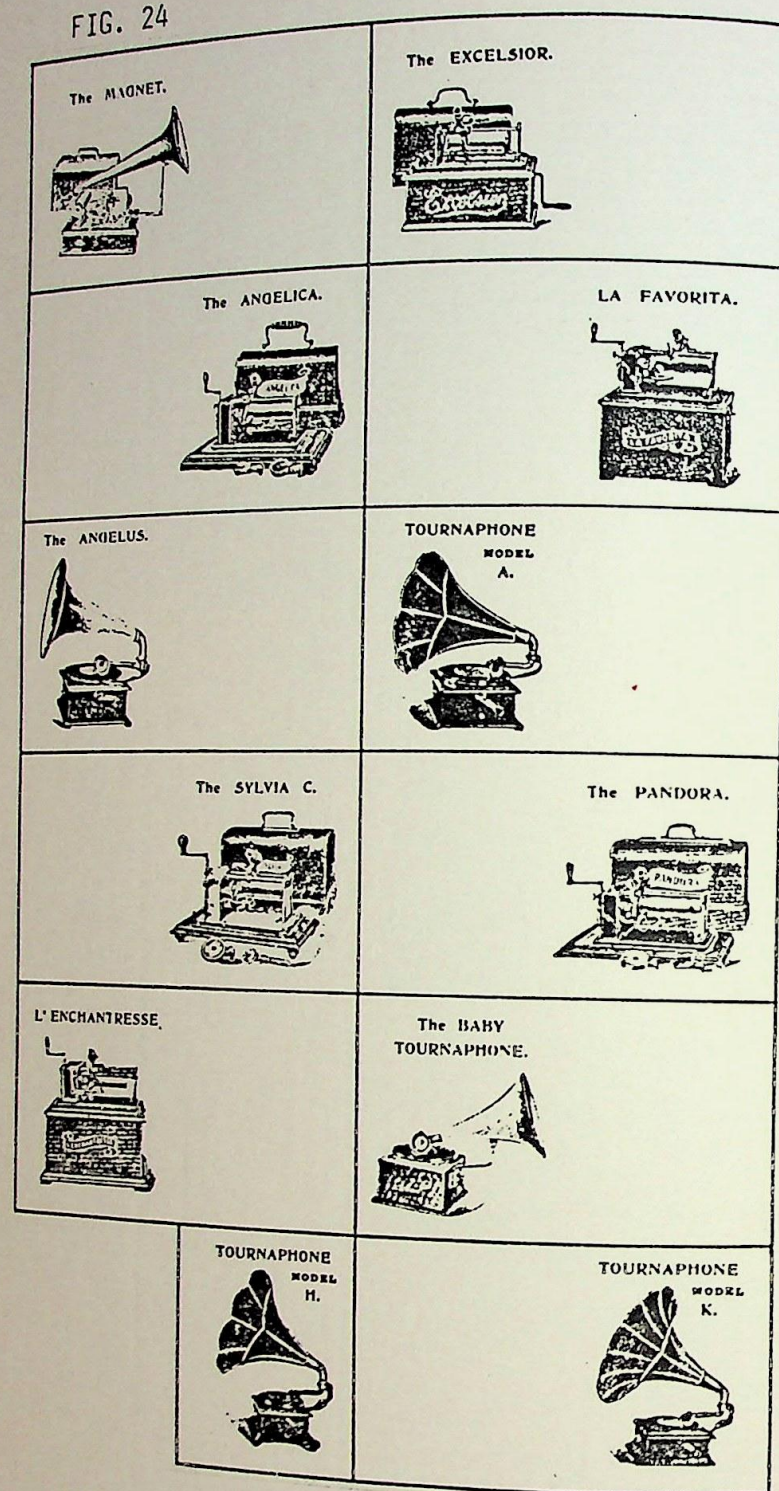




FIG. 24



during the summer. To contend with this the dealer often sold bicycles as well Fig.23 . The dealer also had to contend with price cutting by the major companies

Between 1900 and 1914 there was a bewildering variety of imports from Germany, with the names suitably altered. In some cases British manufacturers imported all components from abroad and supplied its own cabinets. Hence in addition to the major suppliers, other families were established whose continental affinity could be suspected.

The design of phonographs from this period Fig.24 paid little or no attention to aesthetic quality except in the case of the big horns whose elegance was enhanced by being styled like a flower in some cases.

The domination of the cylinder trade by Edison Bell, Columbia and Pathe was threatened in 1905 with the introduction of five new types; Rex Sterling, White, London Popular and Clarion. Of these Edison and Clarion cylinders survived into the Great War period while others abandoned the cylinder trade. The disc market was ultimately to be dominated by the black shellac-based needle cut disc 10" or 12" in diameter, recorded on both sides. Competition forced prices down from 5s 0d in 1904 to 2s 6d in 1909 at which it stabilised for a period.

#### THE TALKING MACHINE IN GERMANY

In the early stage of the industry the most remarkable contribution by the Germans was the Puck instrument Figs. 25 to 28. Built on a cast iron lyre-shaped base, it had



an exposed single-spring motor with a governor and a partially balanced horn connected at the throat to a reproducer which moved across the cylinder as the latter rotated. The performance usually ended with the horn falling off the end of the cylinder.

Hundreds and thousands of these simple instruments were sold locally and in England at prices which gave the manufacturer little or no profit. Their sale continued because it stimulated the sale of cylinders, and because it was hoped the purchasers would ultimately aspire to higher things. Sometimes the Puck was given free to a purchaser of a number of cylinders.

The German manufacturers continued to develop it by adding a flower horn, mounting it on a wooden box or adding features which reduced the severity of the wooden base and making it capable of playing both cylinders and discs etc. The lyre-shaped base and its decoration Figs. 25 and 26 in the early models is surprisingly Art Nouveau for this period, but it is completely aesthetically separate from the working parts plonked on top of it. This inconsistency is evident in the later models also, Figs 27 and 28. Whatever the refinements the Puck remained cheap and it cannot be denied that it gave pleasure to millions who could not otherwise have profited by Edison's Invention,

The cylinder instrument was, however, shortlived and an attempt to enforce its moulding patents by the Edison company accelerated the decline of the cylinder by encouraging German manufacturers to concentrate on cheapening the disc to regain their lost mass market.

Another aspect of the German talking machine industry was a vein of lyricism which expressed itself in the styling



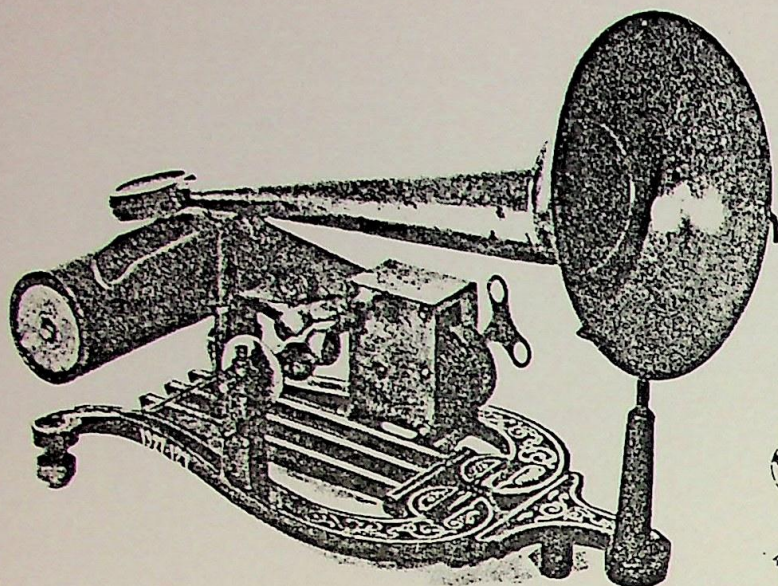


FIG. 25

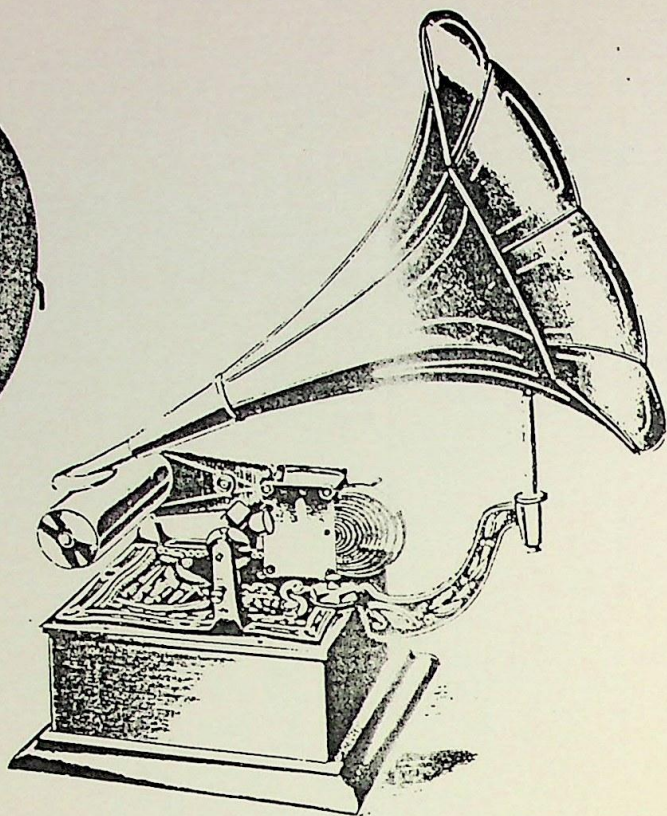
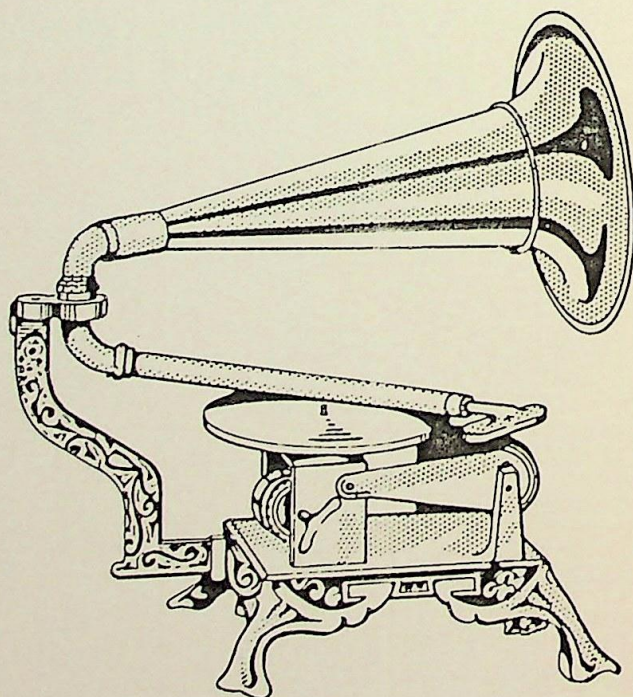


FIG. 26

FIG. 27

FIG. 28





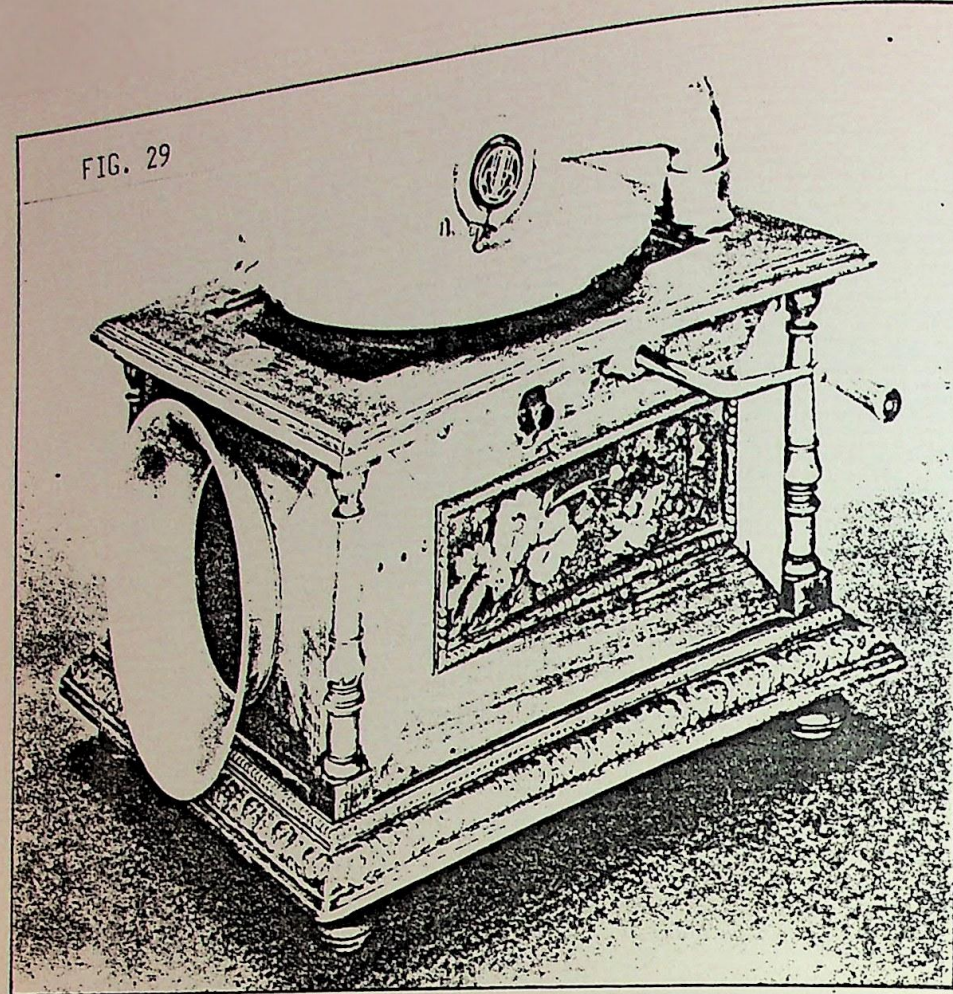


FIG. 29

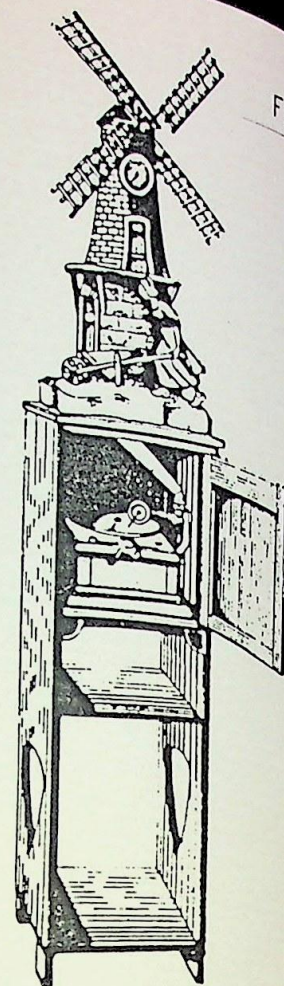


FIG. 30

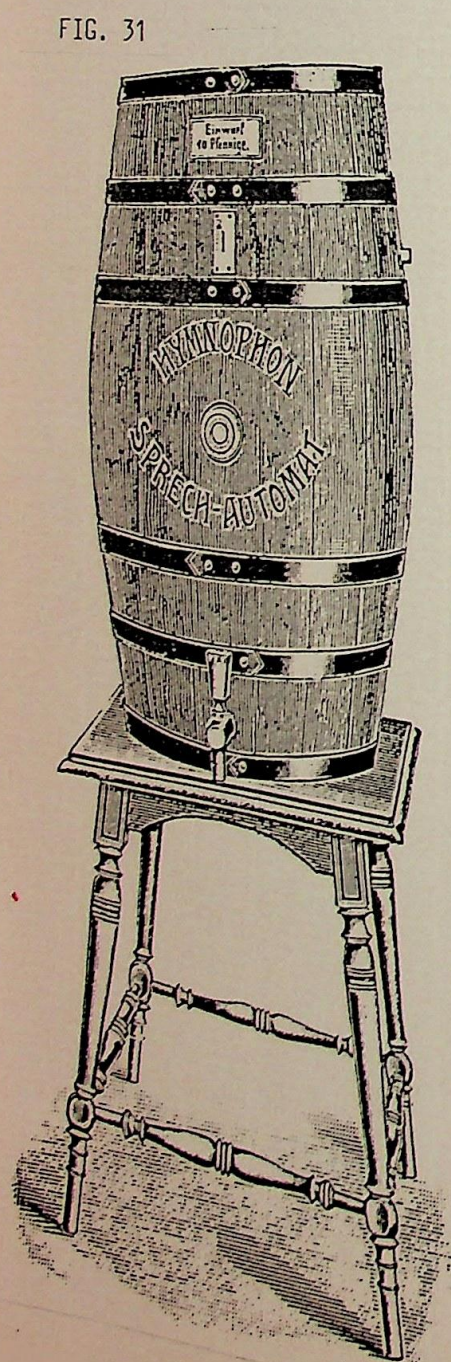


FIG. 31

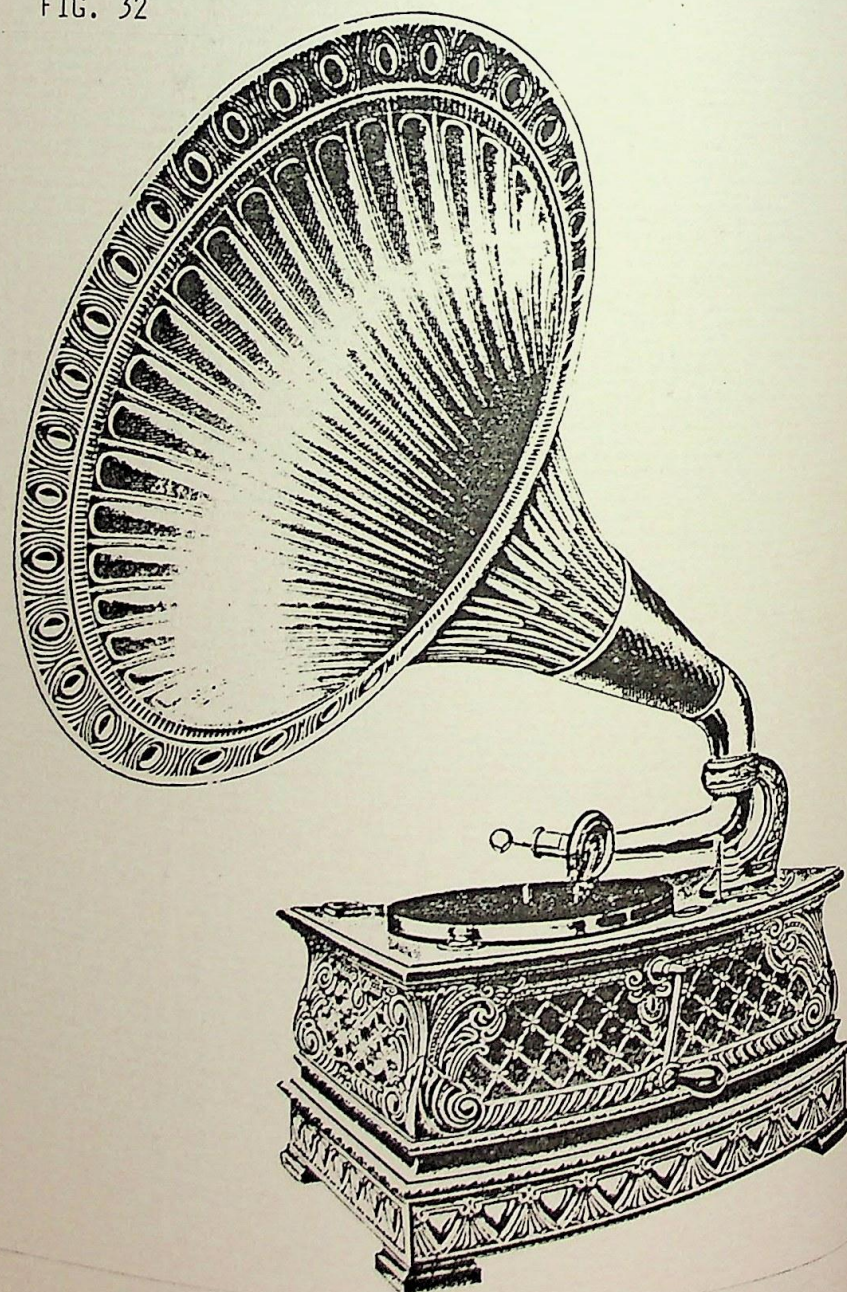


FIG. 32

of the instrument . The horn flowered modestly in England; in Germany it did so with tropical abandon. The Hymnophone Gramophone shown in Fig.29 , was designed and manufactured by Holzweissig, Leipzig. The architectural flourishes such as the marquetry panelling and the free-standing columns belie the fact that this is, in fact, an aesthetically advanced machine. The innovation of concealing the trumpet has allowed one formal concept to dominate the design.

While the hymnophone indicated the correct way to conceal the horn, later manufacturers merely disguised it. In an orgy of kitsch the instrument went into a box and the horn masqueraded above it as a majolica group, a lighthouse or a windmill Fig. 30 . One complete instrument took the form of a Greek temple, and another of a potted plant. Holzweissig produced a hornless instrument in the shape of an upright beer barrell Fig. 31 and another model appeared as a flowered grotto with coloured lights and a fountain which played when the record was started! These extravagances were, of course, exceptional, but we have already seen the same tendency at work on mass-produced instruments such as the Lorele, Puck Fig. 27 , and it appears also in the elaborately detailed metallic plates which were fixed first to the more expensive disc instruments Fig. 32 and then to the cheaper ones.

#### EDISON PHONOGRAPHS IN GREAT BRITAIN

The instruments available to play Edisons cylindrical records included the Triumph, Fig.33, introduced as the Spring Motor in 1896 the Home, Fig. 34 (1896) the standard Fig 35 (1898) and the Gem Fig 36, (1899). The Triumph had



FIG. 33

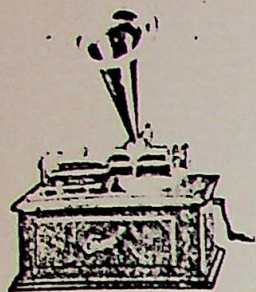
TRIUMPH  
Model B

FIG. 34

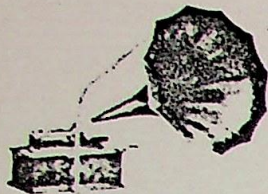
HOME  
Model C and D

FIG. 35

STANDARD  
Model E, F and G

FIG. 36

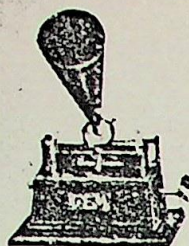
GEM  
Model A

FIG. 37

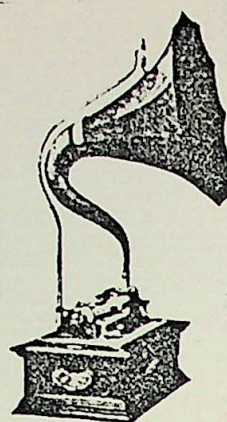
IDELIA  
Model D1

FIG. 38

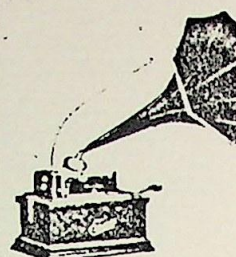
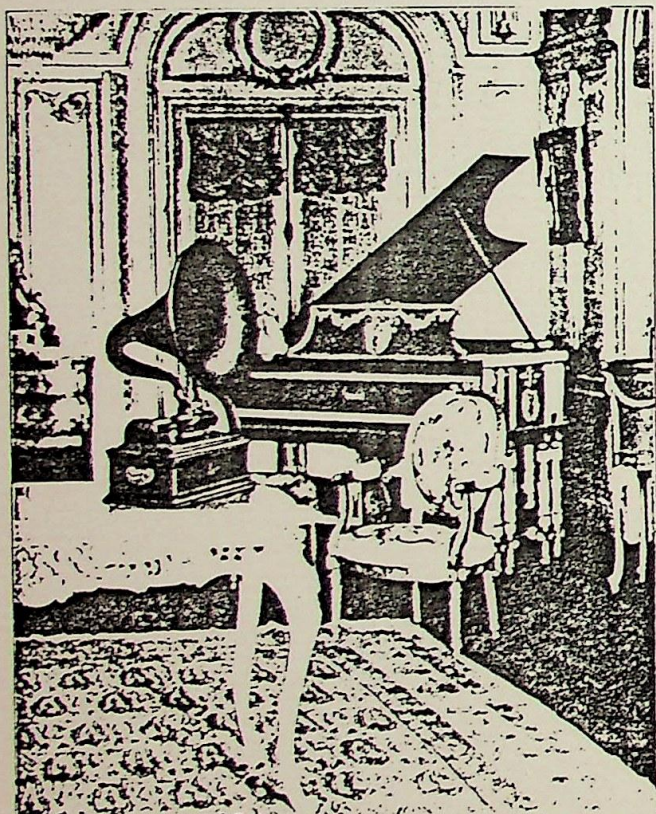
FIRESIDE  
Model A

FIG. 39



## EDISON CONCERT PHONOGRAPH

MAHOGANY

Price, £18-18-0

Cabinet, Mahogany, piano finish, with cover. Diamond Point Reproducer, Model A. Self-supported mahogany wood cygnet horn. Noiseless automatic stop. Double spring, direct drive motor; can be wound while playing.  
Plays Blue Amberol Records only, but will play any four-minute record when equipped with a Sapphire Point Reproducer.

Size (without horn), 14½ inches high; 18 inches wide; 12½ inches deep.

Same instrument with oak cabinet (without handles) and oak horn, £17-17-0

FIG. 40

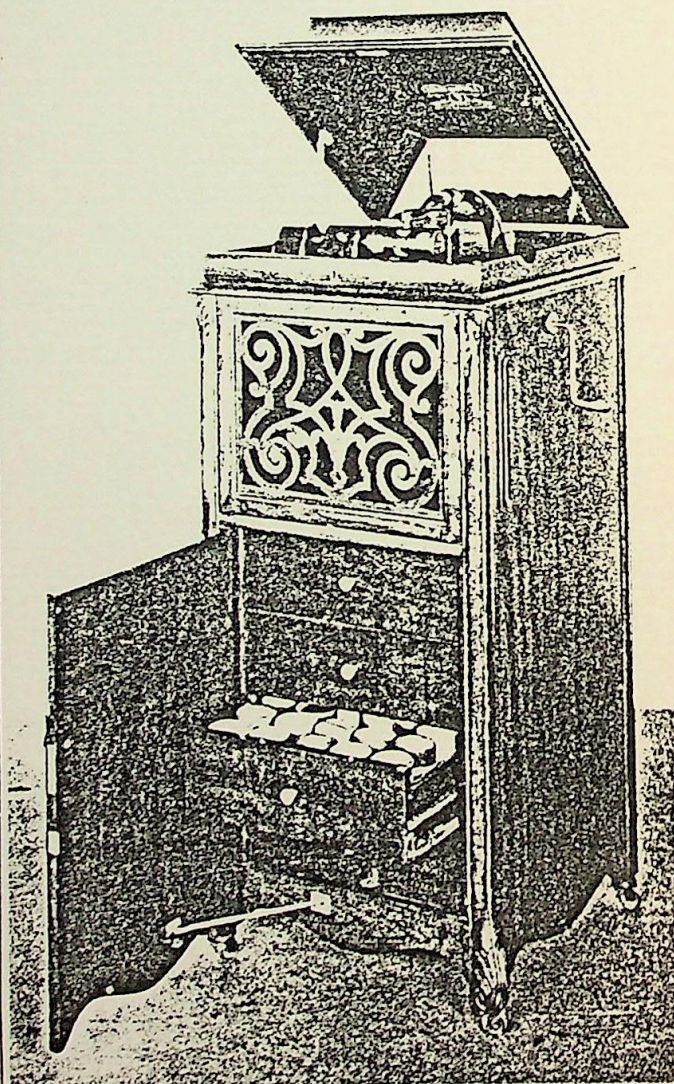




FIG. 41



a triple spring and played 14 cylinders at one winding while the Gem had a single spring playing only two cylinders. The Concert Phonograph, which Edison had reluctantly introduced in 1899 to meet the challenge of the similar Graphophone Grand, played wax records of 5" diameter.

The instruments of the Triumph-Gem Family were well designed, well constructed and robust. Many have survived until today in perfect working order. In 1907 the Idelia Fig.37 was added to the range. With oxidized bronze fittings, it was the most expensive and was designed 'to fulfil the requirements of every home'. In 1908 Edison introduced the Amberol cylinder with 200 grooves to the inch and playing for four minutes, to supplement the standard cylinder with 100 grooves and playing for two minutes. Combination instruments were marketed to play both types of cylinder. The Fireside phonograph, Fig.38 was introduced in 1909 and also had a double stylus to play both types.

The last of the exposed horn phonographs, the Concert, Fig. 39, was introduced in 1912. The sound emerged from a most elegant, self-supporting wooden-horn. All exposed-horn models sold after October 1912 played only four-minute cylinders and in 1913 the manufacture stopped, unfortunately the end of the phonographs most appealing feature.

The National Phonograph Company introduced an enclosed horn phonograph in 1909 called the Amberola Fig.40 which included storage for the cylinders. By 1912 the cylinder had long ceased to be a serious competitor to the disc, as Edison reluctantly recognised when he introduced his disc phonograph, but he continued to supply a band of devoted and enthusiastic cylinder lovers until 1929 Fig. 41 shows



a selection of needle tins.

#### THE GRAMAPHONE COMPANY

The Gramophone company, which was established in 1898 acquired the famous 'dog and trumpet' trade mark in 1899, Fig. 43 W. B. Owen the Managing Director of the Company bought the painting after the artist Francis Varraud agreed to substitute a gramophone for the original phonograph. Fig 42.

The main reason for the company gaining prestige and a position of leadership in the European talking machine industry was due to its ambitious recording policy. One by one the greatest stars of the operatic world, including Chaliapin Caruso Tamagno, Melba Fig. 44 Sarah Bernhard Fig.45 were persuaded to record. This helped to convince the man in the street that the gramophone was a musical instrument and not a toy.

In 1900 seven different models were available called styles No 2 to 7 and De Luxe Style No 2 Fig.46 was hand driven and sold for 22s 0d. Style No 5 was the 'trademark model' at 51s 0d Fig.43 There followed a family of Monarch Instruments comprising the Monarch (1901) Fig.47 Junior Monarch (1902) Fig.48 Senior Monarch (1905) Fig. 49 and Intermediate Monarch P(1908), Fig. 50

A most important technical development came in 1903 when the tone arm was introduced. Before this the horn was connected directly to the soundbox by a leather elbow and was carried across the record as it rotated. Now the horn could be directed as desired and the needle point



FIG. 42

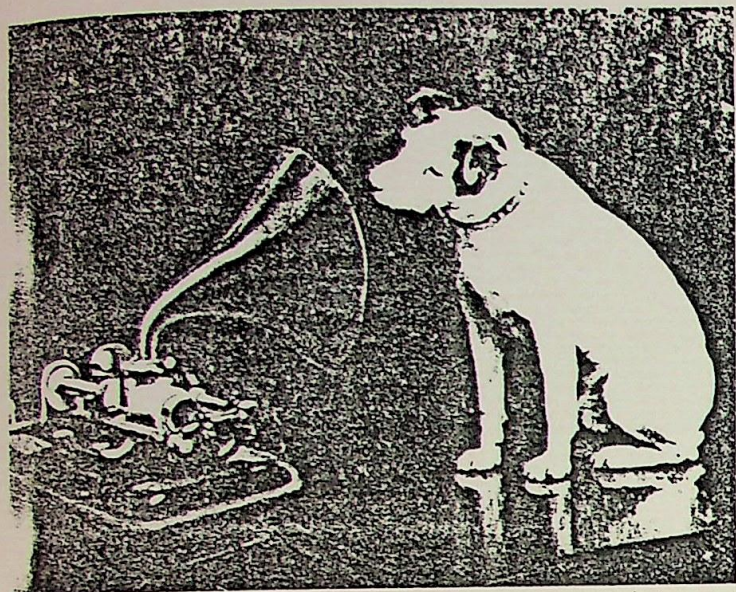


FIG. 43

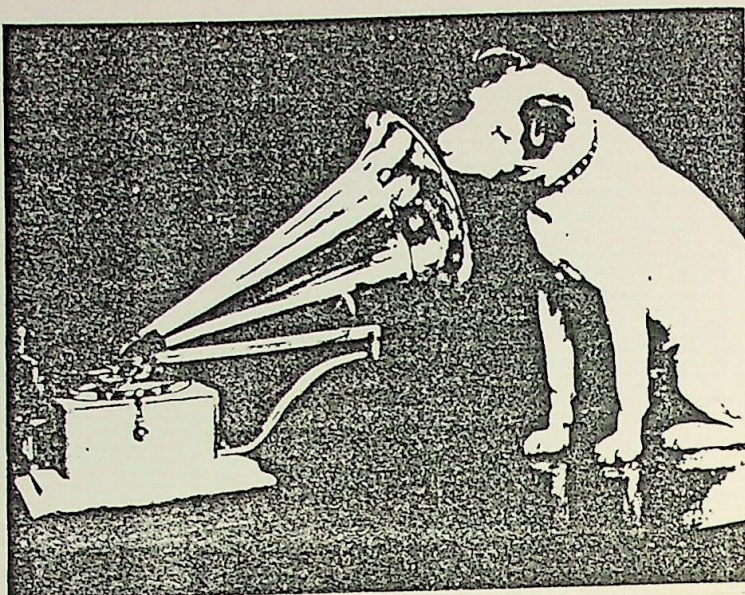
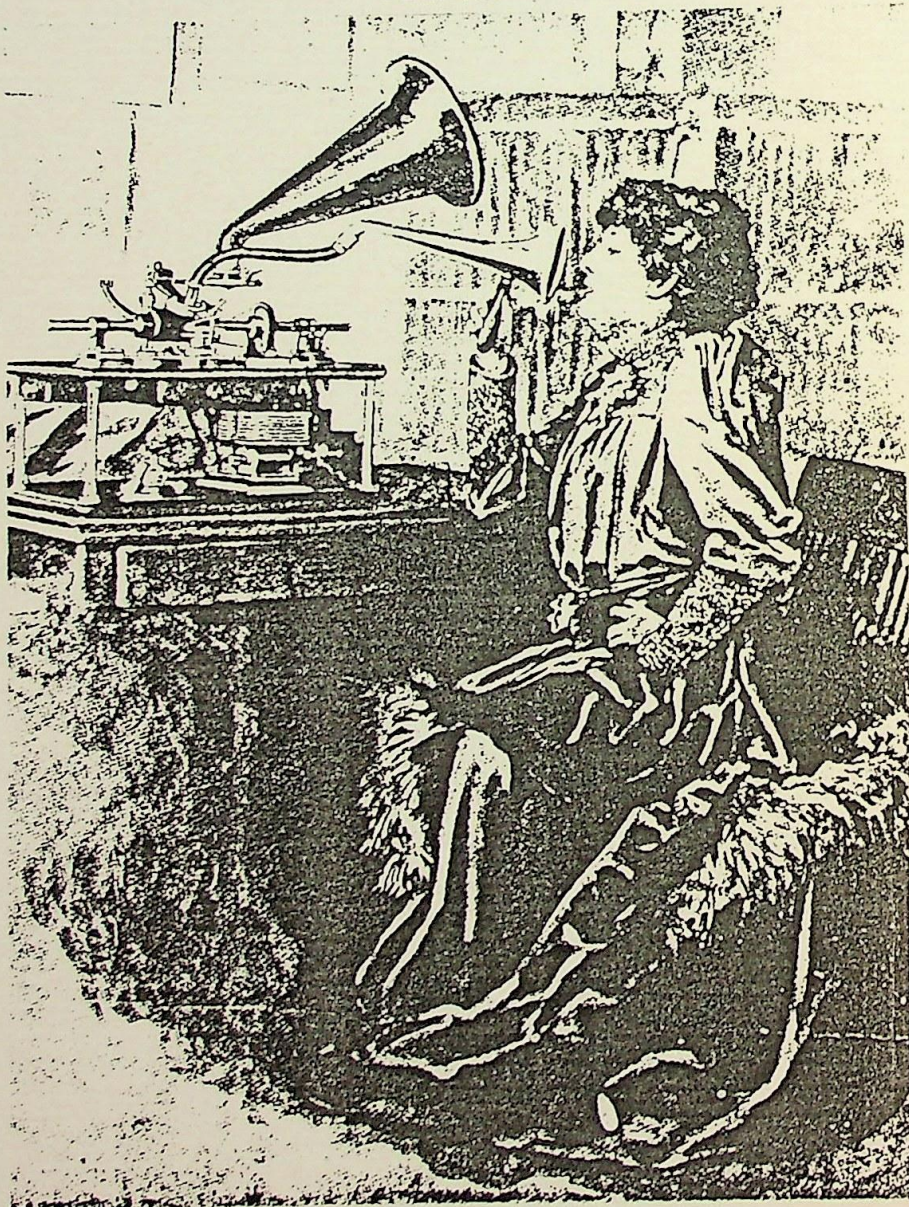


FIG. 44



FIG. 45



The Gramophone Co.  
I am very pleased with my latest records. Your wonderful  
Gramophone improves year by year.

*Helmi Melba*



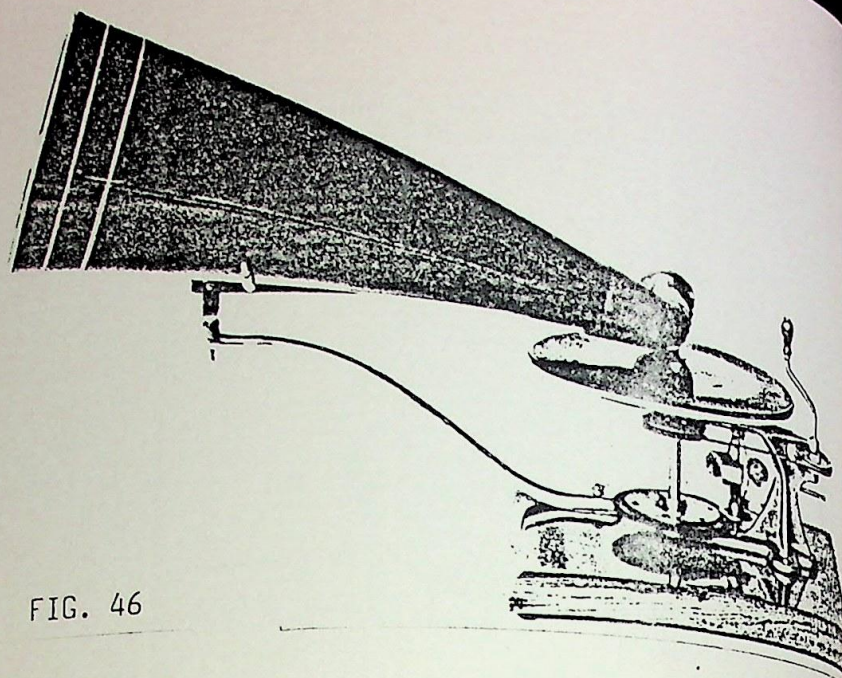


FIG. 46

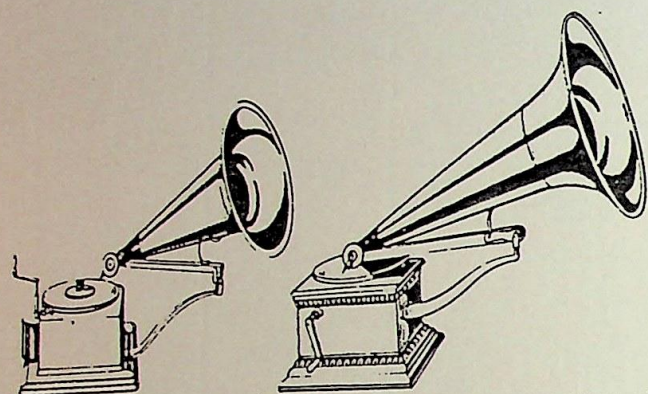


FIG. 47

FIG. 48

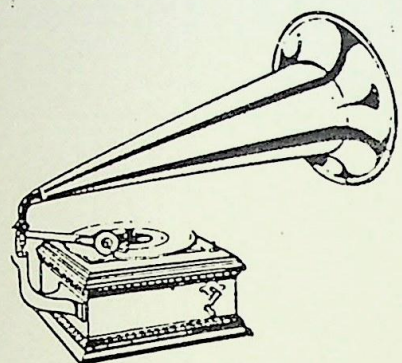


FIG. 49

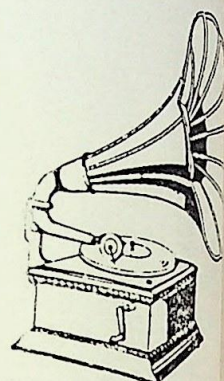


FIG. 50

FIG. 51

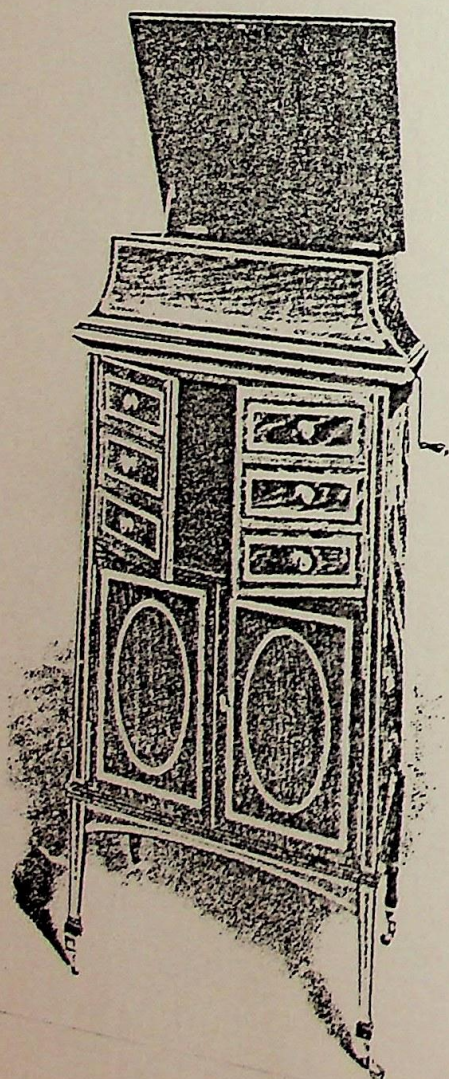


FIG. 52

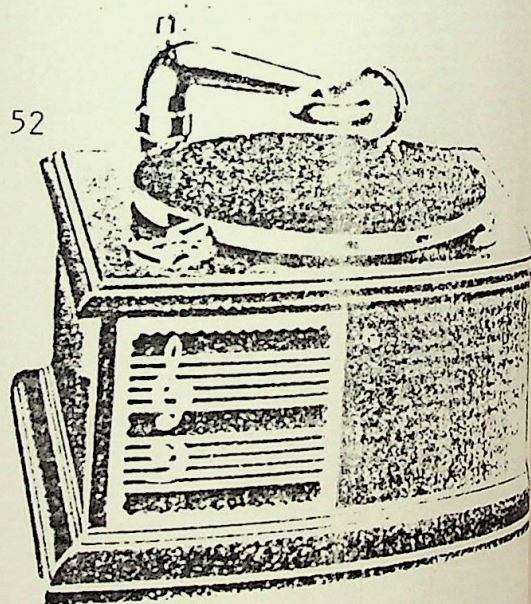
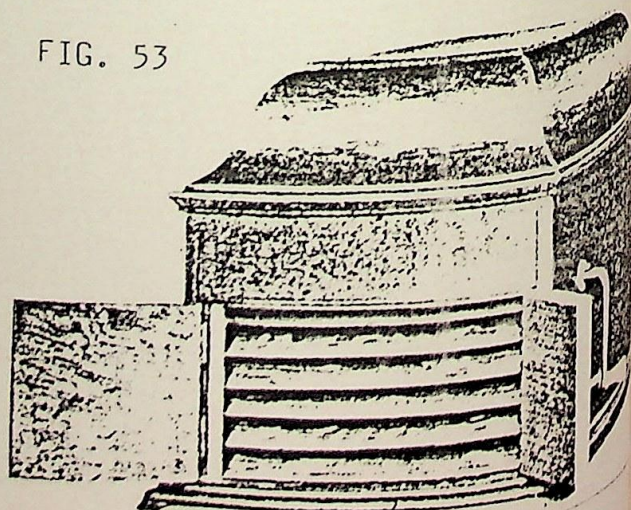


FIG. 53



pressure was reduced. At first the tone arm was of uniform diameter but then it was tapered to improve reproduction.

The straight 'trumpet' which had given a somewhat ludicrous appearance to the early machines was now replaced by flower shaped horns. The drawing-room triumph of the flower horn was, however, shortlived. The introduction of the tone arm also meant that the horn could be concealed, making the gramophone more easily transported and less dominating in the most exclusive drawing room. The Gramophone Grand Fig. 51 of 1907, with a waste high cabinet in which the turntable was concealed by a lid and the horn beneath it by doors, achieved this object and also supplied, below the horn a space for the storage of records. The gramophone is now well on the road to becoming a possession to be proud of, one which fits into the home atmosphere unlike the earlier models. In 1909 the Gramophone company launched the first 'hornless' model Fig. 52 The Pigmy Grand. In 1910 the First table grand, Fig. 53 appeared. This was the predecessor of portable models which were the only significant additions before the advent of electrical reproduction.

#### THE COLUMBIA PHONOGRAPH COMPANY

Between 1896 and 1910 at least 40 different models of Columbia cylinder instruments were manufactured in the United States. Of the Instruments imported in 1900, the cheap baseboard models, designed for the mass market, were the type Q, Fig. 54, and the Eagle B, Fig. 55. In addition there were two models with the motor enclosed in



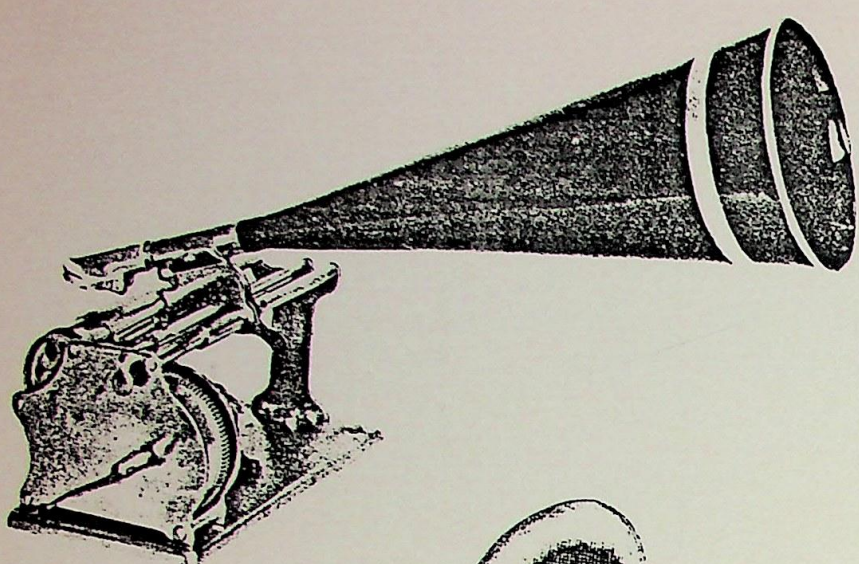


FIG. 54

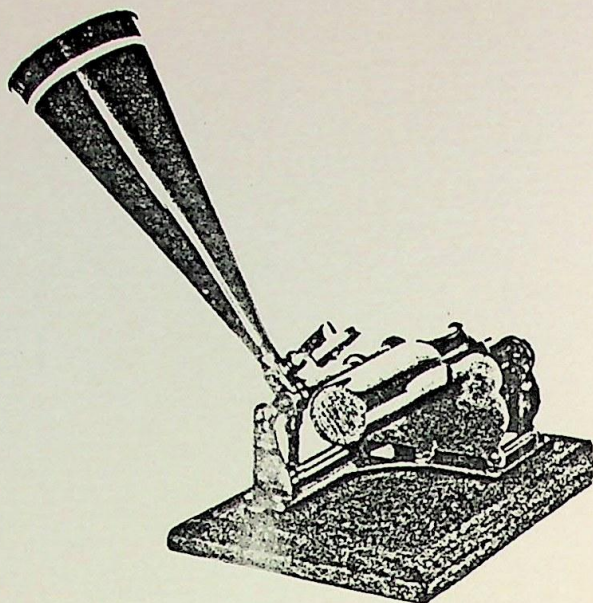


FIG. 55

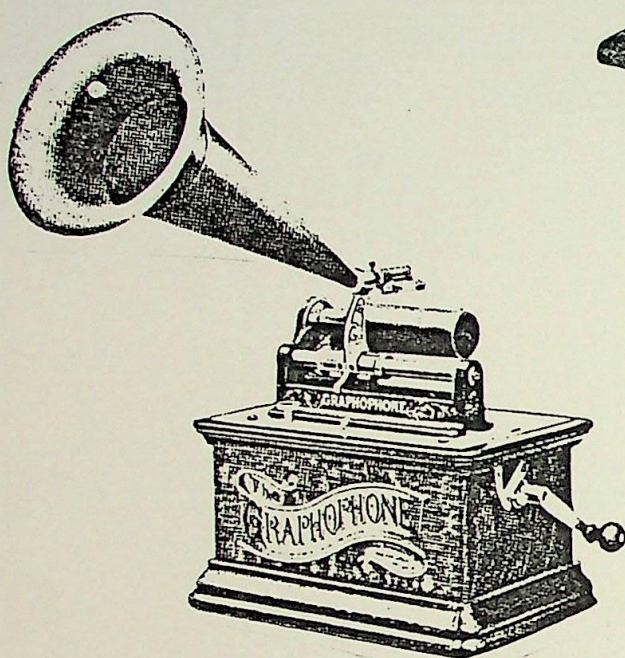


FIG. 56

FIG. 57

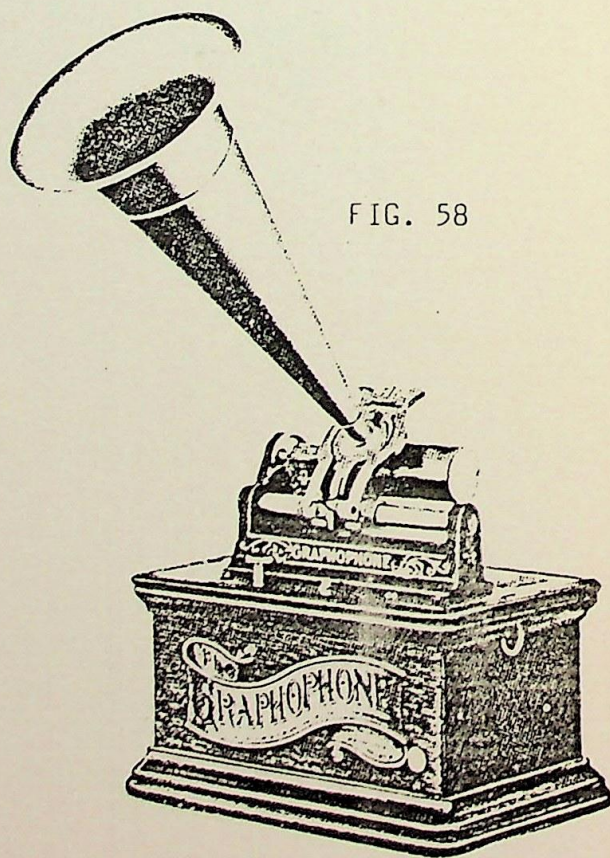
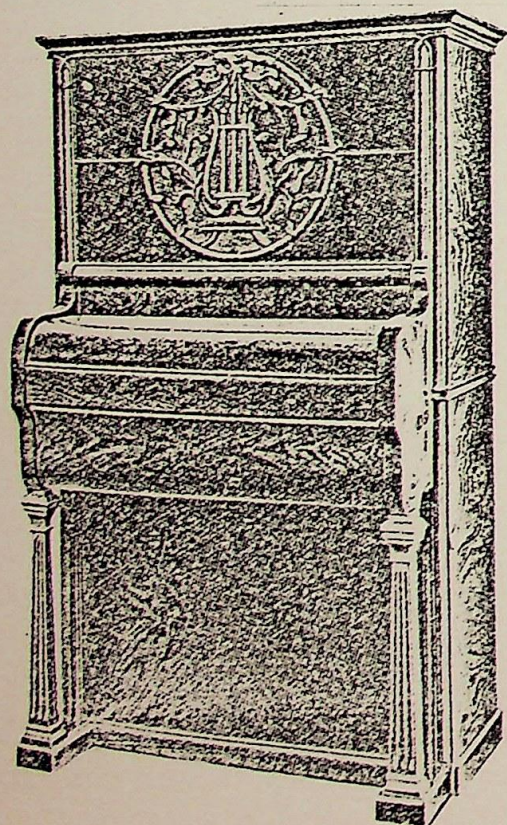
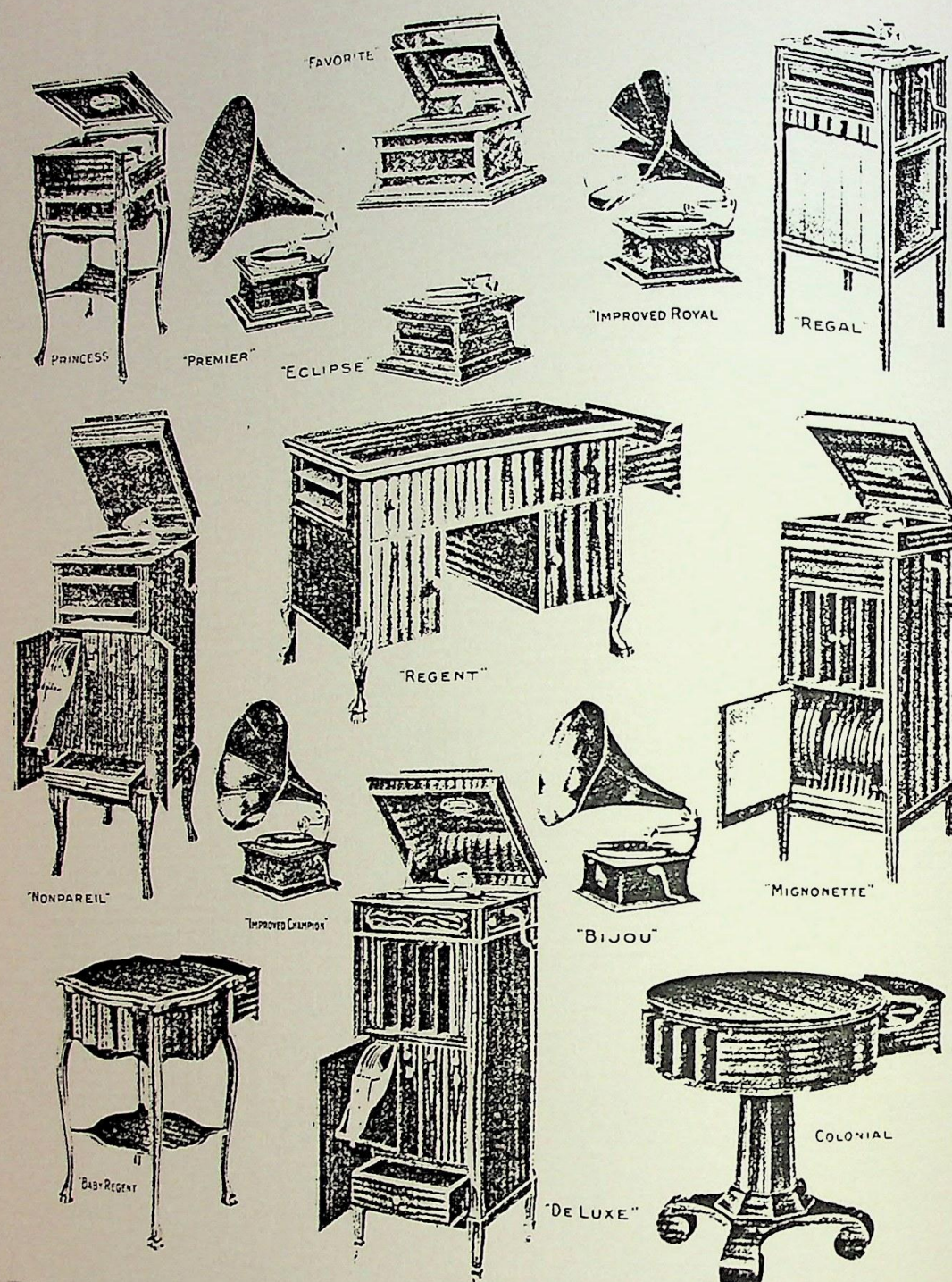


FIG. 58



FIG. 59



a wooden cabinet, namely the Columbia (AT) Fig. 56 for standard size records. The 1904 AZ type, Fig. 57, was distinguished by a lyre-shaped reproducer called the lyric, in which the stylus was held on contact with the record by means of a spring.

In its employment of the freedom of styling resulting from the introduction of the concealed horn Columbia at first took up a position intermediate between the restraint of the Victor and Gramophone Company designers and the extremism of certain European firms. While ready, and indeed anxious to let a talking machine disguise its true function they were not prepared to go so far as to make it look like an airship. The first concealed horn model, the Symphony Grand of 1907, Fig. 58 took the exterior form of an upright piano and in later catalogues certain talking machines masqueraded as Regency side tables and as executive desks, Fig. 59. In America these instruments were the harbingers of an era in which period styling ran riot and it was possible to pay over \$1,000 for a Columbia instrument, but wartime austerity prevented the perpetration of such excesses in Europe.

#### UNUSUAL TALKING MACHINES

Early talking machines were raucous but mercifully thin in tone. Cylindrical records had a celluloid surface, but Liomet patented a process in 1893 whereby this surface was temporarily softened by means of hot water to receive the recorded impressions. This meant greater amplitude than could be achieved with wax plus a diaphragm of considerable diameter made his instrument Fig. 60 audible in a large hall. In 1893 he pioneered the use of



FIG. 60

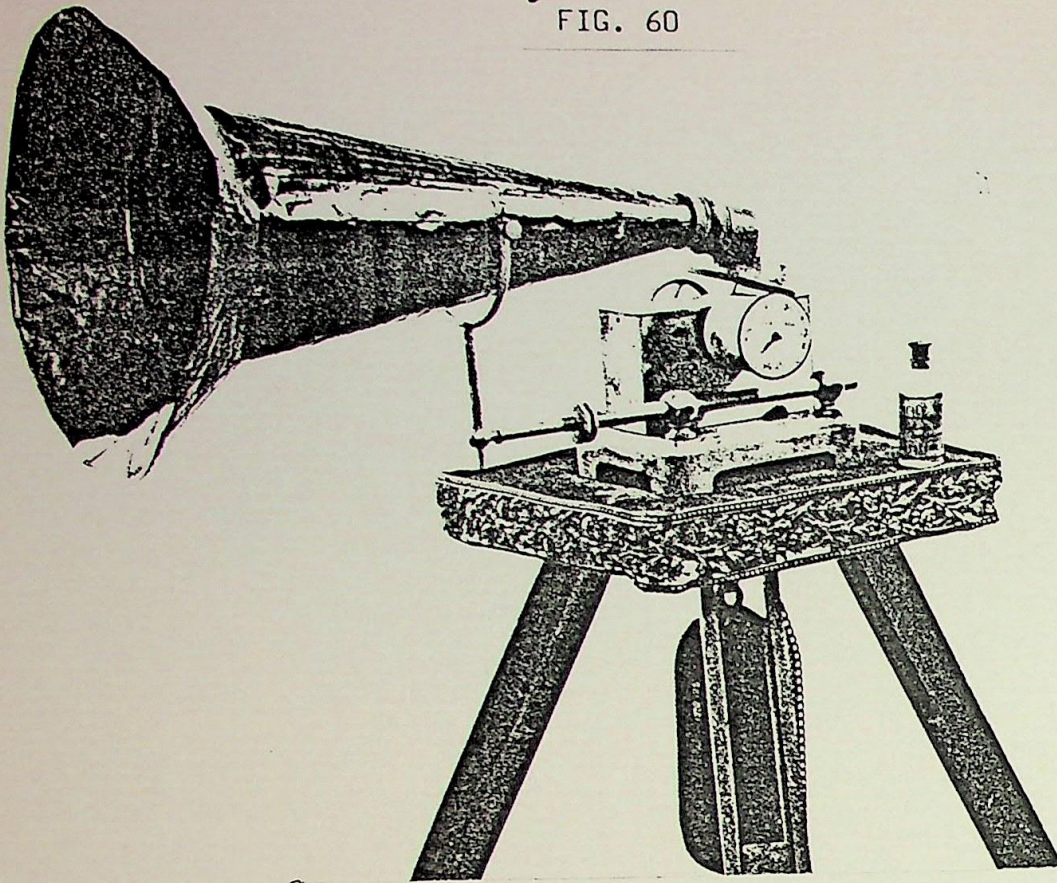


FIG. 61

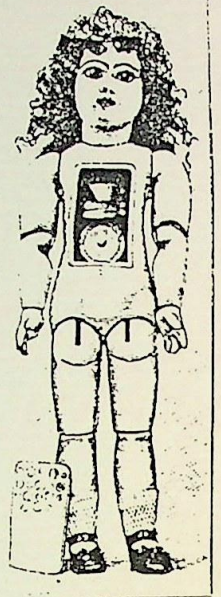


FIG. 62

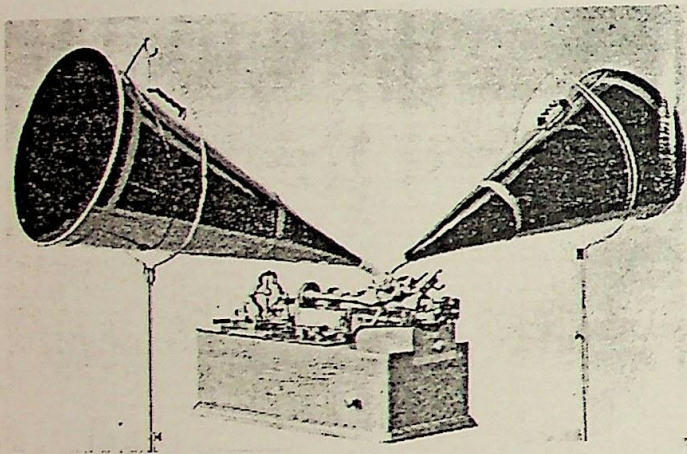


FIG. 63

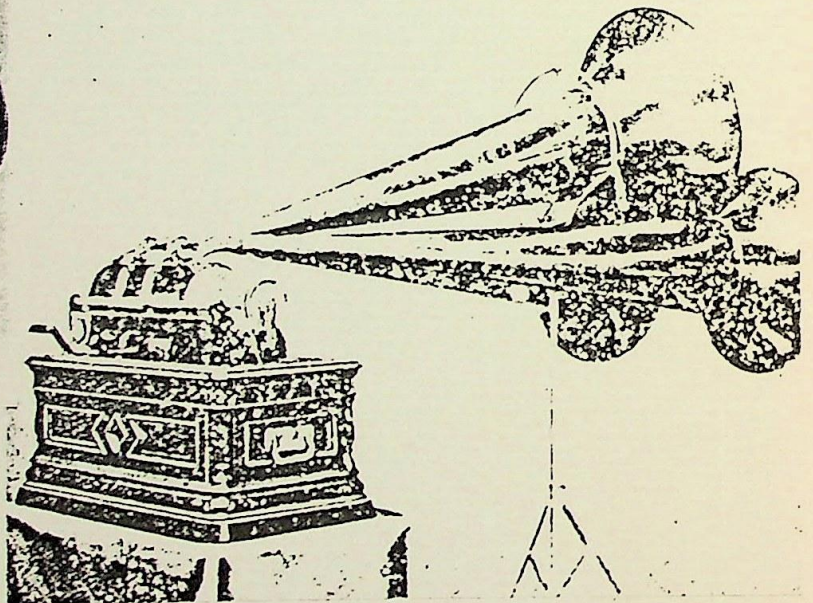


FIG. 64

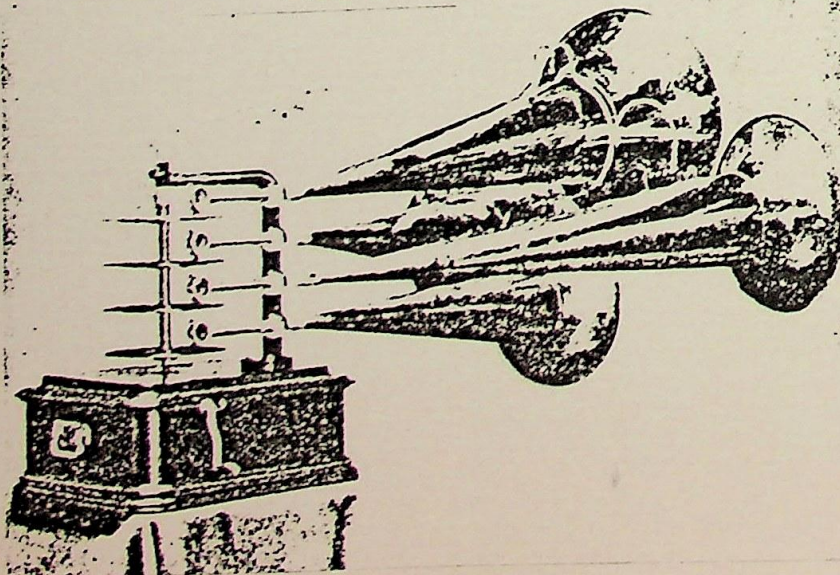




FIG. 65

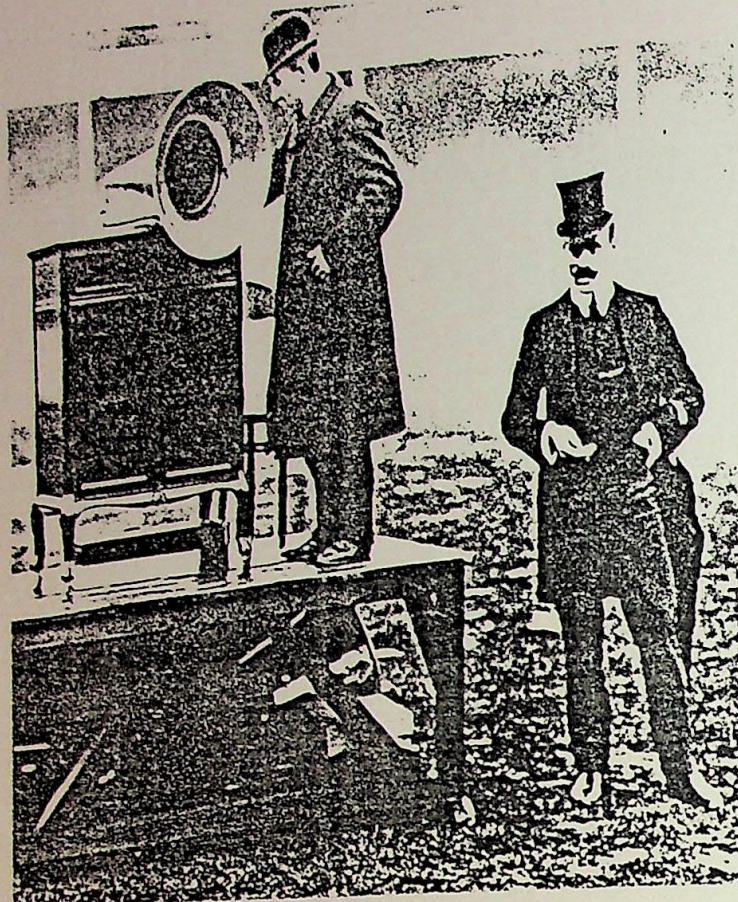


FIG. 66

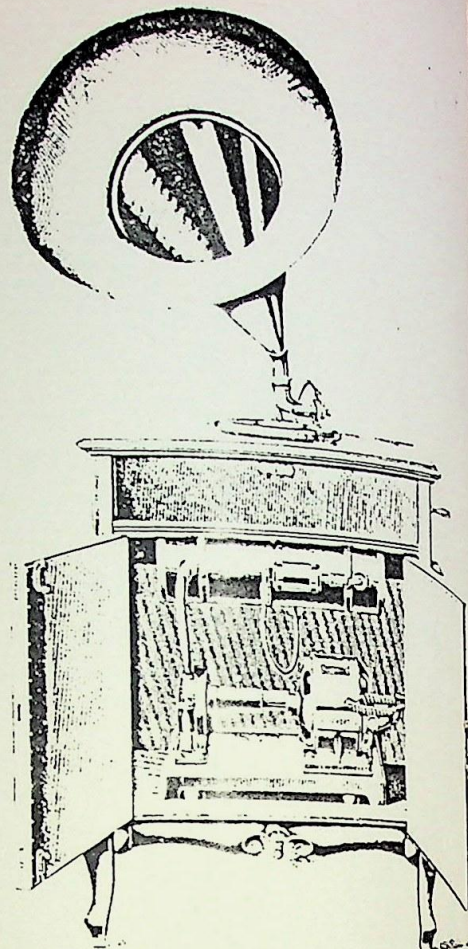


FIG. 67

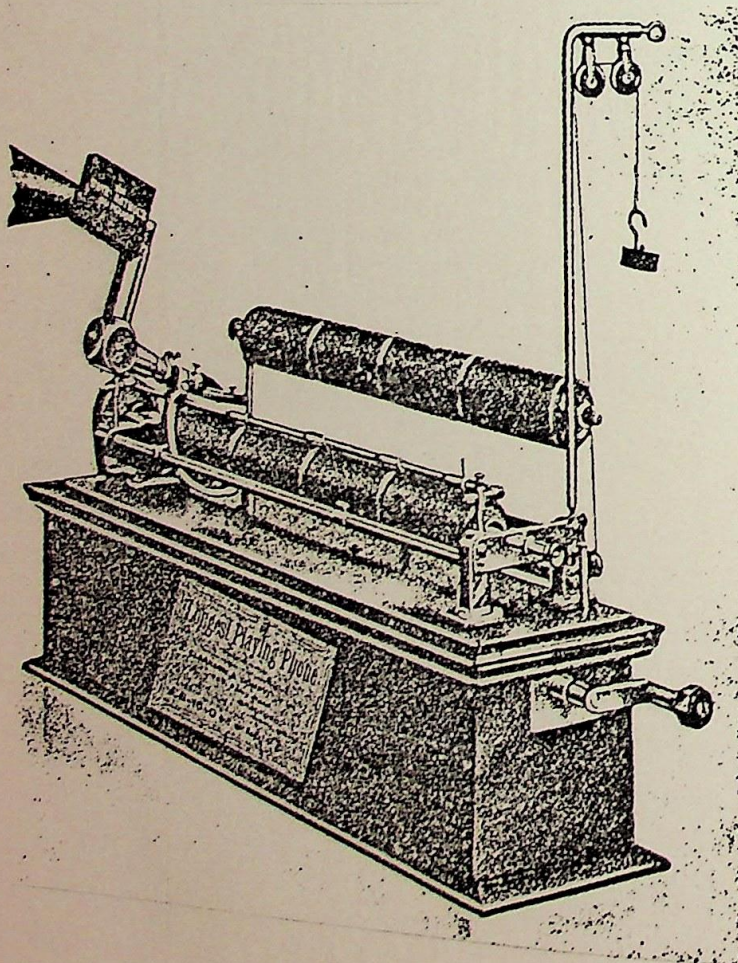
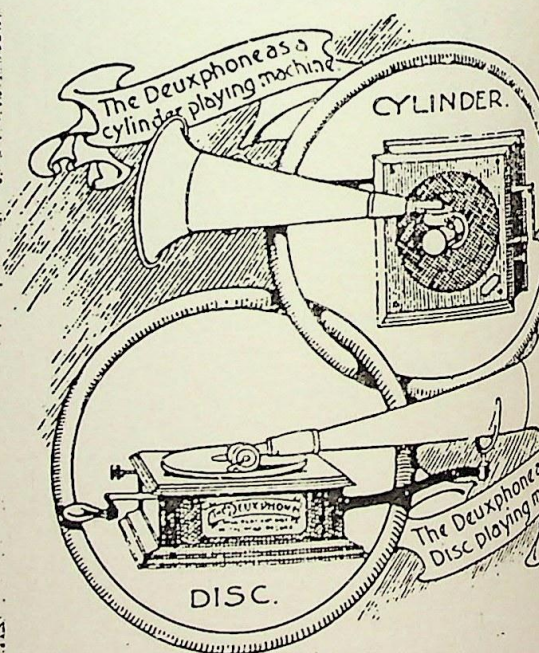


FIG. 68



a spring motor to drive a phonograph for use in a talking doll Fig. 61.

For a showman who wanted all the volume he could get, Edison produced in 1896 a duplex reproducer whereby two trumpets could be pointed in opposite directions by the exhibitor in a hall Fig. 62. The multiplication of horns went a stage further when in 1900, Columbia showed their multiplex Grand, Fig. 63 having three horns and soundboxes in parallel. It was possible to record three separate sound tracks on this cylinder, giving reproduction stereophonic properties but it is doubtful if this was the intention of the designer. Finally in 1904 Columbia produced a quadruple-disc Graphophone Fig. 64 having four turntables mounted on a single shaft, thus outdoing Victor's Triplephone which entertained an audience of 20,000 at the Crystal Palace in the same year.

A more sophisticated method of increasing volume developed was to allow the vibrations of the reproducing stylus to modulate the flow of air passing from a compressor into the horn. The Auxetophone Fig. 65 developed by Sir Charles Parsons and marketed by the Gramophone Company at £100 in 1906 was used to give concerts in the Albert Hall and other concert halls, public parks and at skating rinks, Fig. 65. A rival to the Auxetophone, using a similar principle, was introduced by Pathe in 1907 under the name Orphone, Fig. 66. German imitations adapted to coin-slot operation for restaurants entertainment, quickly followed.

Every form of motive power was employed to work the compressor including hand pump, electric motor, falling weight, water motor, hot air, motor and even cylinder of carbon dioxide which raised some misgivings about the effect of this gas on the health and comfort of the unsuspecting audience.



FIG. 69



FIG. 70

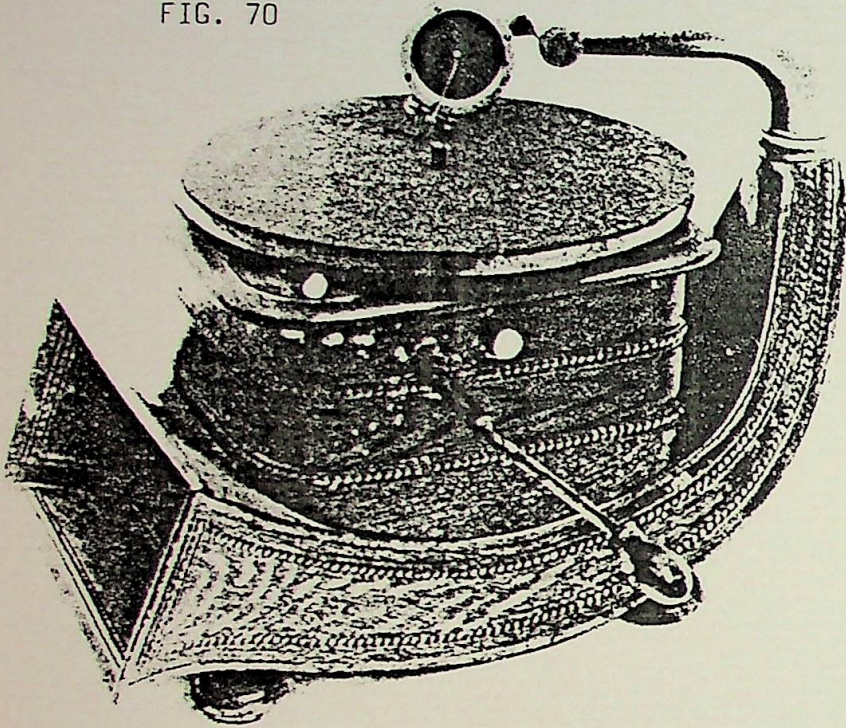


FIG. 71

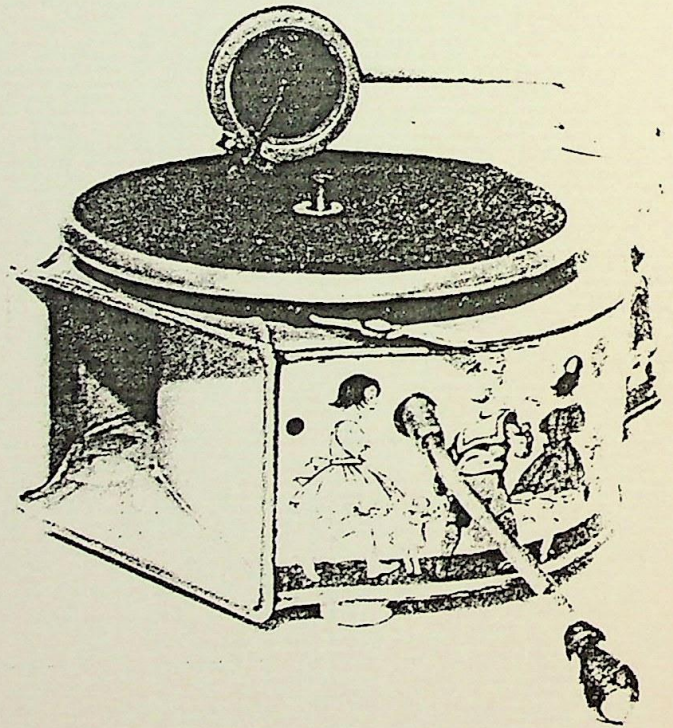


FIG. 72

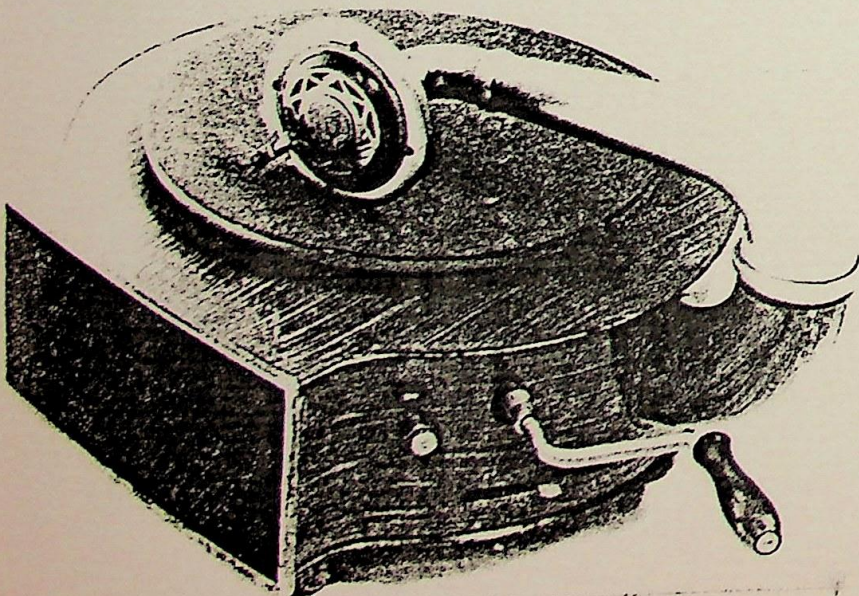




FIG. 73



FIG. 74





The most notable attempt to increase playing time for cylinders, the 1908 Edison 'Longest Playing Phone' Fig. 67 was a commercial failure. A similar failure surprisingly was the Deuxphone, Fig. 68 of 1905 which was capable of playing both cylinders and discs. A different type of long playing machine was the Apollo No 10 of 1910 which used a hot air motor and ran for 12 hours on one charge of methylated spirits. The Stollwerck gramophone of 1903 Fig. 69 playing a chocolate record which could ultimately be eaten by the purchaser, was clearly not meant to be taken seriously but it did have some quite appealing decorations and the overall shape was pleasing.

The Parlophone of 1913, Fig. 70 had a wooden motor board and the remainder of the case was metal, painted in imitation wood grain. The direction and amplification of the sound is apparent in this attractive sculptural design. Similar designs are shown in Figs. 71+72 but they are unfortunately of unidentified origin.

An announcement in the *Phonographische Zeitschrift* on 1st April 1910, stating that a French Firm was about to introduce a disc of about 3" diameter which was to play for 5 minutes using a hardened bee-sting as a reproducing stylus, was a satirical allusion by the editor to the many preposterous projects that wasted the time of the Patent Office staff during a period in which the development of the talking machine was unaccompanied by any scientific investigation of the basic principles.

But in 1914 the process in Europe of the industry of human happiness which Edison had founded was temporarily checked and many of its factories were converted for the production of human misery instead, Figs. 73 + 74.



## JAZZ IN CHIPPENDALE

Meanwhile in America something else was happening which was affecting record companies and their customers. The country had gone dance crazy overnight Fig 75 . Victor and Columbia promptly took advantage of the countrywide disposition to shuffle about on a dance floor. From 1913 Tangos, One-Steps, Hesitation Waltzes, Bostons and Turkey Trots came spewing forth from the record presses. Victor engaged Vernon and Irene Castle, Fig.76 the nation's ultimate arbiters of ballroom dancing, to supervise the making of all Victor dance records. The dance mania stimulated the record business as nothing else ever had. Despite depressed business conditions in the country as a whole, the talking machine industry in 1914 prospered handsomely.

In 1912 there had been only three manufacturers in the business - Victor, Columbia and Edison. In 1914 six new companies arrived; 1915 saw eighteen more; and in 1916 there were forty six. The dance craze had started the spectacular climb of the phonograph economy, and it was accelerated by a general upturn in business conditions when the country as a whole began to prosper from the effects of a great war in Europe.

Salesmanship centered in cabinetry and styling. With the rising tide of prosperity in 1915 came a demand for high priced phonographs. Victor's, Victrola Fig.77 and Edison's Amberola consoles, which at \$200 had represented the height of pre-war phonographic elegance, were now left far behind. They seemed to be boring and dated in comparison to the expensively veneered Victrola-type instruments now selling at around \$1,000. "Period design" because the new trend of the industry and manufacturers were being abetted





FIG. 75

FIG. 76



FIG. 77

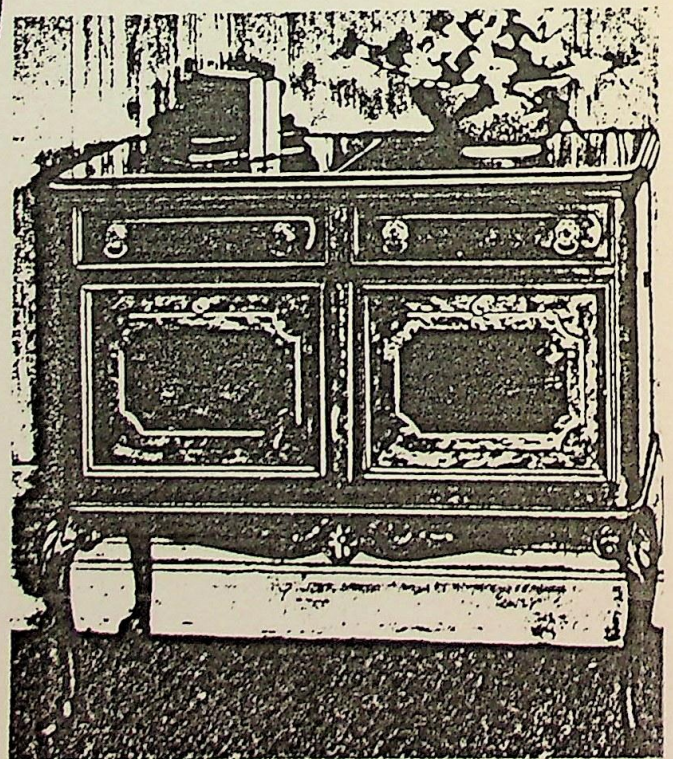




FIG. 78

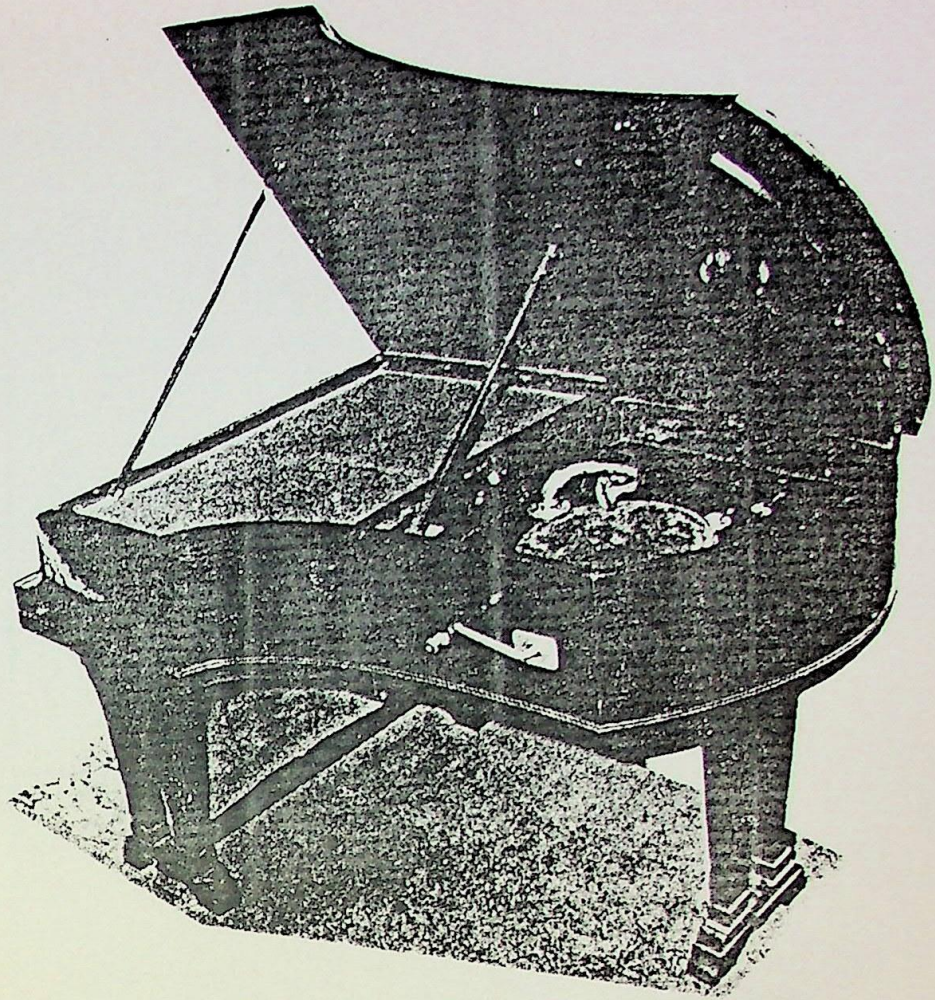


FIG. 79

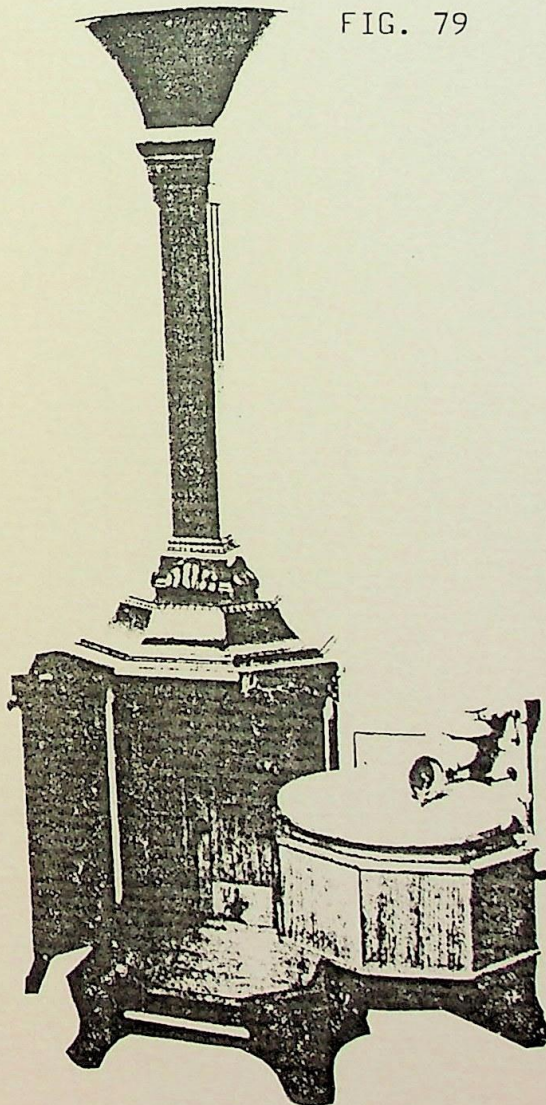
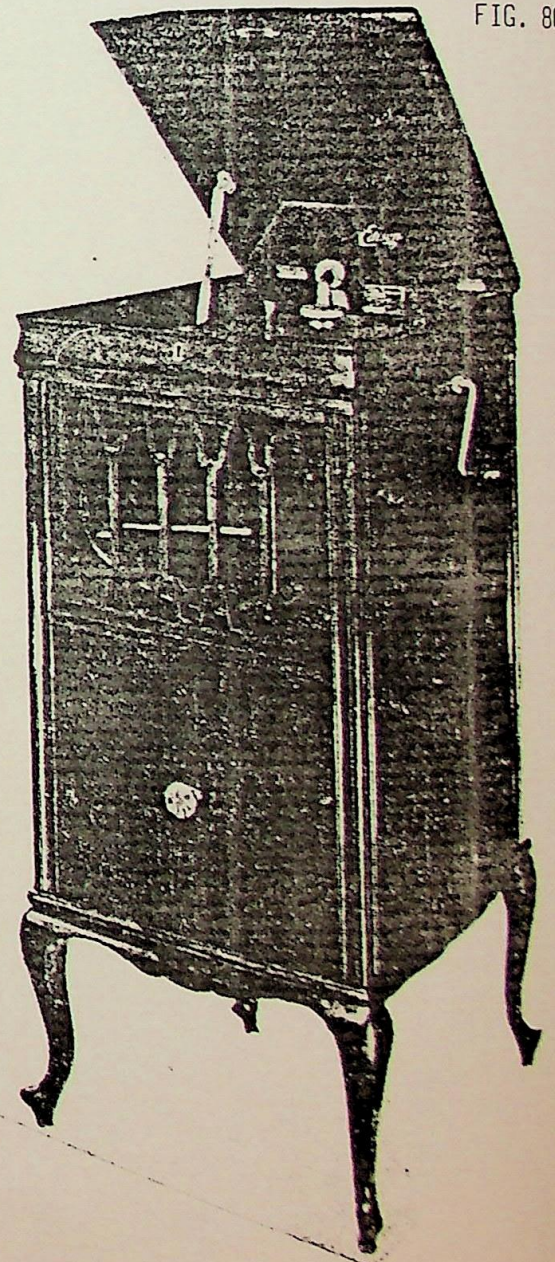


FIG. 80





by glossy home decoration magazines such as Country Life carrying articles like "The Phonograph as a Decorative Element in the Home".

The outward appearance of the phonograph had been neglected until now. The purchaser as well as the makers were now beginning to realise that they were not dealing with an article of the calibre of a furnace. It was being looked at as a decorative object to fit into a room scheme. For inspiration the designers turned to the period styles of their forebearers; the attitude was phonographs should look as little like phonographs as possible. Fig. 78.

Columbia was quick to capitalise on the trend. Fig 79 . Its catalogue of period phonographs ran from massive Gothic chests to dainty Hepplewhite tables with large flat tops, half of which remained permanently shut " so that a vase of flowers or a book rack may be placed on it and need not be removed when you wish to operate the Grafonola". Among Columbia's gems was the "Donatello", a gawky piece of furniture five feet high and two feet wide on which were painted four panels ("with their colouring toned down as if by the passage of three centuries") showing symbolic figures representing intelligence, justice, temperance, and peace. For this reproduction of "fifteenth century Italian art at its imperishable best" Columbia demanded a mere \$535. If you were really in a spending mood, Columbia suggested the "Queen Anne No 5" at \$1,075, which with its Chinese Chippendale Lacquer Finish offered "a superb example of the exquisite work of the patient oriental". Even Victor had ornamental flourishes grafted onto its standard models and billed them as "Louis XVI Victrolas".

The great wartime phonograph book came along just in time



to accelerate the fortunes of Edison's new Disc Phonograph which had his usual high standard of construction to make these instruments superior acoustically to any competing talking machine. Edison was not reticent about revealing this fact, and to drive it home he inaugurated his famous Edison Tone-Test Recitals. A hall would be rented and on the appropriate night an Edison artist would appear with an Edison phonograph. There ensued a series of comparisons with appropriate commentary by an Edison representative. The artist would sing a song and then the same piece would be played on the phonograph. The object of this was to prove that "the Edison Diamond Disc's recreation of music cannot be distinguished from the original". Apparently it convinced a lot of people, for sales of Edison merchandise rose steadily through the country.

The Edison disc Phonograph Fig. 80 were not cheap. Ordinary console models sold for \$200, while the period cabinets went for \$800 and up. Edison believed that his machine should make its chief appeal to "people of cultured and elegant tastes". Once again he set out to capture the market for high class music.

#### THE FLATTENED VICTROLA

In 1919 customers had fallen all over themselves buying phonographs and jamming into shops in a sellers market where demand far exceeded supply. At the end of 1919 the industry's balance sheets were wonderful to behold. The trade papers were optimistic that all sales records would be broken in 1920. Unfortunately it did not work out that way at all. The Columbia Company, in anticipation of



mammoth sales had ordered thousands of cabinets from twenty-one wood-working factories scattered throughout the country; but instead of mammoth sales, there was a mammoth inventory. This marked the beginning of the end of a company dating back to 1889.

To the overproduction of 1920 was added the business depression of 1921. Columbia's ledgers looked grimmer than ever. In a desperate bid to regain solvency, Columbia sold its British branch in December 1922 and three months later its Dictaphone branch, but it was too late for this to help. In October 1923 the company went into receivership.

Victor on the other hand had started off the critical years with a backlog of unfilled orders amounting to millions of dollars, and it sailed smoothly on. In the face of industry wide depressions, it thrived as never before. But Victor was living on its reputation for quality merchandise and they were using the same old formula that had been so lucrative for twenty years. But there comes a time when a formula outlives its appeal. The Victrola with the squat hinged lid was becoming demode. Public fancy had switched to period cabinets and broad flat tops, from thousands of Victor dealers came pleadings for flat-top Victrola.

For years Victor had resisted the flat-top, they did not want it to imitate anything. In 1922, however, they capitulated when flat-topped Victrolas were made available. But they were flat-tops with a difference, for right in the middle of the cabinet was a familiar looking object - the raised Victrola lid covering the phonograph mechanism. It was promptly nicknamed "the humpback" and customers took a derisive view of it. Victor found its inventory of unsalable instruments growing steadily larger.



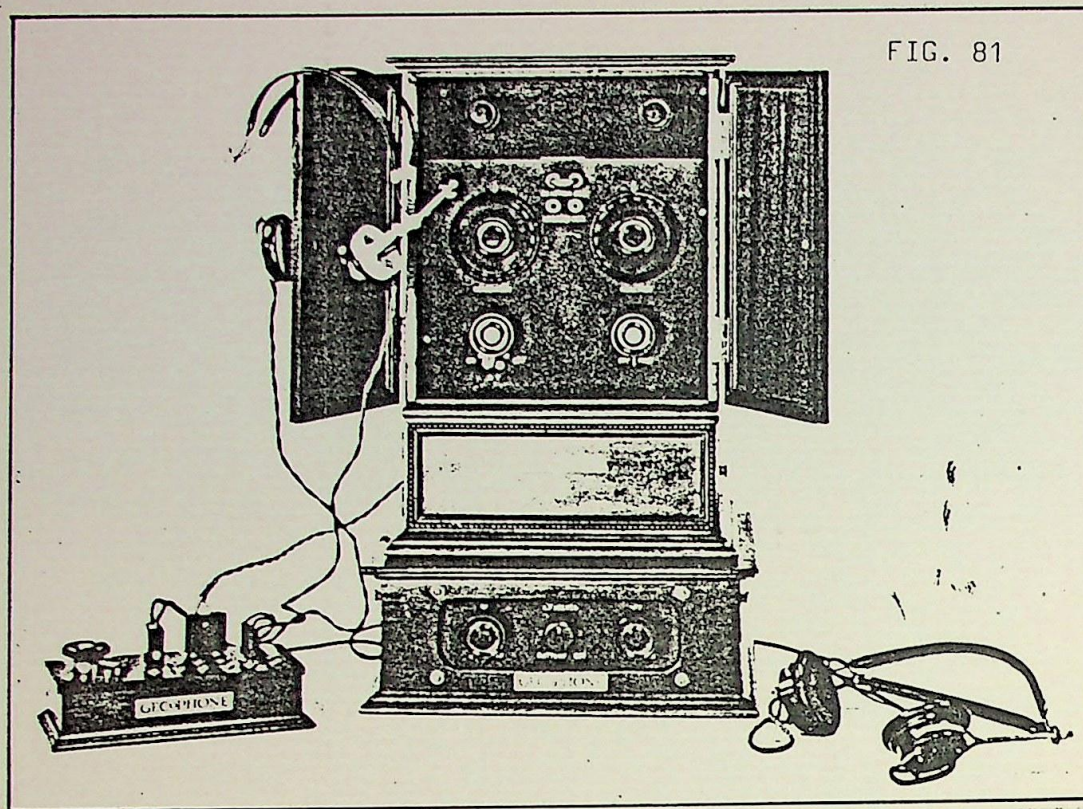


FIG. 82

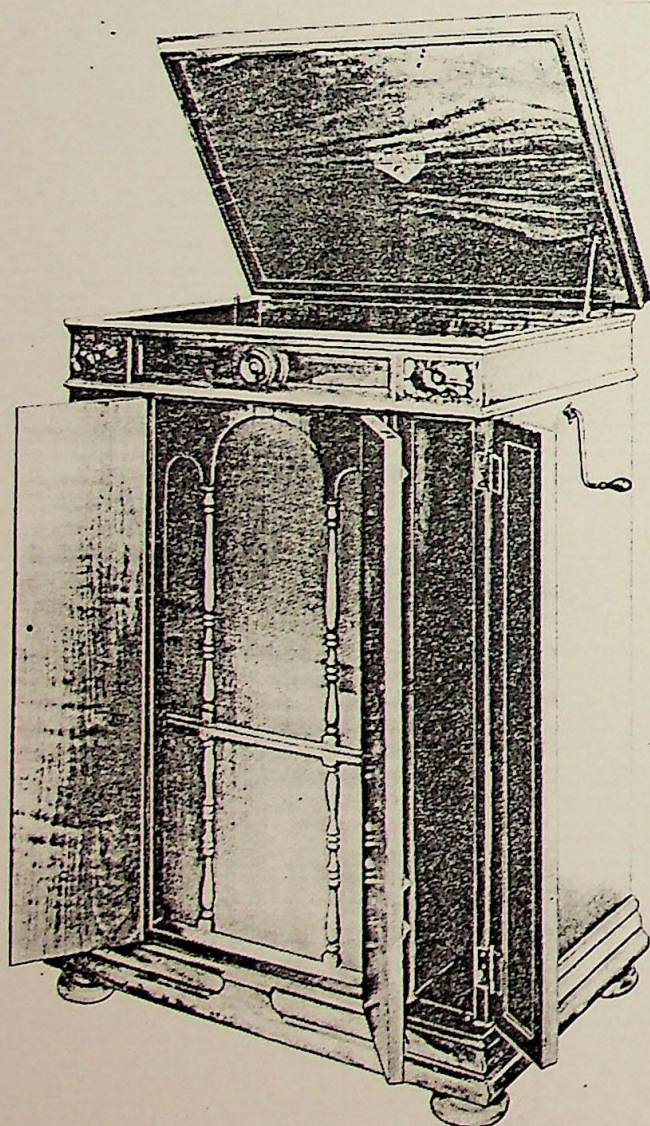


FIG. 83

POPULAR WIRELESS WEEKLY, PUBLISHED BY THE W. & A. PUBLISHING CO. (SEE PAGE 1).

No. 27. FREE ADVICE FOR THE BEGINNER

# POPULAR WIRELESS

3d Weekly

A RADIO TEA.

SPECIAL FEATURE IN THIS ISSUE:

## THE ORIGIN OF THE FLEMING VALVE

By Dr. J. A. Fleming, F.R.S.

THE FASCINATING STORY OF THE INVENTION OF THE THERMIONIC VALVE, SPECIALLY WRITTEN FOR "POPULAR WIRELESS" BY THE GREAT INVENTOR.







The record business, fortunately remained in fairly good condition. This prosperity was largely attributed to jazz, a form of music by then in full flower.

But a new menace was now at hand. The radio boom got under way in 1922 Fig. 87 Minor phonograph companies jumped onto the band wagon and began building combination phonograph radios. A year later Sonora followed suit with its combination sonoradio, and in March 1924 the Brunswick company, by arrangement with the Radio Corporation of America (RCA) installed the popular Radiola in Brunswick Phonographs RCA was at the forefront of a mushrooming industry and people began to say the phonograph was doomed. Also in 1924 Victor brought out a new line of Victrolas Fig. 82 this time with a genuine flat top: the famous Victrola lid had finally be flattened out, but also an empty compartment in which a customer could install any radio receiver of their choice.

Victor was being stubborn as usual, they refused to believe radio was a substitute for the phonograph or even a competitor, Fig. 83 but for all the inadequacies of its amplifier, the radio in 1924 gave a quality of sound reproduction the phonograph could not even approach Fig. 84 Although they did not know it, the mechanical phonograph and acoustically recorded discs were ready for the history books.

#### RECORDING BECOMES ELECTRIC

Electrical recording has been a matter of speculation for a long time. It was only during World War 1 that research brought forth the first workable microphones and



amplifiers. Thereafter, the practical realisation of electrical recording was open to anyone who cared to work on it. It's surprising it took so long.

In America the initiative was assumed by Bell Telephone Laboratories Joseph P. Maxfield and Henry C. Harrison Fig 85 in 1919. For the first time in its history the phonograph was subjected to thorough scientific scrutiny and discipline. Specifications for an electromagnetic recording head and an improved acoustical phonograph to play electrical recordings were developed. Thus was born on the drawing board the exponential-horn phonograph Fig. 86 later known as the Orthophonic Victrola. Early in 1924 the specifications had been completed and a prototype constructed. The improvements in the sound were an increase in the frequency range which meant better bass and treble response the "atmosphere" surrounding music in the concert could now be simulated, and finally records were louder and at the same time free from blast.

In February 1925 Bell Laboratories put on a demonstration of electrical recording for Victor. They were impressed and they accepted an offer of use of the electrical recording on a royalty basis. Columbia also signed up around the same time. Between them they agreed to keep the development under wraps until they were ready for the launch.

Production in Victor's Factories halted while the entire plant was retooled for an entirely new kind of instrument. Victor had also bought manufacturing rights to the exponential-horn phonograph and reached an agreement with RCA allowing for the incorporation of Radiolas into the new line of Victrolas. Victor dealers were alerted to expect something wonderful in November 1925 and urged to clear out stocks of old style Victrolas. Then began the biggest advertising campaign in Victor history. A deluge



FIG. 85

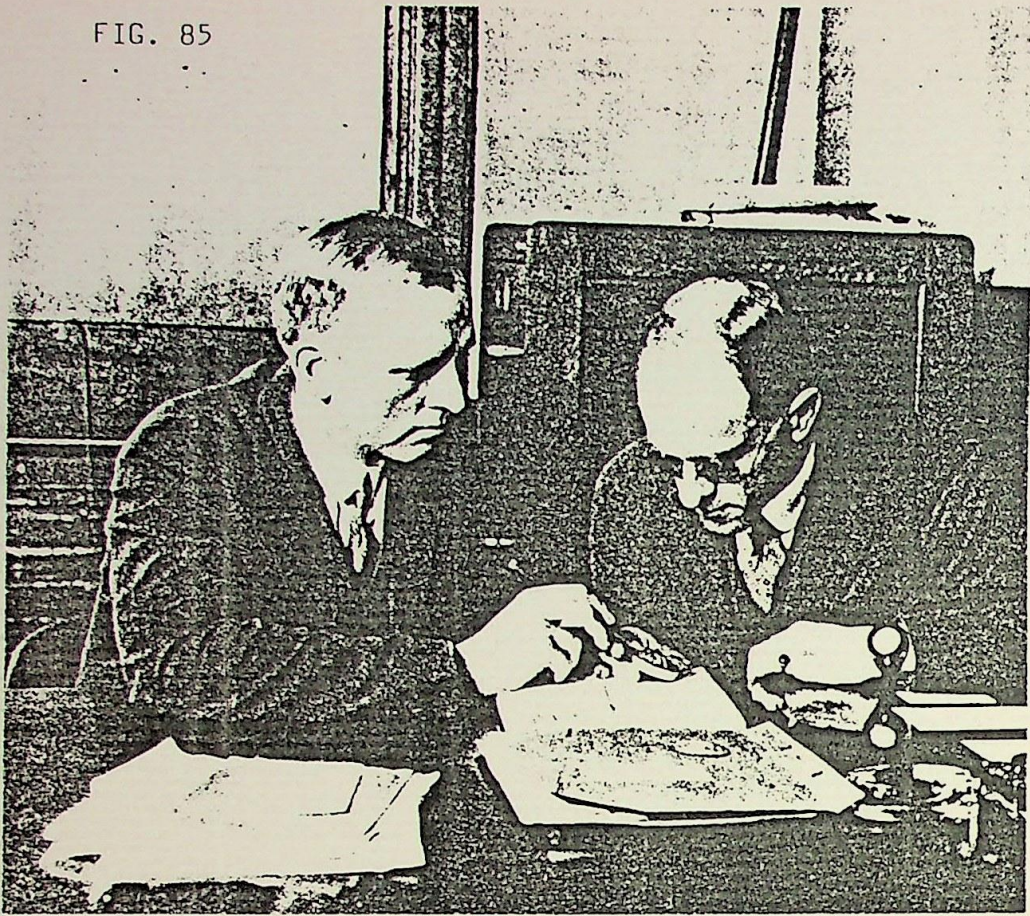


FIG. 86

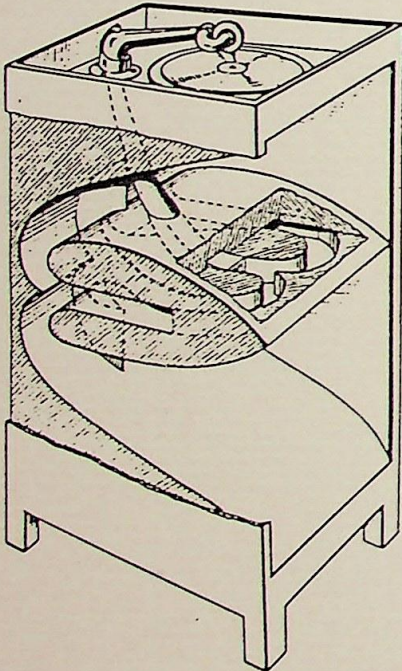
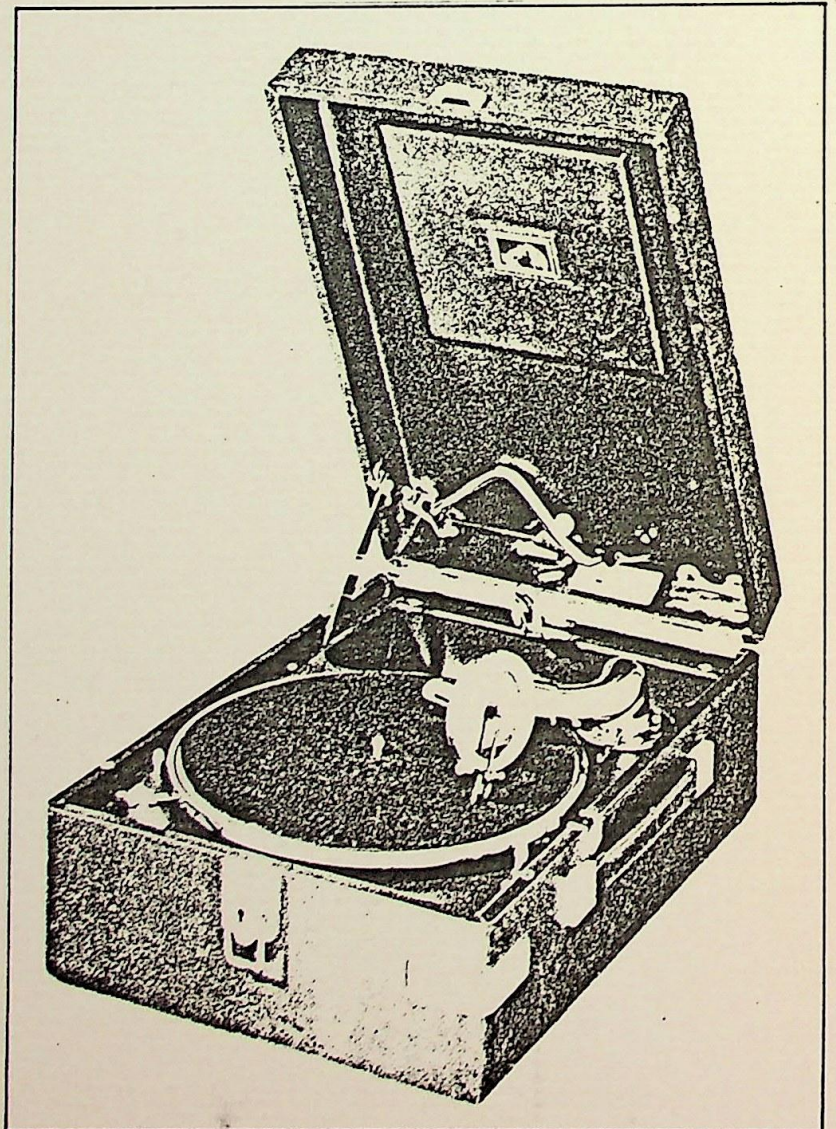


FIG. 87





of advertising informed America of the miracle that Victor dealers were preparing to demonstrate "a musical instrument which in performance and in construction is unlike, and vastly superior to anything the world has ever known". Approximately \$6,000,000 was spent by Victor that year in promoting their new line of Victrolas. It represented a last-ditch gamble by this ailing company. But the gamble paid off. America flocked to the dealers on the day of the unveiling, the 2nd November dubbed Victor Day and began buying the Orthophonic Victrola Fig. 86. Within a week the Victor company had pocketed orders for \$20,000,000 worth of instruments.

So unfolded the events that revolutionised and reanimated the phonograph and record industry during the crucial year of 1925. Fig. 87 shows a HMV 102. From the mid 1920's, when the technology of the gramophone had become familiar, a standard type of payout had become widely accepted. In the case, the gramophone is disposed in a cabinet rather like a suitcase. This arrangement continued until the later 1950's when the hi-fi boom and the new technology it entailed made new shapes and new dispositions of components necessary.

#### THE PHONOGRAPH IN TWILIGHT

Record companies the world over had converted to the new methods. Simply by introducing a microphone into the recording studio Bell Laboratories had set loose a hurricane of activity such as the phonograph had never seen. Fig. 88 Symphonies, operas, masses and oratorios were inscribed wholesale on wax, rushed to the factory, and showered on an avid public. News stars in the



FIG. 88

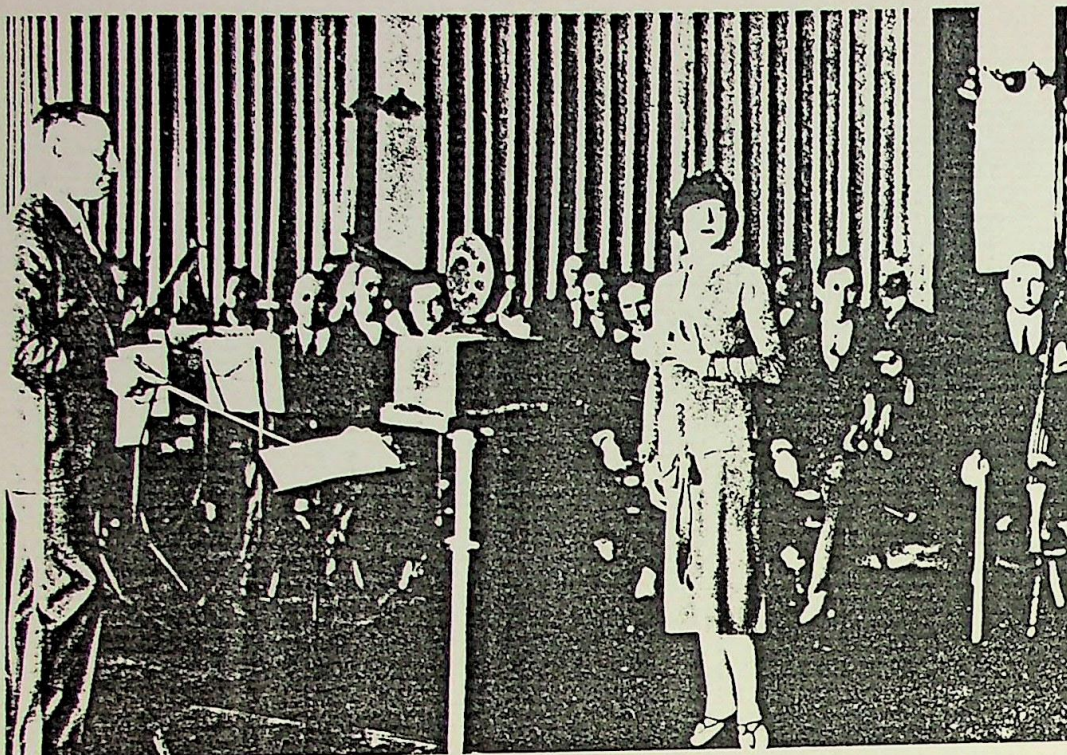


FIG. 89





FIG. 90

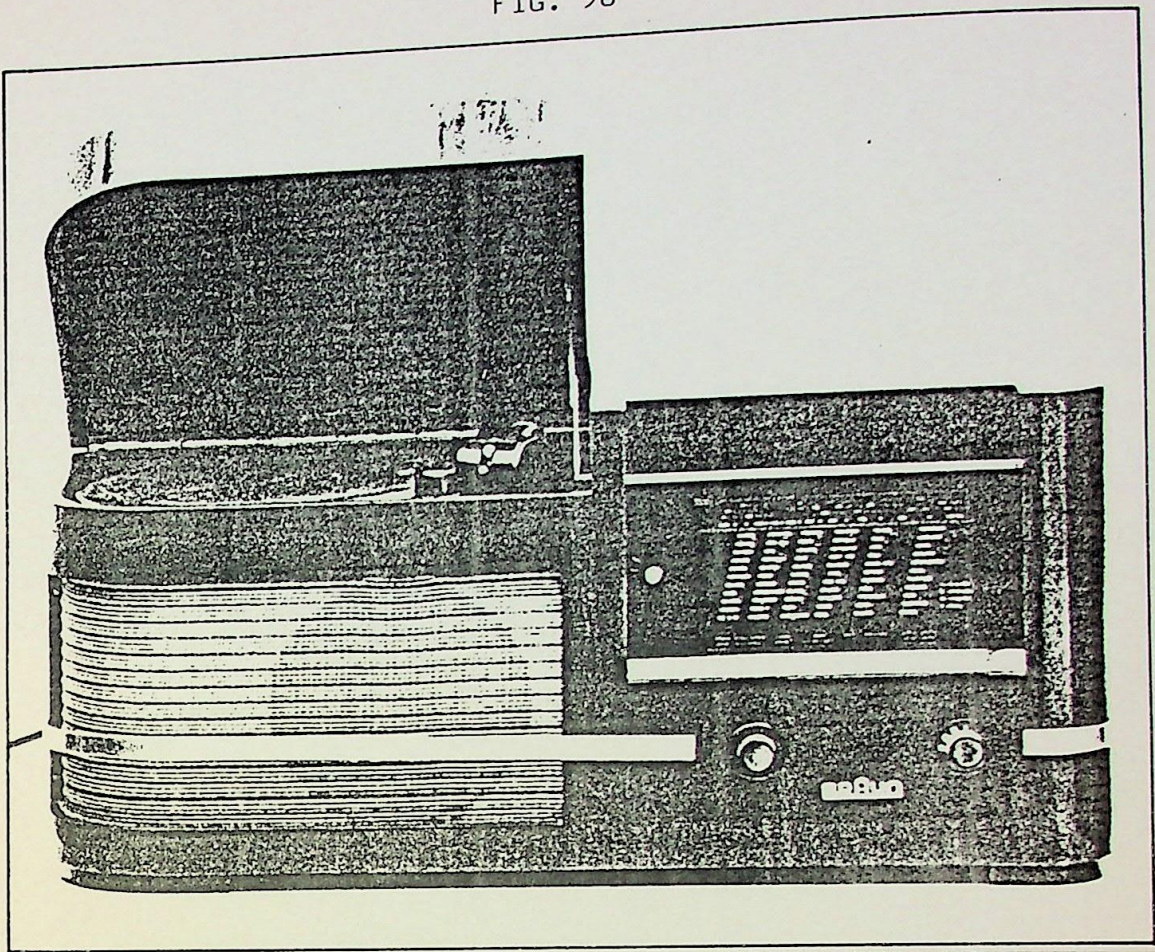
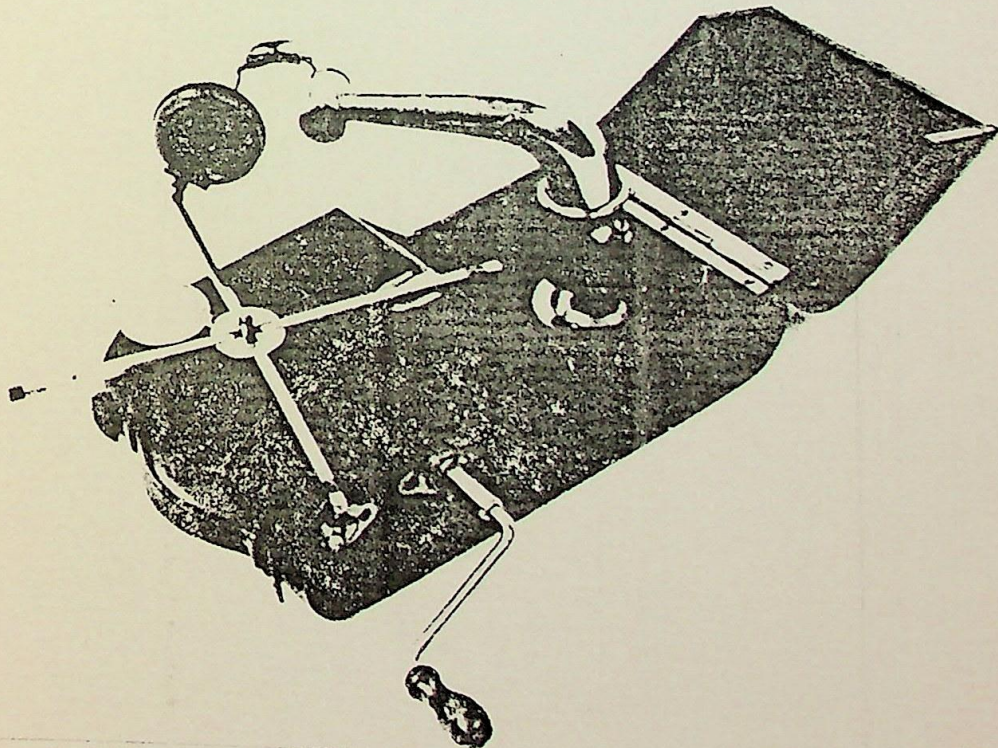


FIG. 92





phonographic firmament were quick to make their mark: Stokowski, Fig. 89 , Beecham, Weinfartner and Szigeti became the idols of a new generation, and their latest records were received as eagerly as Caruso's had been two decades earlier. It was, in truth, a real revolution and, like all revolutions, it began with unbounded energy and crusading zeal. Such momentum, however, could not be sustained indefinitely. A reaction was sure to set in, and it started, justifiably enough, where the revolution had originated in the United States.

Victor's most expensive model the Borgia 11 at \$1,000 introduced in 1926 became a best seller. It was a stately piece of furniture that housed an eight-tube superheterodyne Radiola and and Electrola, Victor's all electric record player. The company's rate of production was the biggest in its history. At this time Eldridge Johnson, the founder of the company, was approached by two banking houses, Spreyer & Co and J & W Seligman with an offer to buy the company outright. The near-debacle of 1924-25, his own fluctuating health and the feeling of trouble ahead helped him to decide. On December 7 1926 after thirty years in the business he signed the agreement.

At the end of the first year without Johnson the company's net income was down slightly but not so much as to cause alarm. Almost a million phonographs were manufactured that year; it looked like the radio and the phonograph could prosper side by side after all. All the major companies were featuring radio-phonograph combinations Fig. 90 In January 1929 RCA the makers of the radiola, and Seligman and Speyer signed an agreement for a merger. Under its terms RCA acquired all outstanding Victor Stock. The Victor Talking Machine Company thereafter sank into anonymity. But RCA had no real interest in the



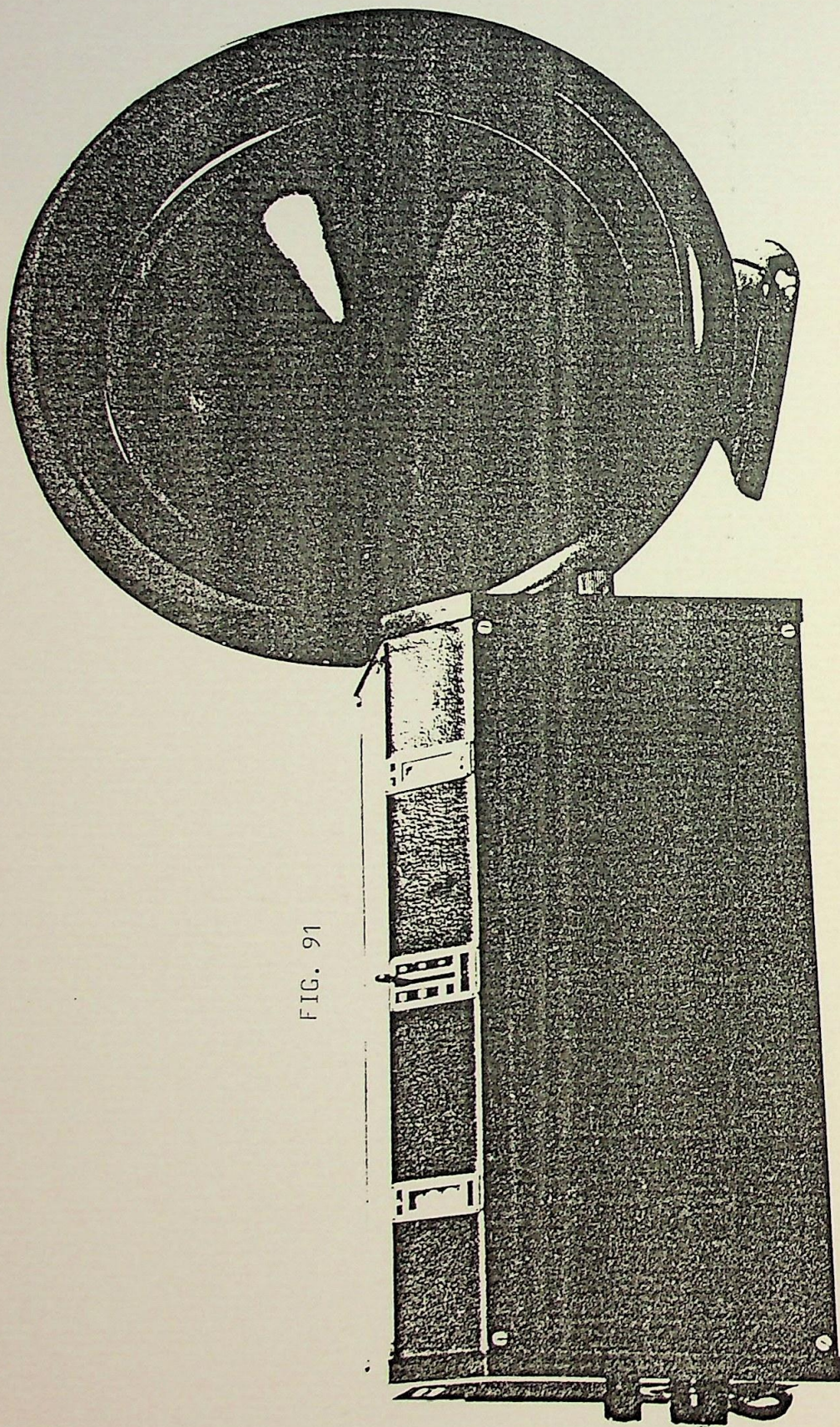


FIG. 91



talking machine, they were essentially interested in an extensive plant and a well-organised system of distributors and dealers. Straight away the factories were adapted for the production of radio sets.

In October 1929 the stock market crashed and the phonograph and record business withered as if frozen in full bloom by a bitter arctic frost. A month later Thomas A. Edison, Inc. made it known that they were no longer going to manufacture phonographs or records. They concentrated on the production of radios and dictating machines instead. This marked the beginning of a general retrenchment and realignment in the phonograph business. It was definitely a depressing year for the phonograph, and it substantiated the belief held by high executives of RCA that the phonograph belonged to the past and radio to the future. The futuristic appearance of the Phillips 2514 radio Fig. 91 show that Phillips made a conscious effort to find a style appropriate to the new technology. Soon instead of Victrolas the assembly lines were now producing radios in all sizes and models, only a small percentage of which were equipped with record-playing mechanisms.

Despite all this the phonograph in American still showed a few signs of life. Columbia attempted to crash the radio market by introducing a portable record player that could be plugged into any radio set. It was called the radiograph Fig. 92. But Americans in the trough of the Depression could find better ways of spending \$55.

RCA Victor introduced a long-playing record in 1931. The advantages were being able to fit the longest movement of a symphony on one side. They played at 33 1/3rpm and had double the number of grooves per inch as the standard 78's. But the sound was bad, the special turntables



required were too expensive and the material used, Vitrolac, wore down very quickly, so it was not a success.

This only made the situation worse and during 1932 the Phonograph entered its worse period. Companies that once had occupied a respectable position in the business community were sold for whatever they would bring.

All business suffered at this time, but not as badly as the phonograph business. The American people had lost all respect for the phonograph and there was little reason to believe it would ever come back.

#### THE ROAD BACK

By January 1933 the record business in America was practically extinct. But it miraculously began to recover. Brunswick and RCA Victor both reported an upturn in record sales. Early in 1934 RCA Victor began advertising its phonograph records again. This new enthusiasm on RCA's behalf was brought about by the new head of Victor's record business, Edward Wallerstein.

Since 1930 the manufacture of phonographs in America had more or less come to a standstill, which meant that those that survived were obsolete. On the other hand twenty million Americans had one or more radio sets to which a record player could easily be hooked up. In September 1934 RCA Victor brought out the Duo Junior, Fig. 93 which consisted of electrically powered turntable and a magnetic pickup mounted in a tiny wooden box, and it only cost \$16.50. Its low price helped to overcome the national



FIG. 93

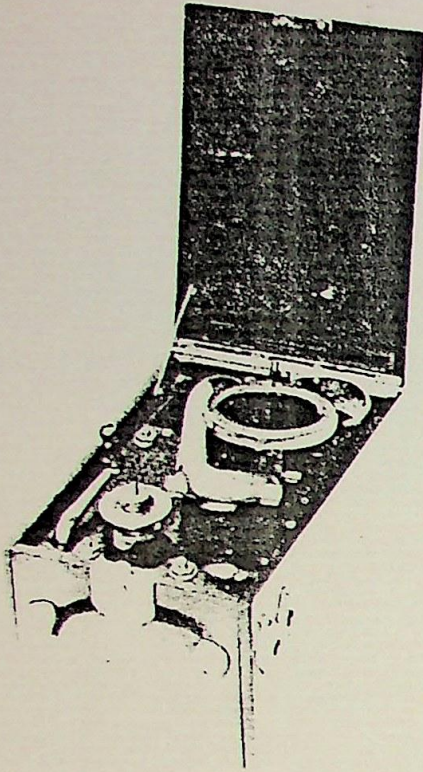


FIG. 94



FIG. 95

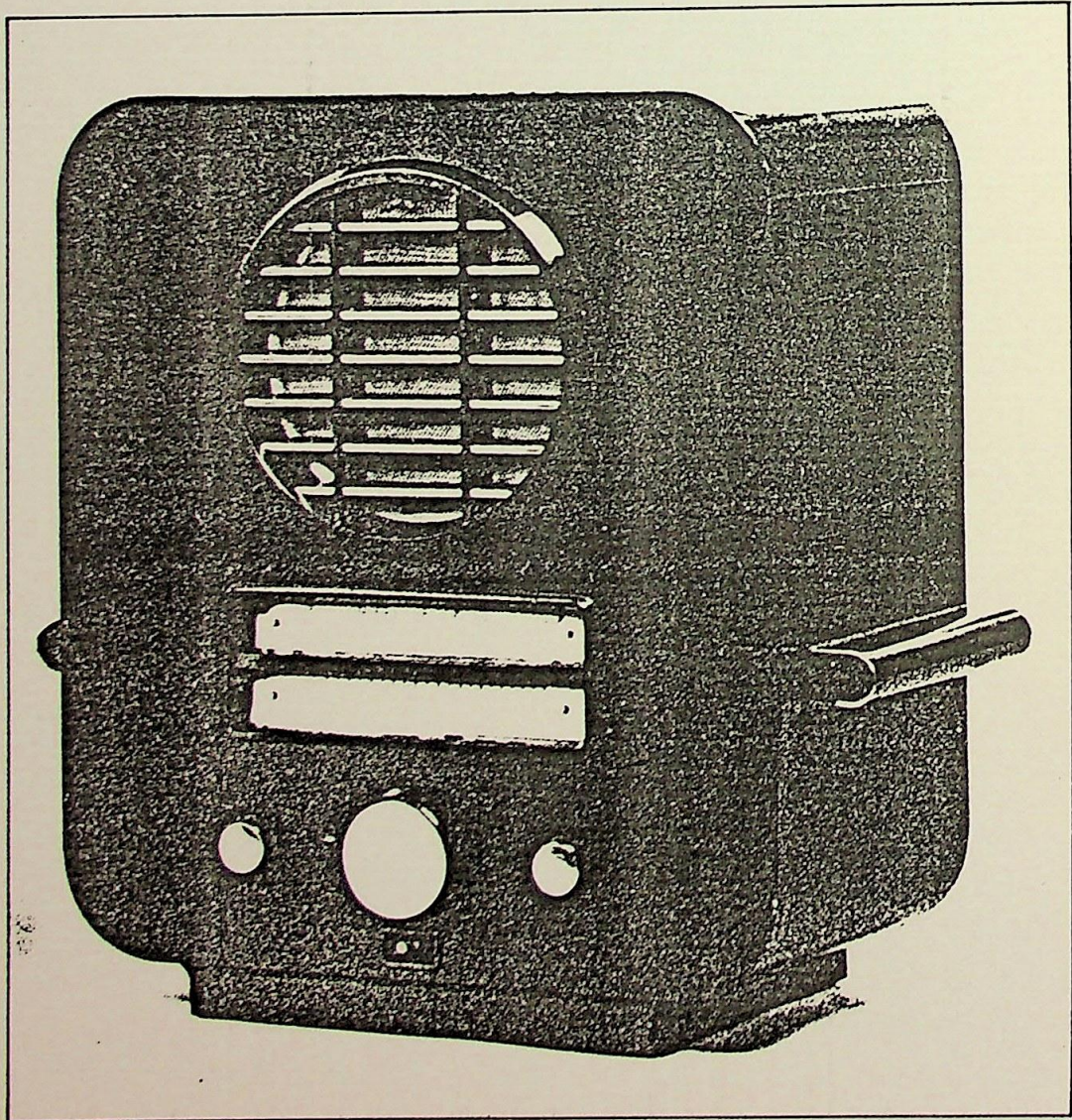




FIG. 96

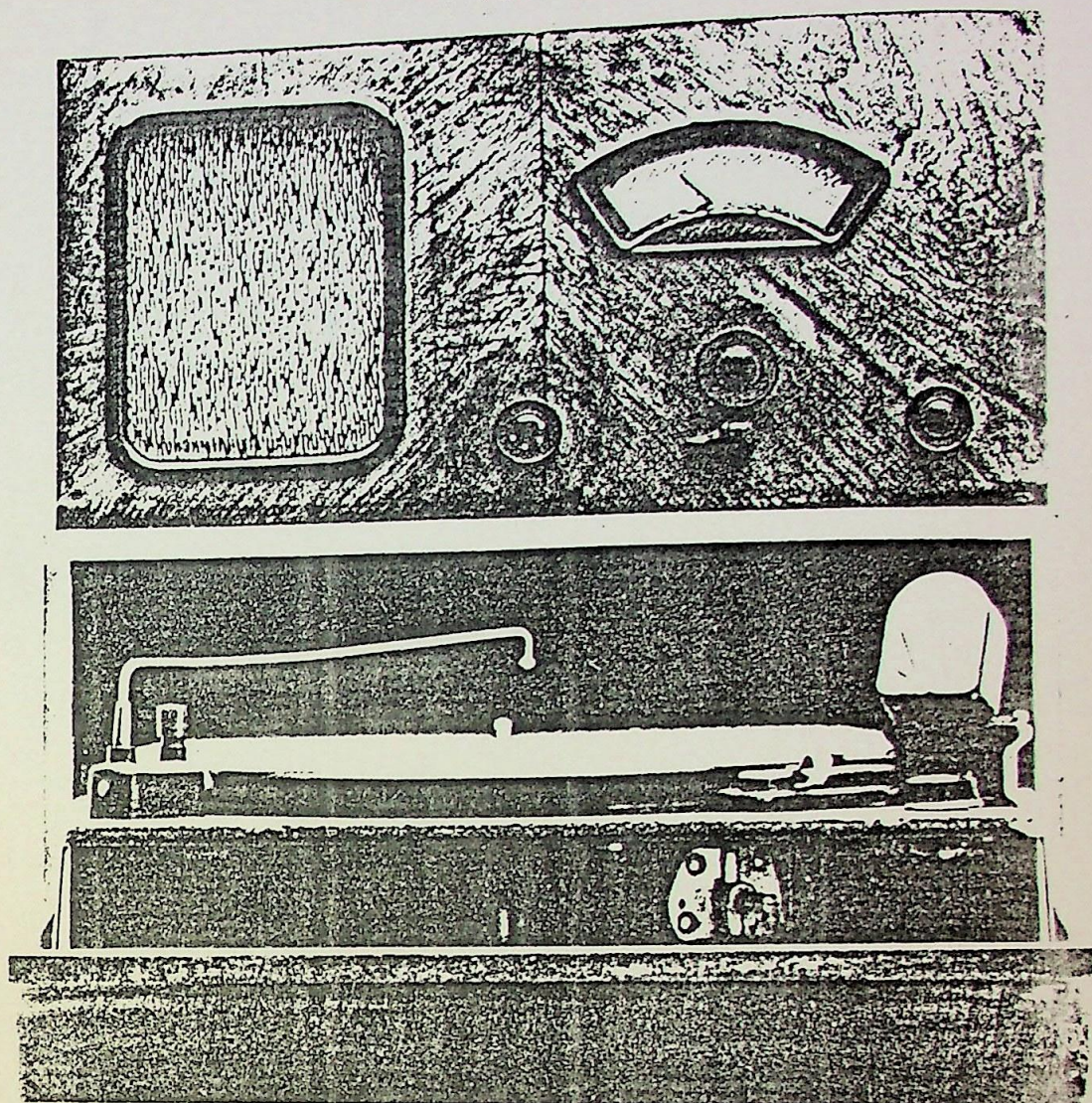
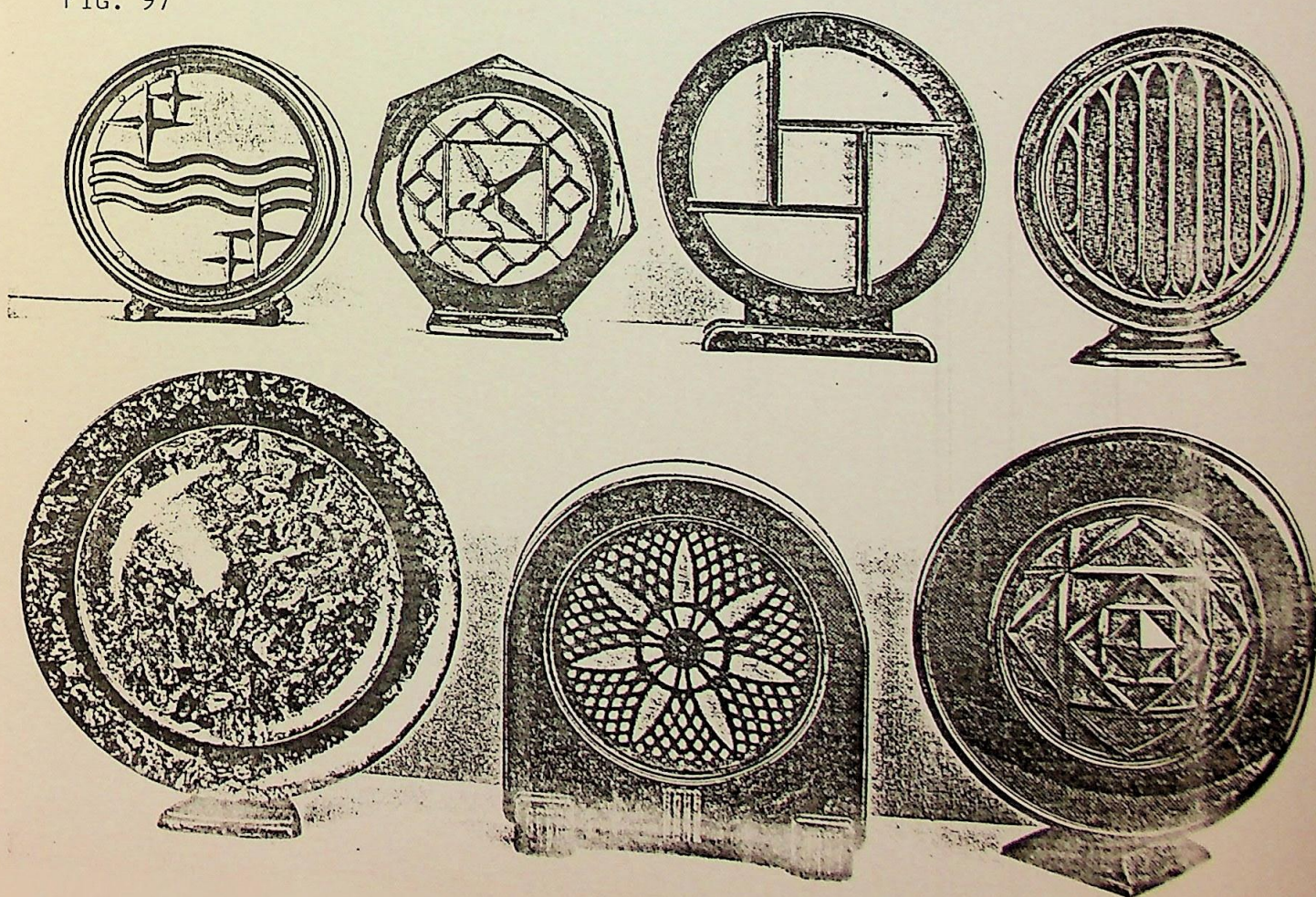


FIG. 97





resistance to phonographs and converted tens of thousands of Americans into record collectors.

At the same time a bold new company made a significant debut. Its guiding genius was Jack Knapp, an ex-employee of Brunswick and his financial backer was E.R. Lewis a London Stockbroker who had taken over the management of the English Decca Company. The new company was also called Decca. They believed that records were far too expensive at 75c, and they began releasing records at 35c each. Among others they signed up exclusively were Bing Crosby and Noel Coward Fig. 94. They helped to provide an imaginative direction to the record business just when it needed it most.

The total spectrum of record had been substantially improved since 1929, and it was around this time 1933 - 1934 that the phrase "High Fidelity" came into general use to describe the improved reproduction then offered by first class radios and gramophones. The fact that the gramophones, used to play these new records on, had not improved meant that this "High Fidelity" was more gimmick than gain and it was really used to sell records.

In 1933 ECKO brought out its Model AC74 Radio Fig. 95 Designed by Serge Chermayeff and manufactured in England, its moulded plastic cabinet was a bold attempt to establish a language of radio design, appropriate to the novelty of the medium and the advanced technology it employed. The Model BV78 brought out four years later used walnut for its cabinet designed by Misha Black and this followed similar design ideals.

After the technical innovation which allowed Braun to combine in one unit the previously separate components of



radios and record players, the company continued to exploit during the 1930's the visual opportunities this unified design offered Fig. 96. Some examples of where plastic began to be used extensively in speakers Fig. 97.

With the reappearance of Toscani before Victor recording microphones in 1936, the evidence became unmistakable that the phonograph was on its way back. Toscani had agreed to record a Beethoven Symphony, some Wagnerian excerpts and two Rossini overtures. Technically they were among the best records ever issued; musically they were incomparable. The response was wonderful, and it helped to further RCA Victor's commitment to the phonograph.

In this year a good proportion of popular records were consumed by a tubby, gaudily coloured machine that would blare out your favourite song with the deposit of a nickel. It was called the jukebox Figs. 98 & 99. The teenagers of 1936 invested millions of nickels to hear the "King of Swing", Benny Goodman, give forth with "One O'Clock Jump". Coin operated phonographs had been around for a long time Figs. 99 but they too had gone into serious decline during the depression. They began to proliferate in bars, drugstores, and diners during 1936. By 1939 it took thirteen million discs a year to nourish them. It served the double function of buyer and seller as millions of records were purchased solely because they had been heard and enjoyed the night before on a jukebox. It became possible once again to talk of record best sellers.

Just as jukeboxes sold swing, radio was selling the classics. During the mid-thirties the air was saturated with live music as never before. Americans were evincing a growing disposition to absorb Bach, Beethoven and Brahms in stout quantities. Radio, which once had laid the phonograph low, was now bringing it millions of new



FIG. 98

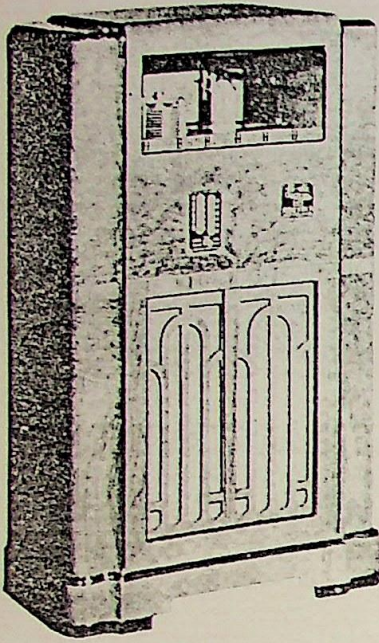


FIG. 100

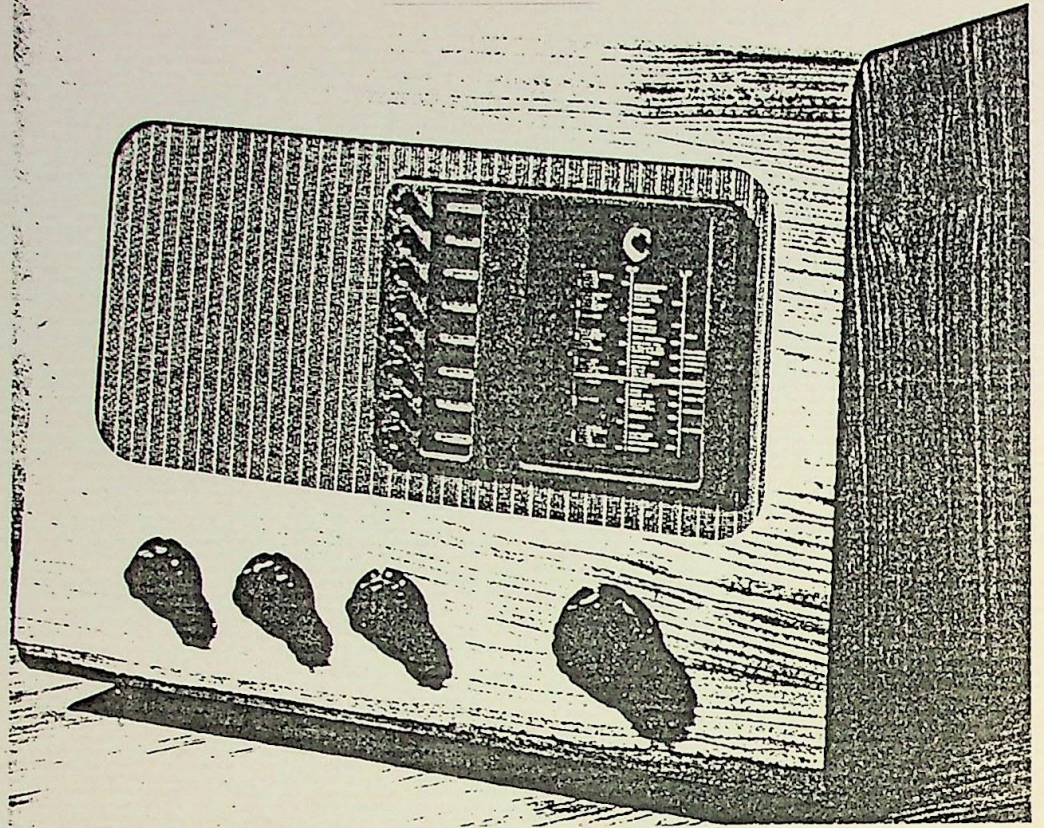


FIG. 99

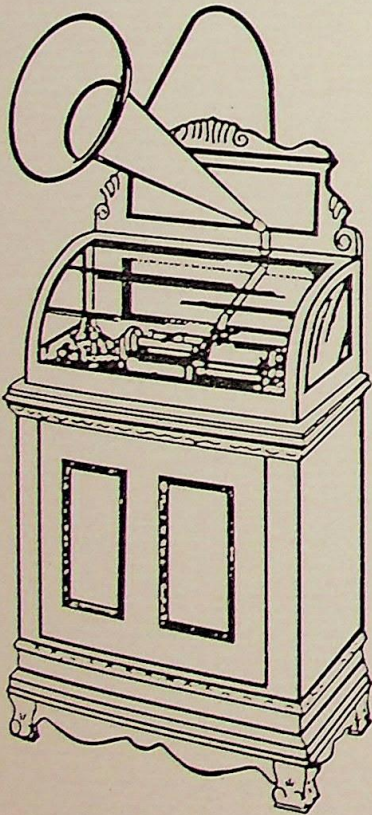
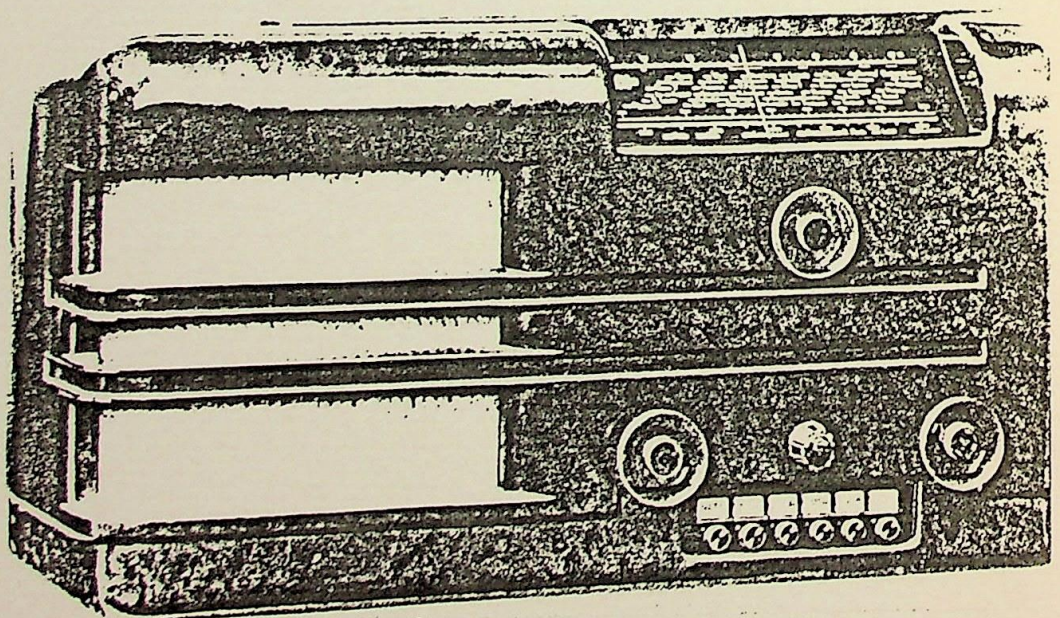


FIG. 101





customers.

The Murphy Model A52 Radio shown in Fig.100 was designed by Dick Russell. This advanced superhet radio has a veneered wooden cabinet. Although puritanically free of extraneous ornaments, the form and appearance of the cabinet is dependant on craft work and is, therefore, inappropriate to the advanced technology used in the receiver itself.

The anonymous Ferranti radio design of 1939, Fig.101 was among the most advanced of contemporary radio cabinets. In the high competitive field of radio cabinet design only three companies, Ferranti, Murphy and Ecko, maintained the highest standard of design throughout the pre-war years.

Of the 33 million records sold in 1938, seventy-five per cent at least were accounted for by RCA and Decca. The Decca policy of "top tunes and top artists for 35c" had paid off. Columbia, on the other hand, who still relied almost exclusively on European sources for its music material, drifted inconclusively waiting for someone to rescue it. That person turned out to be Edward Wallerstein who quit his job at RCA in favour of revitalising Columbia. In 1938 he convinced CBS to buy the company and with their backing he began to rebuild the Columbia catalogue. Benny Goodman, Duke Ellington, Count Basie and many other idols of the swing era were put under contract along with some major orchestras from around the country. In March 1940 the first recordings were placed on sale at \$2.00 each just like Victor and the others. Record collecting in 1940 was still an expensive hobby - but not for long.

On August 6, without any advance warning, Columbia reduced the price of every twelve-inch record in the catalogue to \$1.00. Record collectors flocked into the stores and



bought Columbia merchandise to the exclusion of practically all else. RCA Victor had no recourse but to reply in kind. On August 21 they did the same thing.

Wallerstein's hunch was right; following the price cuts, sales of classical records were said to have increased fifteen hundred per cent.

In response to this intense competition RCA Victor began to sign up the remainder of the major orchestras. Orchestral Recording in America would have increased in any case, as the Europeans were far too preoccupied with war to bother with exporting records.

Radio, Price cuts, Jukeboxes, and intensive promotion by three highly competitive companies served to swell and quicken the phonographs return to public favour. At the end of 1941 an amazing 127 million discs had been sold. On December 7, 1941, the United States found itself at war and importation of shellac, the basic ingredient of phonograph records was immediately affected. In April 1942 the non-military use of shellac was cut by seventy per cent. The phonograph, which was on the threshold of its greatest triumphs, had to dig in for the duration of the war

#### A WAR AND ITS AFTERMATH

On August 1, 1942 all recording activity stopped in the United States. This was due to a war; not the global conflict in which seventy million men in uniform were involved, but a private war between James Ceasar Petrillo, President of the American Federation of Musicians, and



the phonograph record. The nation's jukeboxes (400,000 of them by 1942) and broadcasting stations were assuredly depending on phonograph records to the detriment of those musicians who used to play live music instead. An order from the AFM went out to every union member in the country instructing them to refuse all recording engagements after July 31, 1942. The eddict applied to every type of musician and was obeyed meticulously. The recording studios of Columbia, Decca and RCA Victor were effectively and decisively silenced.

The industry hoped to call Petrillo's bluff by relying on sizable stock piles of unissued recordings, so some time elapsed before the effects of the ban were felt. But this was inadequate because new songs such as the music from Oklahoma! were not available when the public wanted them. After thirteen months, Decca, who relied almost entirely on popular music for its revenue, gave in and signed a contract with the AFM. The terms specified royalties of from a quarter of a cent to five cents on every record sold, payable to the AFM, for the succour of unemployed musicians. In the summer of 1944, after sustaining the ban for two years, Columbia and Victor finally agreed to sign contracts with the AFM on terms similar to the Decca contract.

Wartime record making in Europe had more or less come to a standstill but the studios did remain open, and from one of them emerged a new concept of recorded sound. The English-owned Decca Record Company developed "Full Frequency Range Reproduction (FFRR)" while working on an RAF Coastal Command training record which illustrated the extremely delicate differences between the sound of German and British submarines. Late in 1944 Decca adapted the same techniques to musical reproduction. The new standard of reproduced music was brilliant and incisive in the



treble, full and resonant in the bass, had a heightened sense of presence and room tone. When they reached the United States late in 1946, Decca's FFRR records even at \$2.00 each sold extremely well.

In fact almost anything with grooves sold well in 1946. Unrestricted shellac shipments had been resumed, skilled labour had returned to the record factories, and the combination of pent-up demand and swollen bank accounts boosted total sales for the year to 257 million discs- more than double the prewar high. But this was only a prelude to 1947, during which 400 million records were sold as well as 3,415,000 radio-phonograph combinations. If the phonograph record could only retain its hold on this large market then its future seemed serene.

But there were already distant rumblings to give cause for some misgivings. The phonograph record of 1947, despite all its improvements had many limitations. The shellac discs were scratchy and had to be changed, either manually or automatically, every four minutes.

Magnetic tape did not pose a particular new threat; it was first accomplished by a Danish engineer named Vladimir Poulsen, who called his invention the Telegraphone. The telegraphone, however, could speak no louder or more distinctly than an ordinary Bell telephone of 1900 vintage, and it was, therefore, of little use. Interest revived with the production of efficient microphones and amplifiers in the 1920's, at which time Germany took the lead in magnetic recording research and held it for two decades. A scientist named Pfleumer developed a paper tape coated with an iron oxide sensitive enough for recording purposes around 1932, but it could not cope successfully with music. During the war the Germans developed this tape further so it could record sounds up



to 10,000 cycles attaining a fidelity equal to, if not surpassing the finest phonograph. As an instrument for home reproduction it was hopelessly impractical but it did demonstrate the potentialities of magnetic recording.

In America the Minnesota Mining and Manufacturing Company, makers of "scotch" tape, developed an improved magnetic tape which would record sounds up to 15,000 cycles at a speed of 7.5 inches per second. When they started manufacturing the new tape in 1947, Bing Crosby was amongst the first to start a landslide in the radio industry toward tape where the phonograph had previously been used for transcribing programmes. Would tape now displace the phonograph in the home? Tape could play uninterrupted for half an hour, it did not wear out and it reproduced music better than the best records, but the phonograph was about to embark on a new venture that would meet tape on its own terms.

#### RENAISSANCE AT A NEW SPEED

In June 1948 members of the press were summoned to a suite in the Waldorf-Astoria Hotel to hear about "a revolutionary new product" from Columbia Records. It was the LP (Long Playing) Record, a nonbreakable microgroove disc with a playing time of twenty-three minutes per side, which was pressed in vinylite Figs.102. It was played at 33 1/3rpm on an LP attachment that the Philco Corporation was manufacturing to sell for \$29.95.

In the hope of accomplishing a quick and painless change-over to the new record speed, Columbia offered to share



FIG. 102

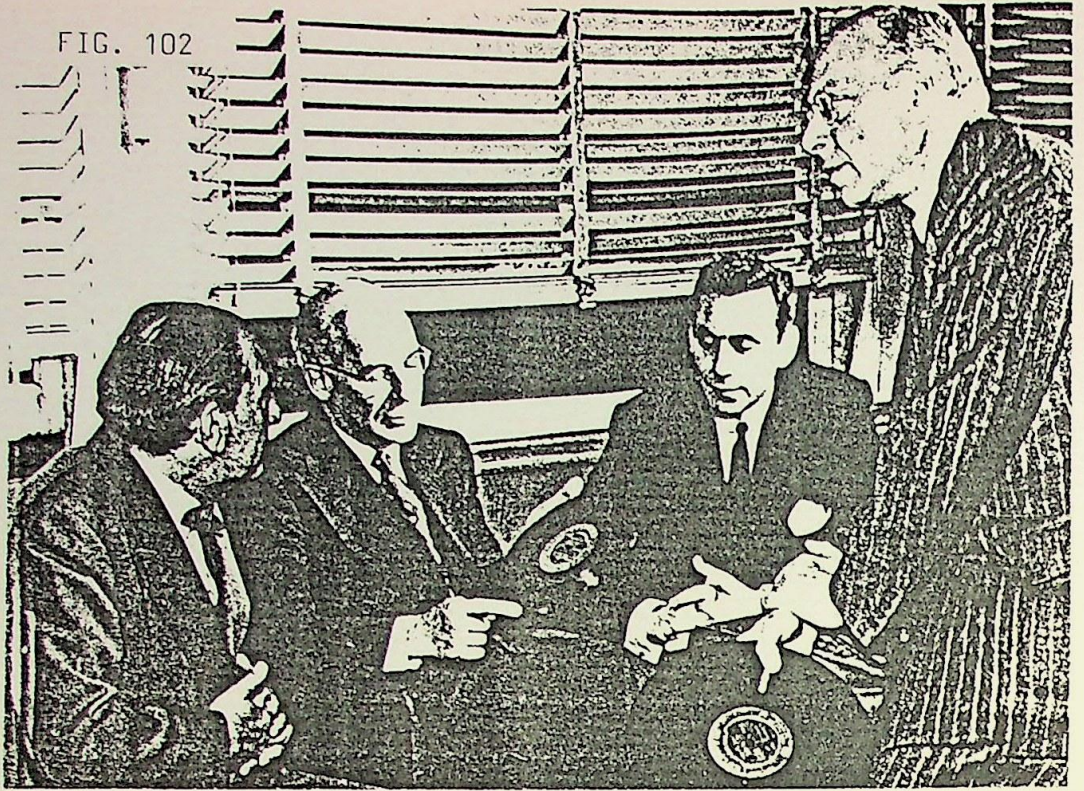


FIG. 104

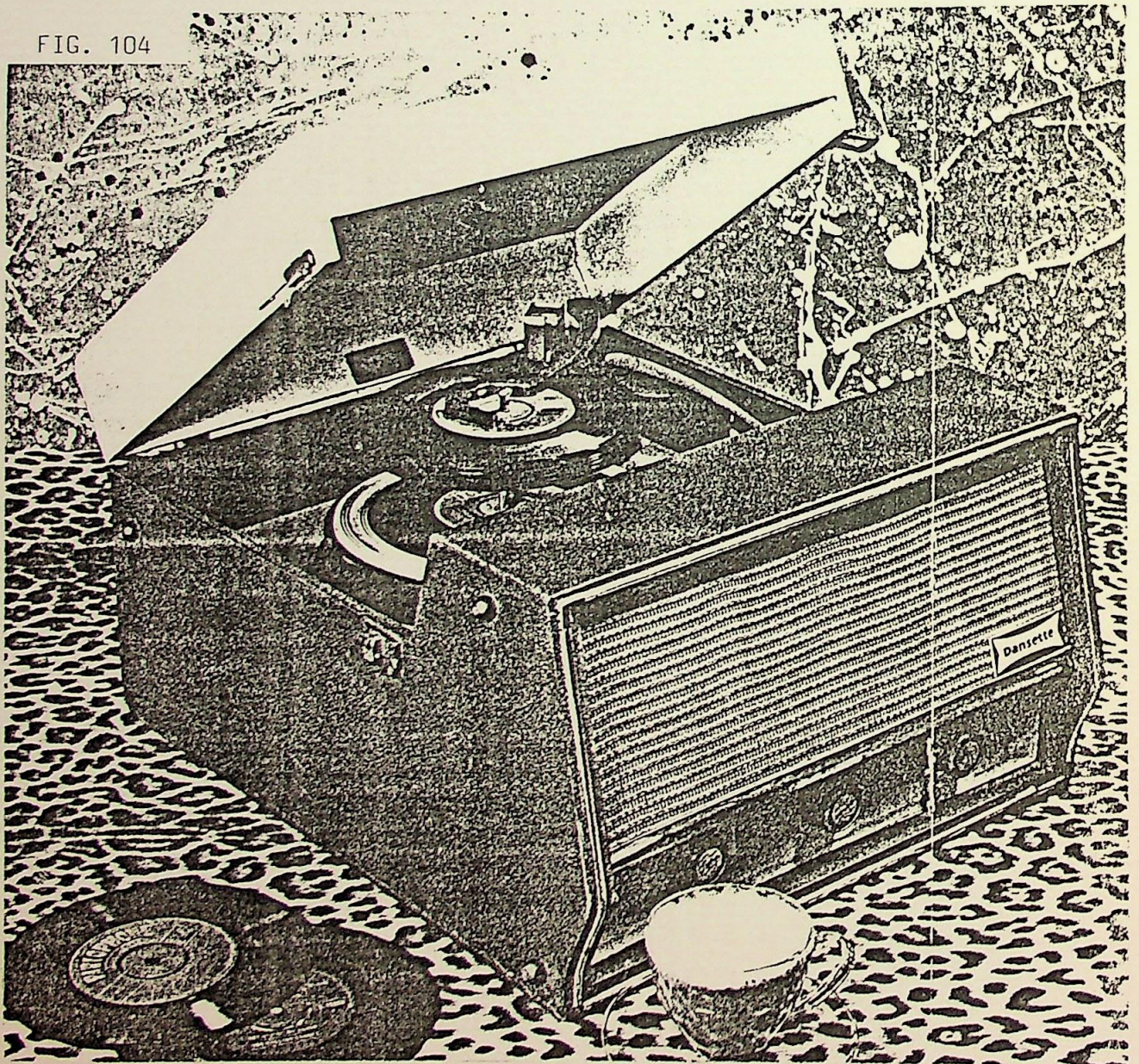
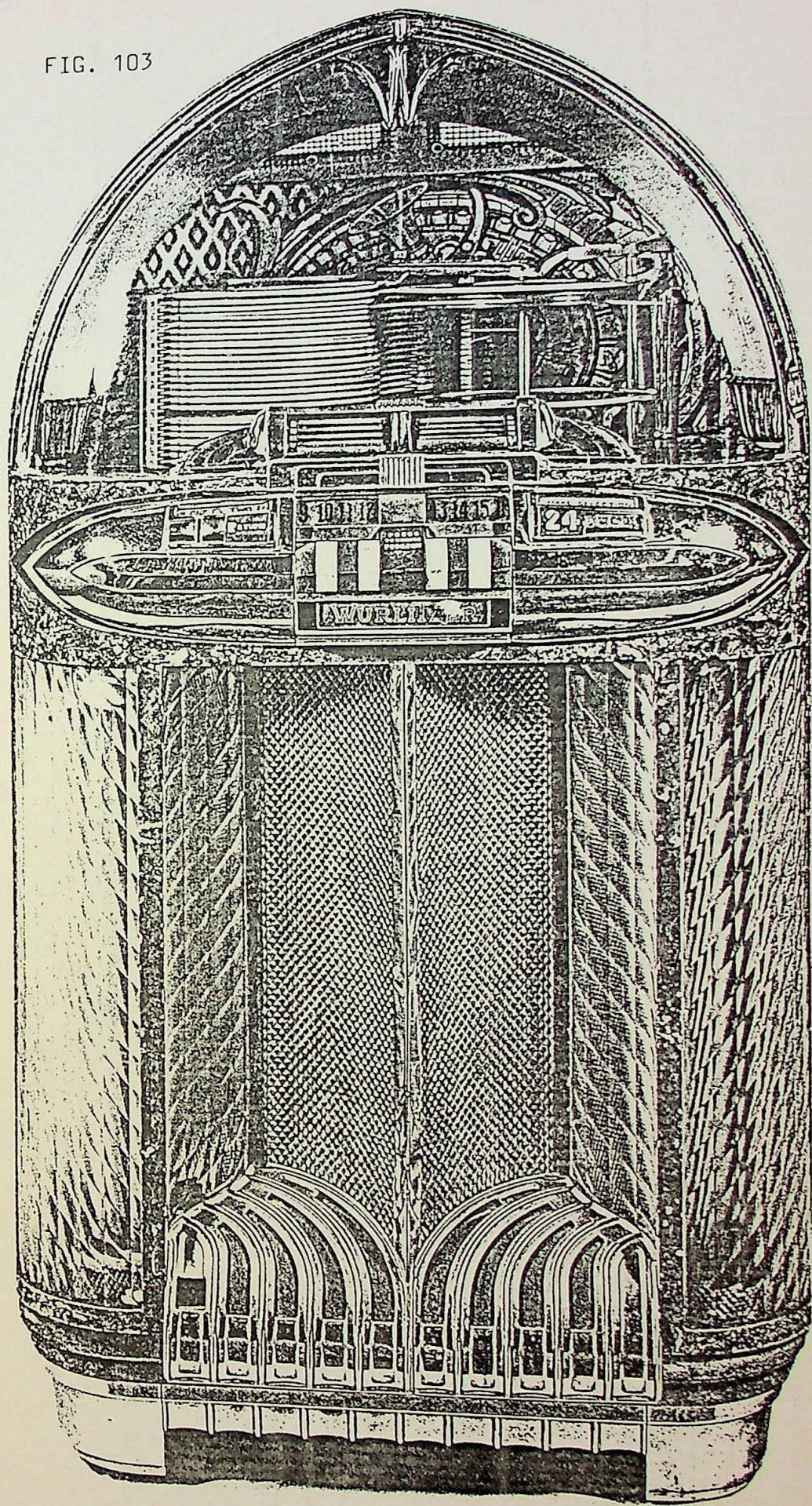




FIG. 103





its system of LP recording with RCA Victor. The advantages of LP's were fourfold: recorded performances could be heard without breaks in continuity; they minimised surface scratch and record wear; they alleviated the problem of storage and finally they provided more music per dollar. After the initial demonstration however, Victor maintained an equivocal silence, so Columbia went ahead with its launch in June and by the end of the year 1,250,000 of the new records were in use.

Early in 1949 the strange silence from RCA Victor subsequent to Columbia's private demonstration of the LP was explained. Victor was replying with a microgroove record of its own, one that played at 45rpm and required yet another special attachment, thus initiating the unhappy and ill-advised battle of the speeds. A compact player unit priced at \$24.95 embodying the "worlds fastest changer", was used to play the 7" vinylite records. Record sales soon dropped as the record buyer waited for the battle to be decided. Fortunately, the slump did not get out of hand. By the summer of 1949 public favour was plainly inclined toward Columbia L.P. Within eighteen months of its introduction, L.P. had been adopted by every record company of consequence, save RCA Victor who's 45rpm failed to find any allies.

It seemed the battle was lost when on January 4, 1950 RCA Victor made available its classical library on LP 33 1/3rpm records. In the area of popular music however the 45rpm records, being unbreakable and easily stored, had undoubted appeal, Figs 103 & 104. RCA Victor had spent five million on advertising and it began to pay off as collectors of popular music turned increasingly to the convenient "45" records. One by one all the major companies (including Columbia) took up the 45 for popular music Fig. 103. The standard 78rpm shellac disc had



meanwhile suffered a swift decline and by 1952 they disappeared completely.

Along with the rise of LP went two related phenomena: High Fidelity reproduction and tape recording. A few stubborn souls refused to take what was offered in the name of "High Fidelity". They found that the components for genuine high Fidelity reproduction, powerful and flexible amplifiers, sensitive and carefully balanced picks, and large and heavy loud-speakers mounted in separate enclosure, could be obtained, expensively at certain radio supply houses. An infatuation with high fidelity components began infiltrating the ranks of discerning record collectors in 1947 and 1948.

High Fidelity reproduction depended on high Fidelity records, and high Fidelity records in turn depended on the existence of tape recording. Magnetic tape instead of displacing the flat disc, had become its precious helpmate. Tape's invasion of the recording studio began early in 1949 and within a year the old method of direct recording on wax and acetate blanks was almost completely superseded. Improvements in tape equipment and the tape itself had extended the potential frequency response to 20 - 20,000 cycles. It could be recorded on continuously for 30 minutes and more importantly it lent itself to "editing". It was also a relatively cheap way of recording and by August 1954 the number of companies in America publishing LP recordings increased from eleven to almost two hundred. A lot of non-standard music was recorded which gave the business an entirely new complexion. In short the whole literature of one of the arts had sprung into being; it was like a Renaissance rediscovering the ancient classics.



## 1955: A TURNING POINT

The year 1955 was a turning point in phonographic history. It was to see the emergence of new directions in music and new methods of marketing that would transform the record business beyond all recognition.

The industry seemed healthy enough but with sales in 1954 amounted to only \$213 million it was still a tiny business with low volume and inefficient distribution. But this was about to change and records would find a mass market.

Elvis Presley, Fig.105 , was one of the seeds of transformation which were to sprout in 1955. Teenagers all over America were to adopt his kind of music and the consequences for the record business were overwhelming. Bill Haley and the Comets with their combination of rhythm and blues and country and western, in 1954, were the first band to start playing this type of music which came to be known as Rock and Roll. "Shake, Rattle and Roll" and "Rock Around the Clock" released by Decca in 1954 were to launch what we now know as the rock revolution.

From the start it had extramusical reverberations, but rock and roll needed a superstar, and in the gyrating, long-sideburned person of Elvis Presley it found its messiah. His music style was similar to Haley's but he also conveyed machismo and sex appeal. He started with Sun Records in Memphis and in 1955 RCA bought his contract. Within a year RCA had sold ten million Presley singles.

Teenage idols were nothing new, but Presley with his throbbing, insolent music a deliberate affront to the adult world, was different. His audience was different too. Elvis's idolaters, with real money in their pockets,



were already a potent economic force with a high degree of independence. In retrospect the pop heroes of the late 1950's - Prelsey, Pat Boone, Paul Anka, Bobby Darin - were mild in comparison to what was to come but the teenagers lapped it up giving sustenance to what was becoming a billion-dollar record industry.

As the rock revolution gained momentum, another revolution was transforming the airwaves. During the later 1940's and early 1950's sponsors shifted their budgets to the mushrooming medium of television Figs. 106. Suddenly the networks were without a ready-made source of programming. Instead of live shows they filled the gap with the latest pop records, presented a fast talking impresario known as a Disc Jockey. In 1955 the Storz chain of radio stations based in New Orleans introduced a formula for record programming that was to sweep the nation. It was called Top 40 radio. Soon the "jukebox of the air" was copied from coast to coast. Essentially the Top 40 formula consisted of playing the forty most popular discs and presenting them in a consistent style through the day.

Other stimuli were revitalising the market for LP albums. On January 3, 1955, RCA reduced the price of every LP record in its catalogue to \$3.98. A good many customers were found for the suddenly devalued merchandise. Columbia, Capital and Decca had no choice but to follow RCA's lead without delay. This was an effort to combat the cut-price retailers - most notably Sam Goddy in New York City - who offered high inventories and whopping discounts. By the early 1950's the neighbourhood store was dying, a victim of unaggressive merchandising and inadequate stocks.

The SK4 radio-record player Fig.107 unit was designed by Dieter Rams in 1956. The cabinet consisted of a u-shaped



FIG. 105



FIG. 106

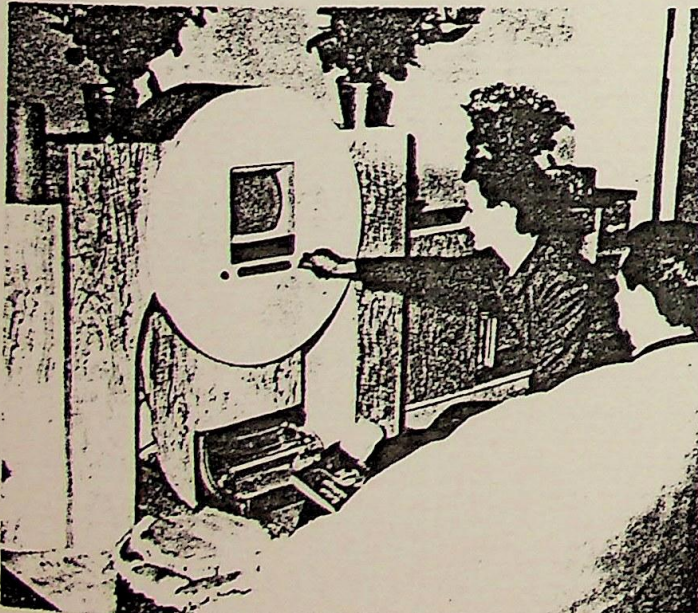


FIG. 107

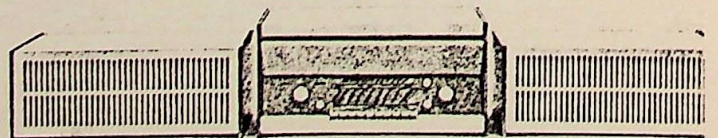
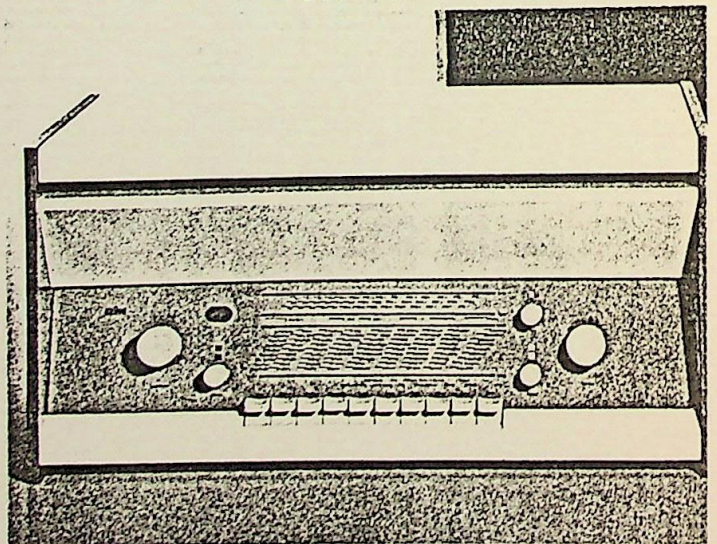




FIG. 108

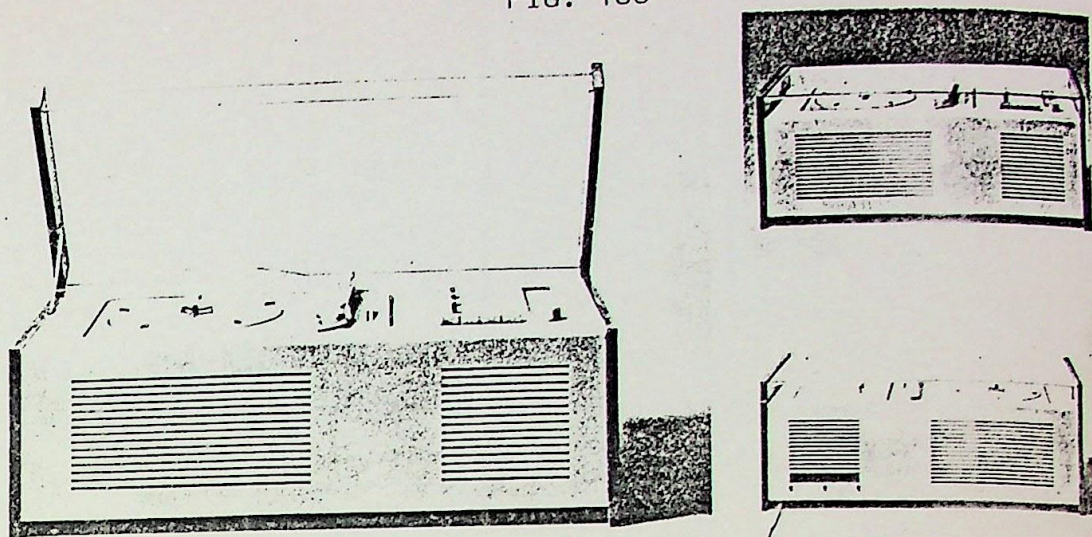
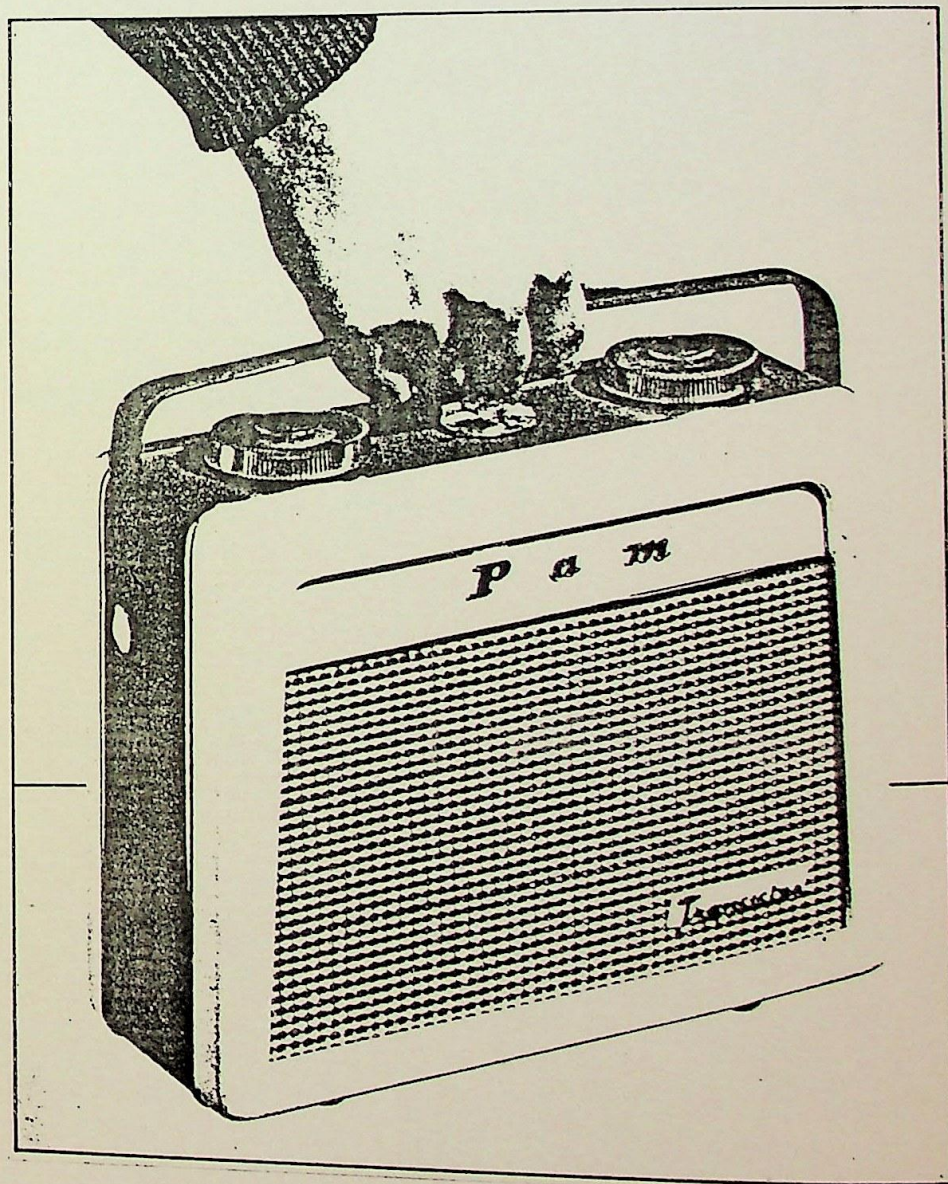


FIG. 109





metal construction framed by two wooden sides. The operating panel was located at the units top surface next to the record player. For the first time in a product of this type the SK4 "honestly" displayed its function - without disguise or ornamentation. The operating elements were clearly ordered and comprehensible at a glance. The product's design derived its structure purely from its function, and not from elements alien to it. The transparent lid was also first and it soon gained popularity and is still being imitated today.

The Atelier 1 (1957) from Braun Fig.108 was a more powerful alternative to the SK4. Although front operated its relationship in design to the SK4 is evident. Atelier 1 made an important break from tradition: it "expelled" the loudspeaker from chassis. The designer's intention was to keep the dimensions of the receiver as compact as possible without making concessions to reproduction quality. Consequently, the loudspeaker was separated from the receiver and placed in a cabinet of its own. (A little later, the new stereophonic technology basically compelled separating the loudspeakers from the receiver).

The Pam 710 (1956), Fig. 109 , was one of the first all-transistor sets. The development of the transistor which replaced the cumbersome valve, forced the idea of portability on radio designers. Its light weight and compactness made bulky radios a thing of the past. This early portable model shows how designers first came to terms with the challenge.

Another threat in the form of the mail-order record clubs had already secured a firm hold in the business. By 1955 they accounted for thirty-five per cent of classical LP sales. Not a penny of this money was going to the regular dealers or the record companies as the mail-order clubs



made their own recordings, usually in Europe. One of the Clubs, "Book of the Month", gained such prestige and resources that they started negotiations with a few of Columbia's and RCA's most celebrated artists. The only way to forestall the Clubs taking total control was for the major record companies to get into the Club business as well.

Columbia was first. In August 1955 they formed the Columbia Record Club. The dealers cried out but Columbia stuck to its guns. Columbia offered to mail any four records, from a selection, to a new member without charge if they agreed to purchase four additional records from the club in the next year. Unlike its predecessors, Columbia offered popular music as well as classical. It proved to be a huge success and within twelve months 409,000 members were on the books. RCA waited for two years in the hope that the traditional independent retailer could still prosper but in January 1958 they gave up and formed the RCA Victor Record Club.

Yet another competitor, the rack jobber, so-called because of the racks on which he displayed budget-priced albums in supermarkets, drug stores etc. entered the competition in the 1950's. Before long their success forced the majors to supply the racks. Along with the groceries you could now pick up the latest Sinatra. This further demoralised the small record dealer.

Rock and Roll, teenage affluence, Top 40 radio, mail-order club, discount shops, rack jobbers - all combined to lift the record business out of its postwar doldrums. In 1955 sales of records increased by thirty per cent to \$277 million. A year later they reached \$377 million and in 1957, \$460 million. Almost overnight records had turned into a growth industry.



## THE SOUND OF STEREO

More and more, records were being "produced" as entities in themselves rather than as mere duplications of concert-hall performances. Tchaikovsky's 1812 Overture put out by Mercury in March 1956, for example, endeavoured to recreate the performance conditions which Tchaikovsky had originally envisaged - a performance out-of-doors, with a military band abetting the orchestra, and with Kremlin bells and a salvo of cannon resounding in the Finale.

Just as sales of the 1812 Overture were gaining momentum, a new method of recording began to make its presence felt. It went under the name of stereophonic sound and even though it had been around for many years, it was only with the advent of high-quality magnetic tape that it was able to enter the home. Essentially, stereo aimed at reproducing the spaciousness, clarity and realism of two-eared listening.

Late in 1956, RCA released a small but imposing number of classic stereo tapes which were to be played on the Victrola Stereo Tape Player, which packaged tape deck, stereo amplifier and speakers in a pair of table top units selling for \$350. No one hearing the early stereo tape recordings could fail to be impressed by their sense of spaciousness.

Stereo gave a boost to the lagging fortunes of recorded tape. A small but growing market for stereo tapes began to develop and soon other major companies began to follow RCA's example but the tapes and the equipment were very expensive and they would only find a mass market when the price was brought down, and that awaited the perfection of a stereo disc.



FIG. 110

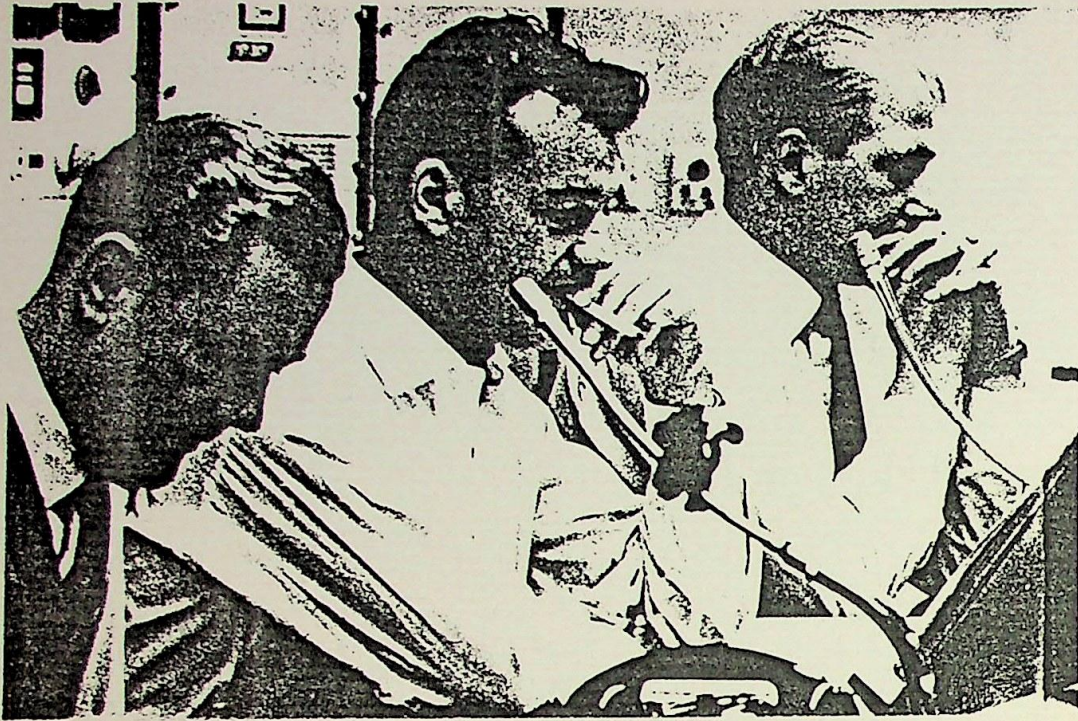
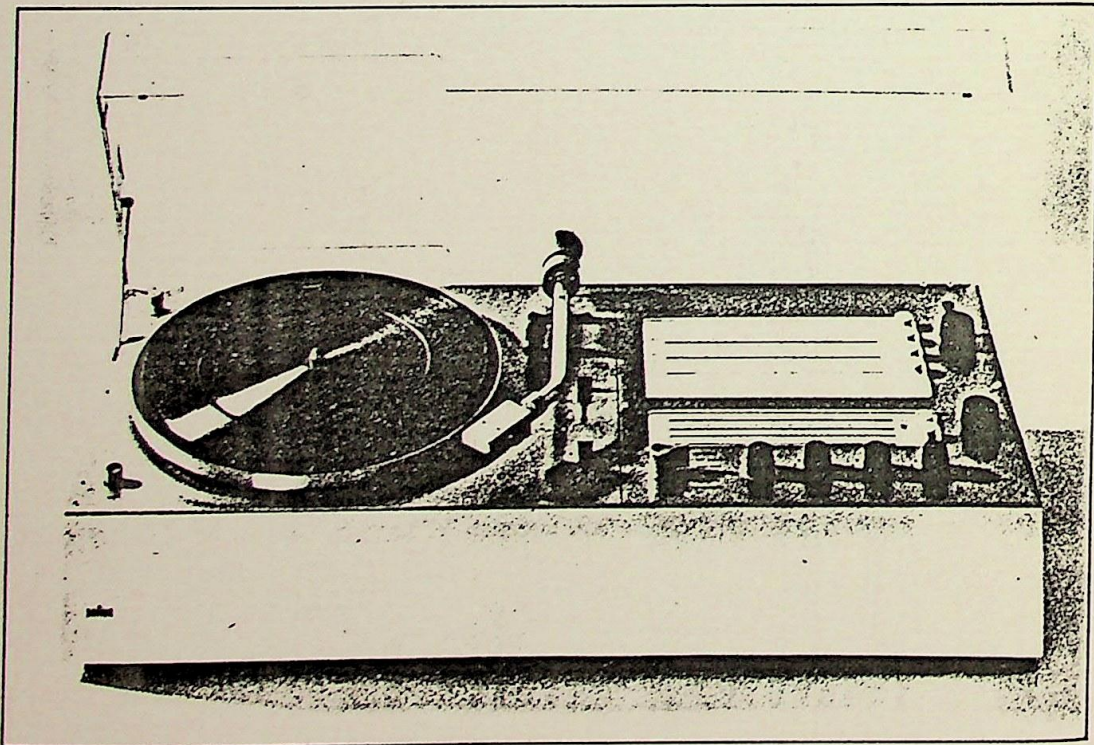


FIG. 111





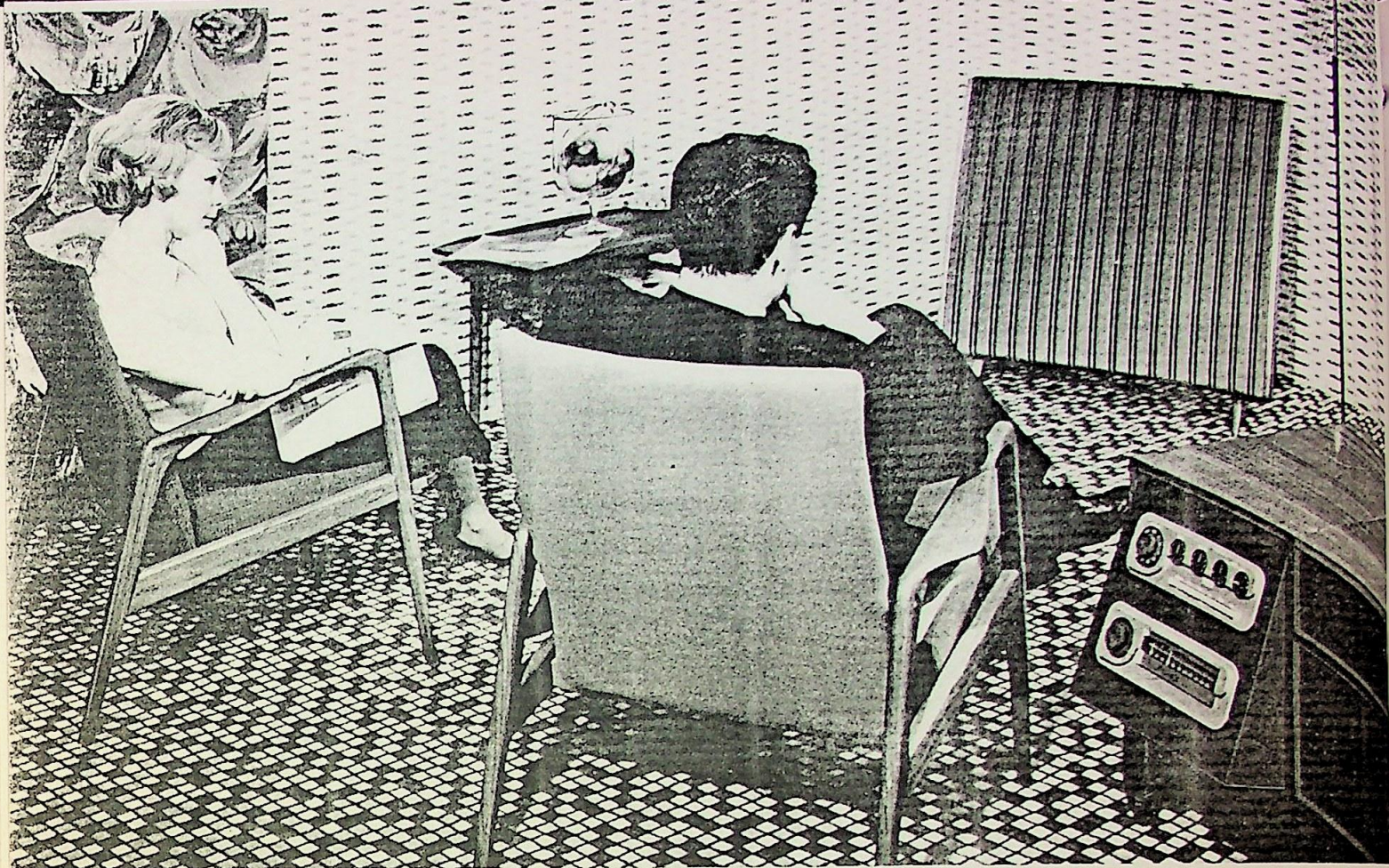
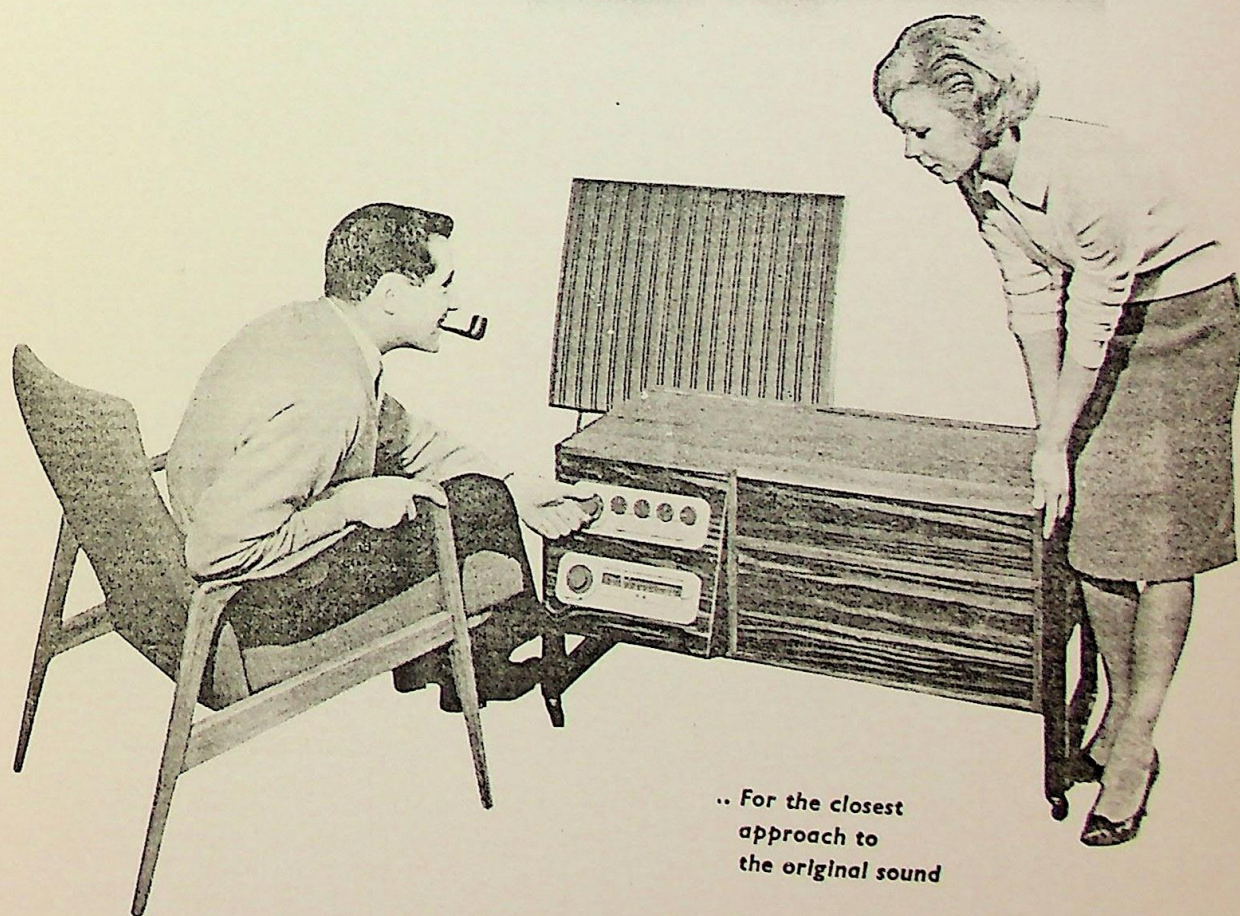


FIG. 112



.. For the closest  
approach to  
the original sound



The Westrex Company devised a successful method of putting two stereo channels into a single groove in 1957. In a rush to cash in on the act a few small companies began releasing stereo discs and manufacturing stereo cartridges. The leaders of the industry had to abandon their well-laid plans for a controlled change over to stereo and quickly slipped into high gear themselves. By September 1958 every record company of importance was offering stereo discs for sale.

The quality suffered greatly as the industry had been pushed into stereo production too quickly. Neither disc nor cartridge design were up to former monophonic standards so the response from the public was not surprisingly a bad one. Something irresistibly attractive would have to come along before they were converted.

For the classical customers, the persuasive something was a recording of Das Rheingold, the first opera in Wagner's Ring tetralogy produced by John Culshaw, Fig.110.

For the Decca Record Company, Culshaw recreated in the studio an environment as close as possible to the theater, with singers acting their parts in a production almost as elaborate as the real thing. He employed his "effects" with knowledge and taste; the result was overpowering. When Das Rheingold appeared in August 1959, record reviewers went agog over its magical moments. In the popular field a record entitled Persuasive Percussion was having a similar effect which eventually established stereo as the preferred choice for home listening.

The Braun Stereo Record Player and Radio, Fig.111 designed by Dieter Rams appeared in 1962. The design predicts many of the visual whims of the 1960's, including the mechanical frankness which was later taken up for popular



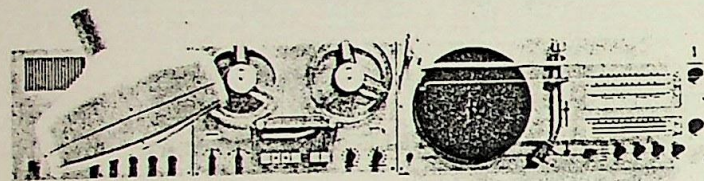
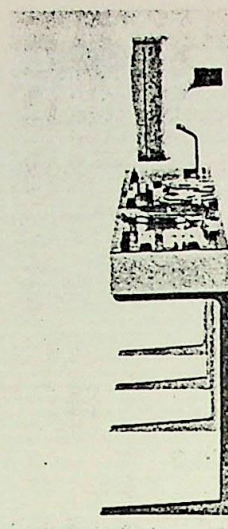
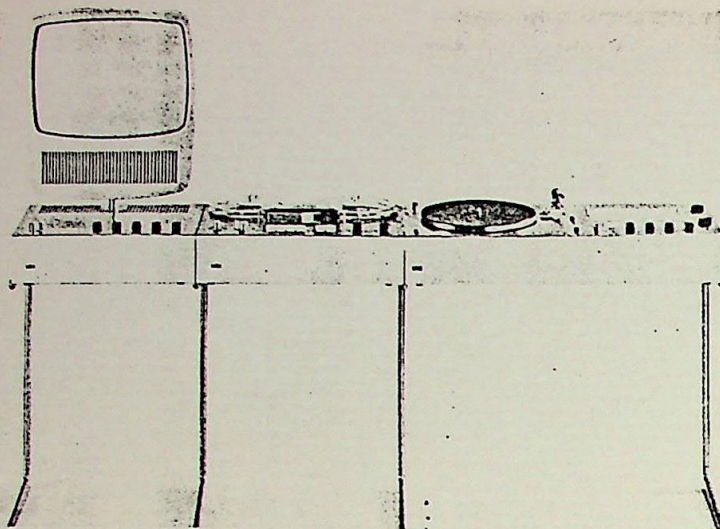


FIG. 113

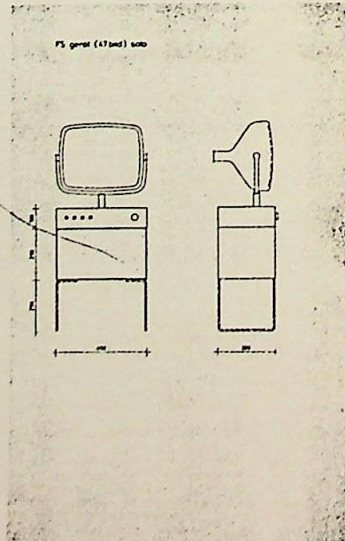
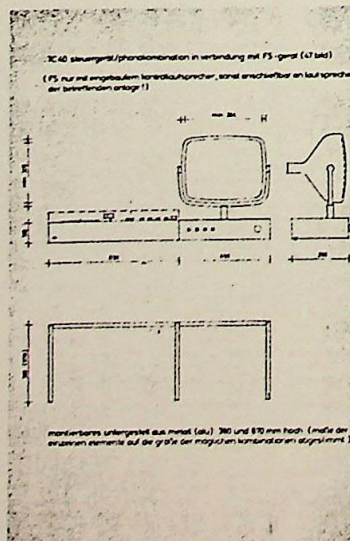
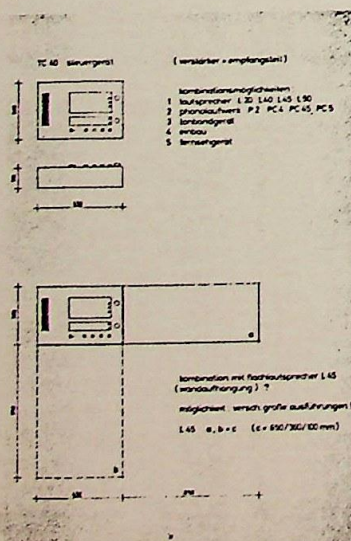
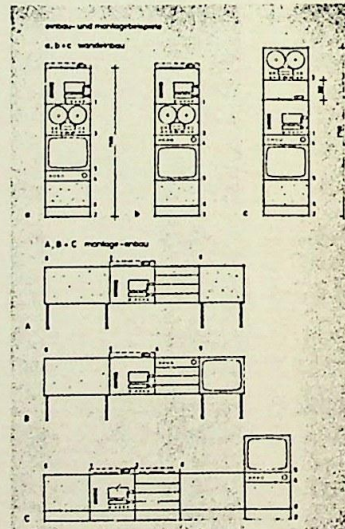
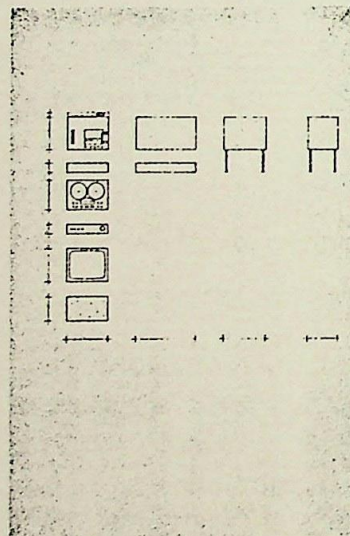
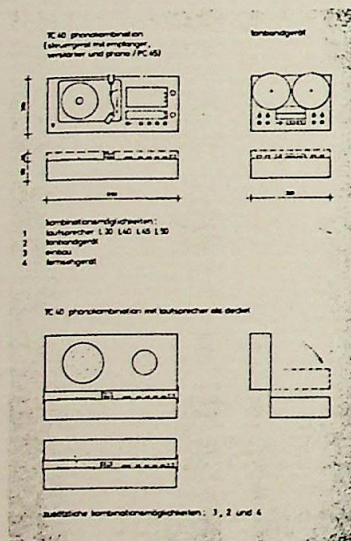




FIG. 114

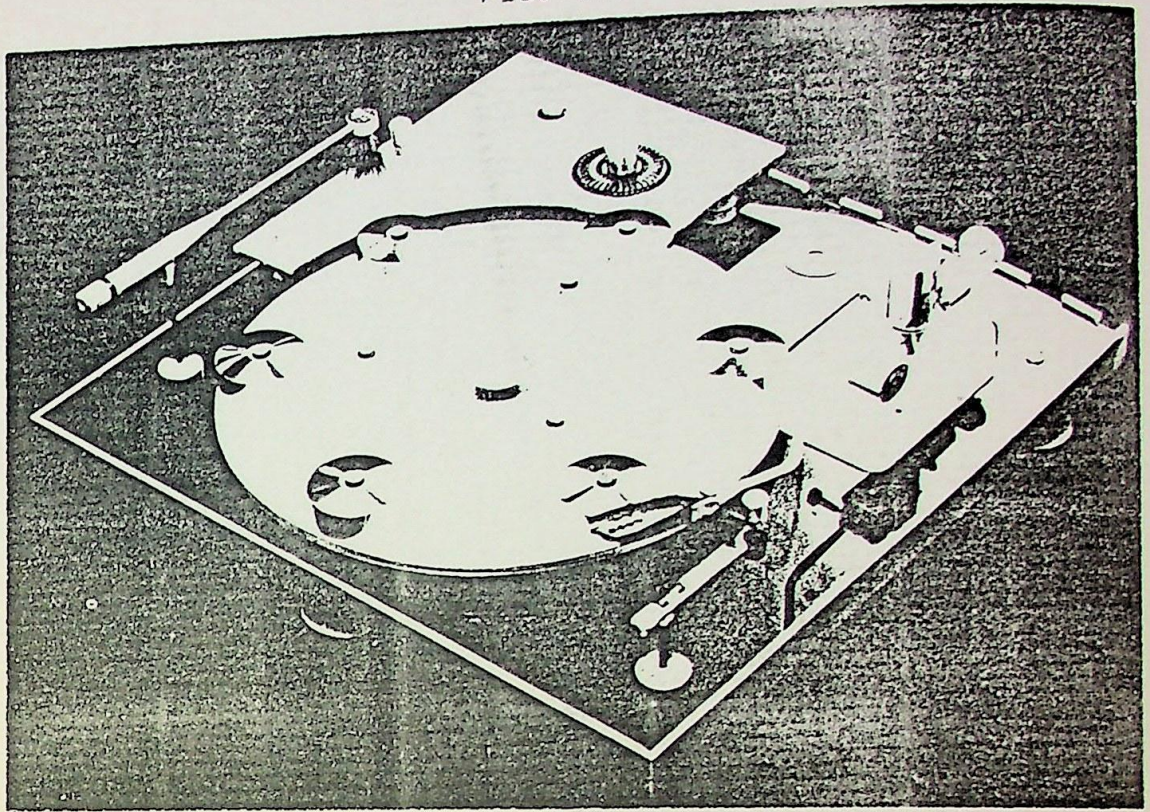
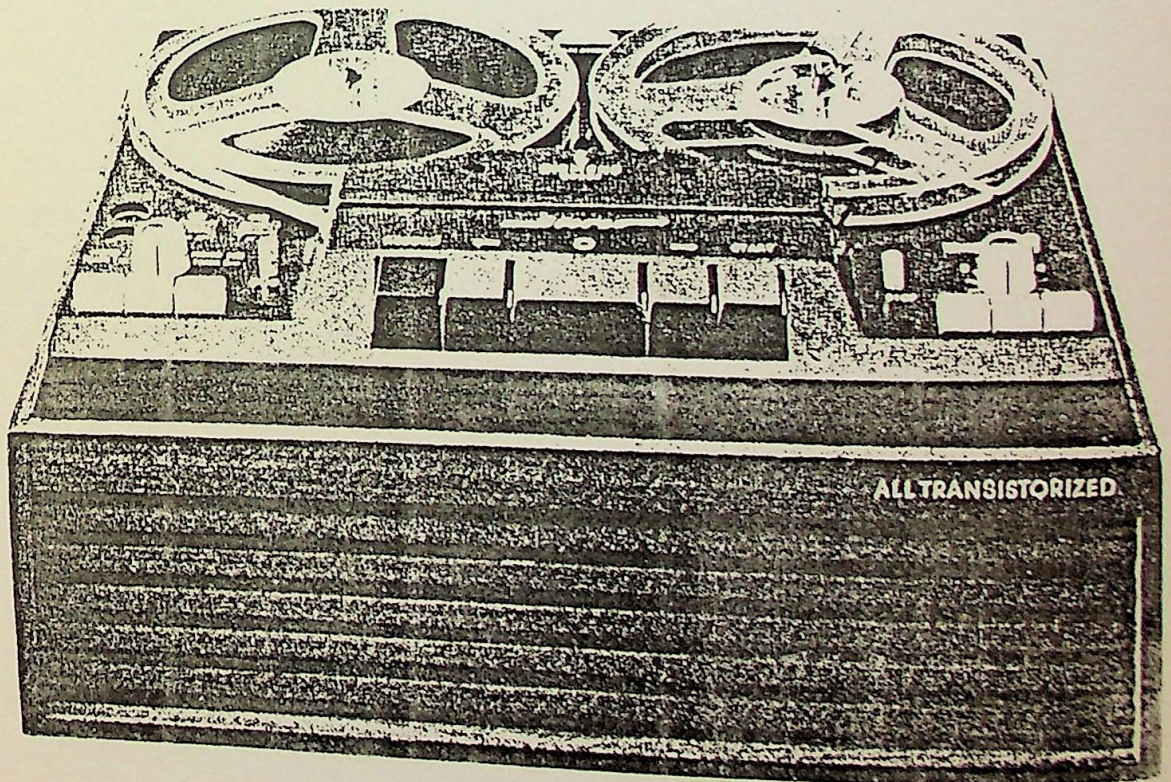


FIG. 115





markets by the Japanese. It is characteristic of Braun's geometric grid design. This functional simplicity is evident in the Quad Monophonic control unit for the power amplifier and speaker in Figs. 112.

Braun also carried out a design study on the audio complex, Figs. 113 around the same time. It looked at possible arrangements and installation of audio and visual components, included is a stacking arrangement which is frequently done today. This study shows a great deal of foresight on the company's behalf.

A turntable using aluminium and acrylic, Fig.114 designed by David Gammon in 1964 never went into production, but it is instructive to view it as an exquisite example of mechanical frankness. After the plastics styling of the 1950's, the reaction towards a pure style dependent on a reverence for the details of the mechanical parts was an entirely wilful act; ironically Gammon's turntable was extremely expensive. By 1964, industry was so used to disguising its products, it became more costly to expose them.

Egil Rein's Siemens stereo tape recorder, Fig.115 is typical of the austere, clean style which Scandinavian manufacturers adopted for their products. Apart from the dated knurled knobs, symmetrically disposed behind a bank of three push buttons, Rein's design does not look exceptionally stale, even after all these years. His careful use of simple materials (teak veneer, plastic and steel) and his chaste grey colour scheme contrast dramatically with contemporary design of consumer electronics which relied largely on the iconography of the juke-box for its effects.

Stereo's acceptance in the home was facilitated by greatly



improved and miniaturised high-fidelity apparatus. Small "bookshelf" speakers were now capable of reproducing the full range of sound frequencies; compact automatic turntables were combining the convenience of the old changer mechanisms with the performance capabilities of studio transcription equipment; miniature tubes and later, transistors were enabling manufacturers to offer superior electronics in minimal space. High-fidelity componentry was also reaching out for a mass market; and as it proliferated, listeners grew increasingly impatient with the ill-defined, tubby sound that had been characteristic of "console" phonographs.

The stereo disc had a disastrous effect on recorded tape sales. Business improved slightly in 1959 when Ampex introduced a four-track version of the open reel tapes. But to the average listener, open reel tape continued to seem like a lot of bother. The market remained insignificant. To reach a wider market tape needed to be foolproofed.

Much trial and error preceded the achievement of that goal but in 1963, the Phillips Company in Holland launched a minicartridge for use in portable recorders. They called it the cassette. It employed eight-inch tape at a speed of  $1 \frac{7}{8}$  ips and had a playing time of up to ninety minutes. The sound quality left a lot to be desired, however, and they were non-competitive with discs. But for portability, the cassette was a success. In 1970, quality cassette recorders were introduced that employed the Dolby Noise Reduction System, which made such a difference as to make cassettes competitive with discs. "Metal" oxide tapes, introduced in the late seventies at present give studio quality reproduction on the appropriate equipment. Cassette tapes have improved so much that "home-taping" has led to big problems for the



record industry. Cassette tapes biggest incursion into the record sales market has been their use in compact lightweight portable players also introduced in the late 1970's.

#### EN ROUTE TO A MASS MARKET

Elvis Presley's first record for RCA, "Heartbreak Hotel", appeared in 1956 and found a million buyers within three months. For years after practically all his records passed the million mark. RCA had been very lucky, others were not so fortunate. Studios throughout the country began churning out releases hoping one would be a success. Occasionally, it happened but in the late fifties and sixties, the process was totally unpredictable.

The decade from 1954 to 1964 was a golden age for independents like Atlantic, Chess, Imperial, King and Speciality who pioneered the exciting new sound of rhythm and blues. They recorded and published some of the most accomplished and consistent talent around - Otis Redding, Ray Charles, (Fig. 116) Chuck Berry, Fats Domino and Little Richard, among others. Although these records were primarily for black people, white teenagers managed to ferret them out.

Given the high stakes of the pop singles market in the 1950's, it is not surprising record companies went to such extraordinary lengths to promote their new releases. The key lay in air play. If a new record wasn't heard on Top 40 radio, it hadn't a hope. A disc jockey couldn't listen to all of the 130 or so new releases each week. To make sure they listened to the right ones, record



companies began paying them consultancy fees. This practice became known as "payola". To the companies it was no different than paying for advertising but in the innocent days of the 1950's when Time magazine ran a lurid account of a disc jockey convention under the headline "Booze, Broads and Payola", the fat was in the fire.

A Congressional Investigation was set up. However, the impetus behind these hearing was related to an assumption that rock was 'bad' music and that it encouraged juvenile delinquency. In the end, Congress made payola a crime punishable to a Fine of up to \$10,000. It drove payola underground but didn't stop the companies trying to get their releases played on the air.

Pop singles, on which AM radio subsisted, were losing out to long-playing albums, however, and by 1960 accounted for only about twenty percent. In the growing market for albums the companies found a dependable base of operations. 'My Fair Lady', the Lerner-Loewe musical opened in New York on March 15, 1956. Columbia's original cast recording, eventually sold over six million copies. The competition was quick to catch on. Record companies bid feverishly for original-cast rights to just about every new Broadway musical that came along. Along with the hits - West Side Story, Fiddler on the Roof, The Sound of Music, Hair - went some disasterous flops.

Closely related were the soundtracks of Hollywood musicals. 'The Sound of Music' soundtrack album has had the largest sale of any LP in history - fifteen million copies to date. Record companies, however, had their own success stories too. A long series of best-sellers, released by Columbia from 1958 on called 'Sing Along with Mitch', eventually sold ten million copies, Fig. 117.



FIG. 116



FIG. 117





FIG. 118

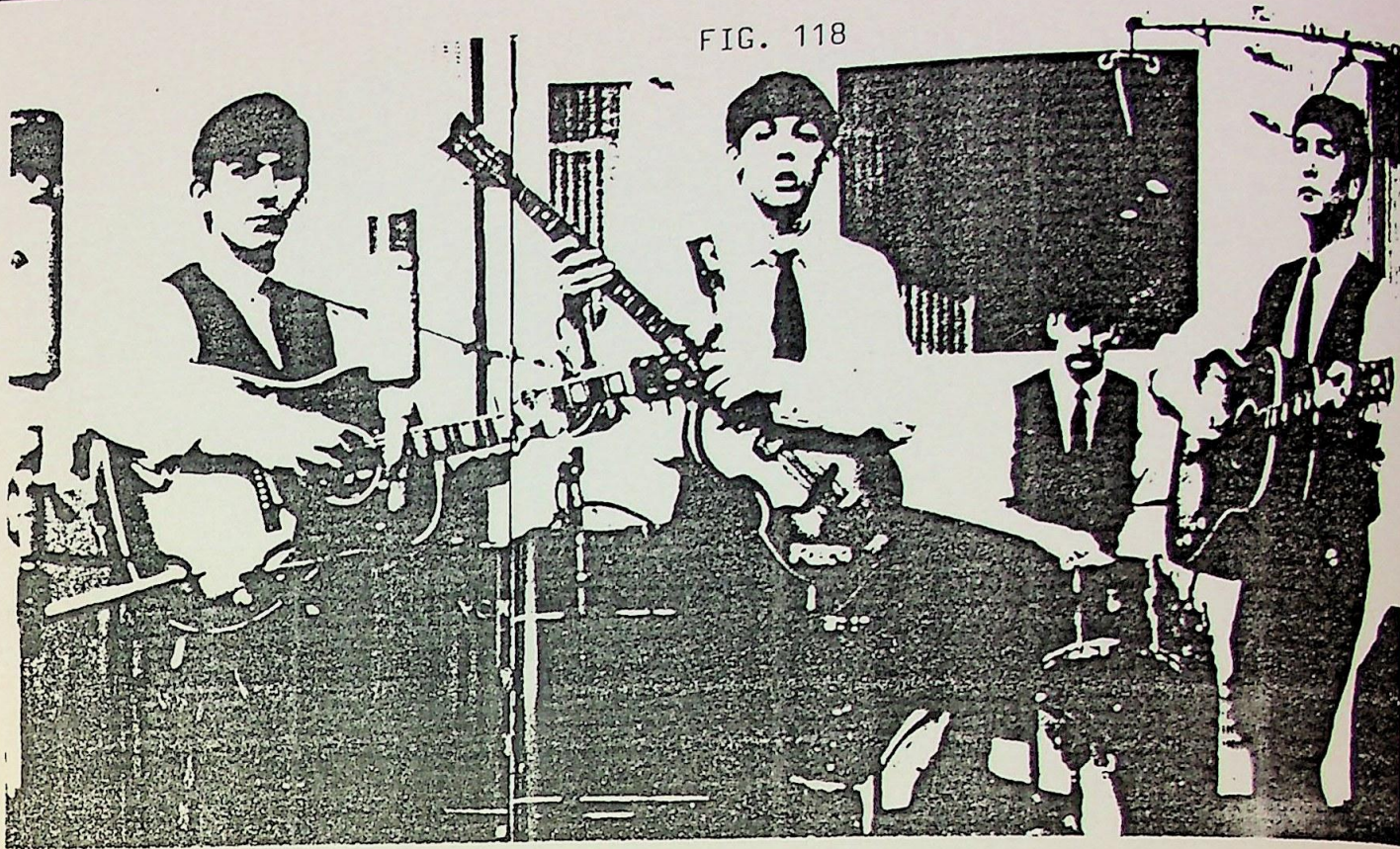


FIG. 119



FIG. 121

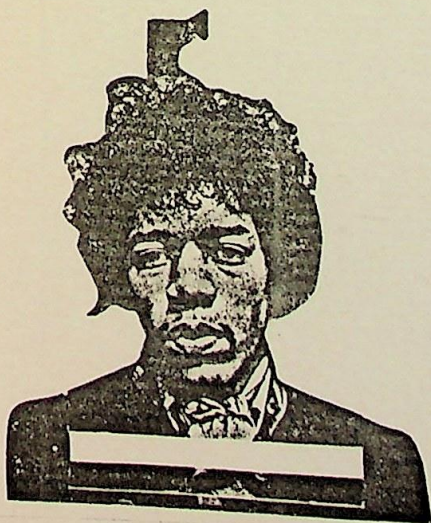


FIG. 120





All this, plus the fact that even Presley seemed to have defected since his duty with the army, sustained a growing conviction among record moguls that rock had been a passing aberration and that the future lay in cultivating the so-called MOR (middle-of-the-road) repertoire. Rock and Roll's momentum seemed to have been spent. Then the Beatles appeared.

From an apprenticeship in grotty Liverpool nightclubs, the Beatles rocketed overnight to international noteriety, performing an inventive and insouciant version of American Rock and Roll. Their manager, Brian Epstein, got George Martin, a producer from EMI, interested in them and The Beatles' first disc for EMI's Parlophone label - "Love me do" backed with "P.S. I love you" - was released in October 1962, Fig.118. Soon the British Isles were awash in a flood of Beatlemania, By the end of 1963, seven million Beatles singles had been sold in Britain. Across the ocean, Capitol, which had been taken over by EMI in 1955, released "I Want to Hold Your Hand" on December 30, 1963. Within three weeks it had sold a million copies.

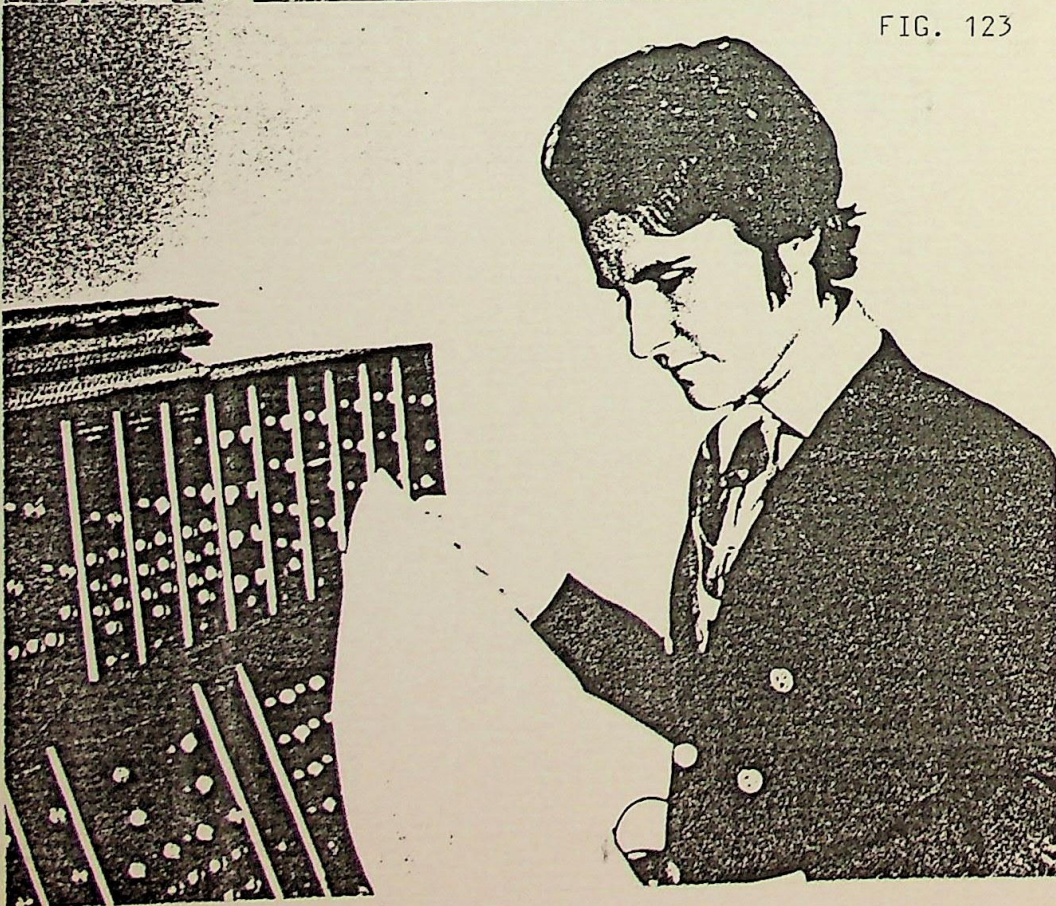
The Beatles not only revitalized the dormant rock revolution, they altered its direction. After the Beatles, the rock performer began to be seen not just as an entertainer but as a social visionary, a cultural trendsetter, a questioning, fashionable, archetypal citizen of a new society, They also pioneered the "concept album" with Sgt. Pepper's Lonely Hearts Club Band released in June 1967. Never before had pop music so creatively exploited the resources of electronics. Sgt. Pepper was recognised as an aesthetic breakthrough: not just a collection of hit singles, but a musical statement to be savoured as a totality. It was The Beatles biggest seller - six million copies - and it hastened the decline



FIG. 122



FIG. 123





of the 45 rpm single. After Sgt. Pepper the pop record business was essentially an album business. By 1985 their share of the total record market had dropped below six per cent. Most singles sold today are 'extended and re-mixed versions' of the song in a 12 inch format.

In the late 1960's the counter-culture emerged as an inescapable presence in American society, Fig.119 +120. It began in San Francisco and soon the hippie lifestyle spread across the country until wherever one looked there were long-haired, blue-jeaned kids "doing their thing". For the Woodstock generation, rock was not only a favoured form of entertainment, but a vital conduit of communication and they consumed it voraciously. The Beatles first, and finally a succession of new American groups and superstars - The Monkees; Simon and Garfunkel; The Lovin' Spoonful; Janis Joplin; Blood, Sweat and Tears; and Jimi Hendrix; Fig.121. All sights were now trained on the youth market, and when the returns were in for 1967 the industry discovered it had passed the billion-dollar mark in annual sales.

The classics had shown a modest sales increase each year but nothing like the dynamic acceleration of pop; by 1985 they accounted for only five per cent of the market. Rock had created mass-market expectations which the classics could not sustain. Only twice during this period did a classical release attain the kind of success that had become routine in the pop category. The first occasion was in 1958, when a young Texan name Van Chiburn unexpectedly won first prize at the Tchaikovsky Piano Competition in Moscow. He returned home to find himself a national hero greeted with a ticker-tape reception in New York, Fig.122 RCA lost no time in recording him as soloist in the Tchaikovsky Piano Concerto and it soon sold over a million copies.



FIG. 124





The other classical best-seller came exactly ten years later with a Columbia album entitled Switched-On Bach. This was a collection of short Bach pieces rendered electronically on the Moog synthesizer by Walter Carlos, Fig.123, a young musician with a background in physics. In time it too sold over a million copies becoming the biggest classical record ever.

If the 1960's were swinging, optimistic, full of innovation, the seventies, Fig. , brought disenchantment, stagnation, a negative feeling and finally the baying, destructive anarchy of Punk Rock. The drug culture may have expanded some minds but it had also reduced some lifespans, including those of the pop idols Jimi Hendrix, Janis Joplin and Brian Jones.

Revolutions are seldom achieved without violence; and though in the case of design this does not usually mean blood-letting, some kind of definitive assault on established values had to precede the regeneration of design and the decorative arts. That assault came from Punk Rock, Fig.124, the most original and influential stylistic movement of the seventies. Here for the first time was a popular movement which was too hot for commerce to handle. EMI gave the Sex Pistols, Fig.124, headed by Johnny Rotten, a contract - but were forced to cancel it, with a big pay-off for the Pistols, because of the damage to their own corporate identity by the Sex Pistols outrageous behaviour on and off stage.

The Braun Cockpit 250, Fig.125, from 1970 was an effort to get a "young" look at as low a price as possible, but without undermining minimum hi-fi quality requirements. A similar desire for a "young" appearance on a stereo can be seen in David Sykes group Glo.e system Hi-Fi unit, Fig.126 also from 1970. The LZGO Loudspeakers, Fig.127, were



FIG. 125

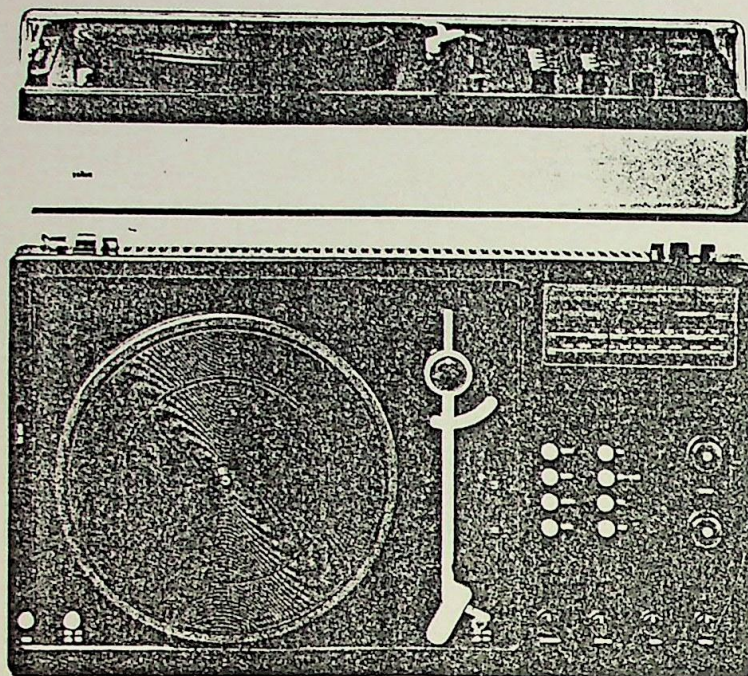


FIG. 127

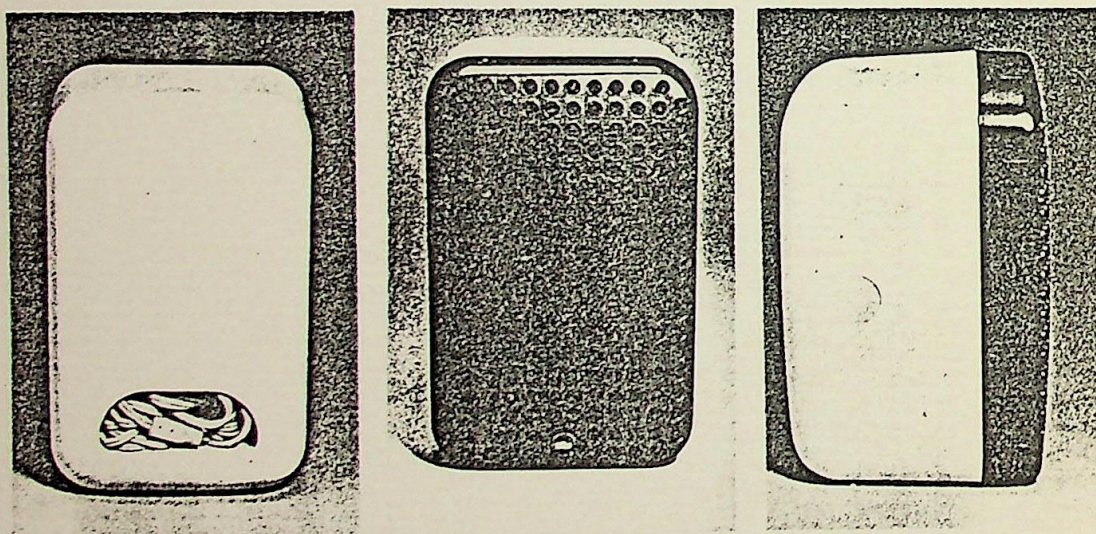
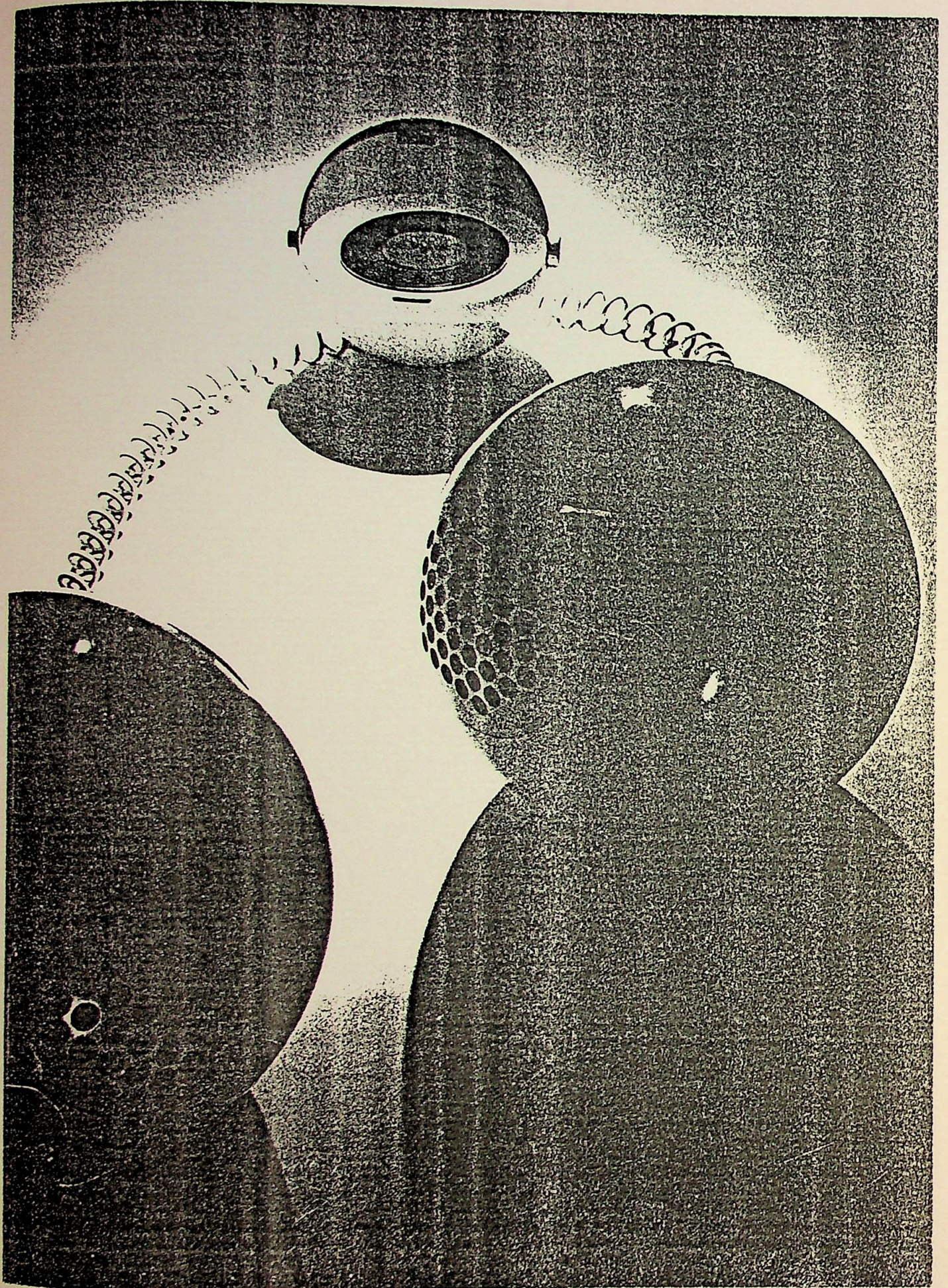




FIG. 126





developed to match the Braun Cockpit. They were also made of plastic and designed for mobility. The large diameter of the front panel perforations generated from the characteristic qualities of the material used.

In 1973 Braun decided a new form for their audio products would permit further progress in performance and operating convenience. A larger production output was planned, and it therefore seemed sensible to substitute the cabinet materials used so far with plastic. The designers developed a casing made of two plastic shells for the audio 308. Fig. 128. Only the top shell needed post-processing work due to the many perforations required for the operating elements. To keep it optically as flat as possible, the top was slanted towards the front. It also signalled operating convenience, extending an invitation to use the unit.

The  $8^{\circ}$  slant was the formal element in other components of the system. The loudspeaker's surface slant permitted directing the sound dispersion towards the listener. Both the receiver and the loudspeaker were mountable on a wall. Fig. 128 shows models of a design study which examined complementing the system with a television set and arranging it in different ways. The idea of the "Home Entertainment Centre" was obviously being explored by Braun at a very early stage.

With the Audio System P4000, Fig. 130 (1977) the idea of a system of sets was thought to be the very end in considering details of production. The cabinet of these units consists of a front and back profile that can be cut on the assembly line to any desired length, enclosed by two side panels to the left and right. Each of the components - record player, cassette deck and receiver amplifier - can either be built into the cabinet singly



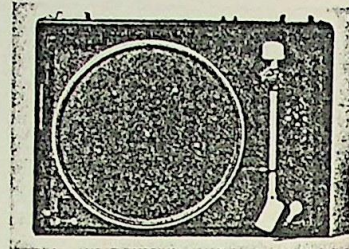
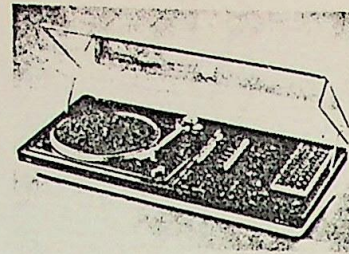
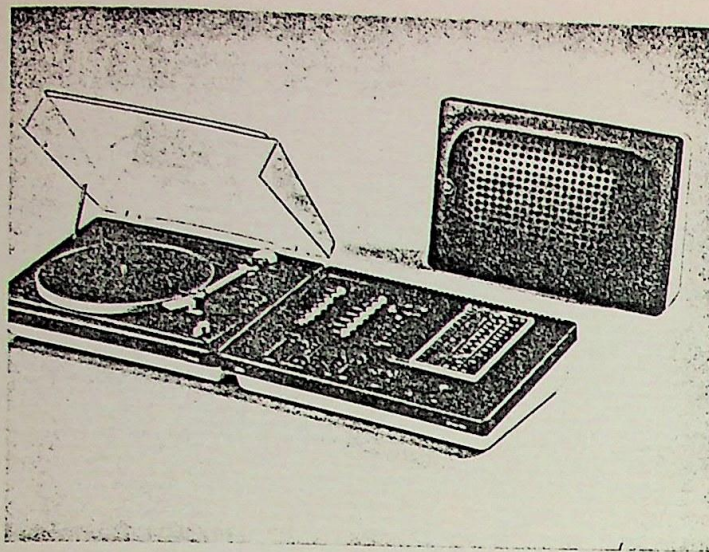


FIG. 128

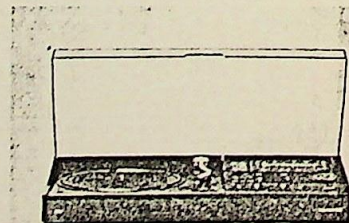
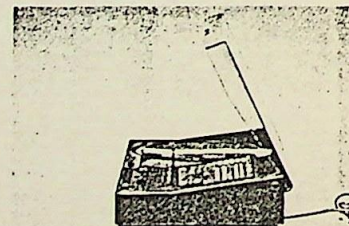
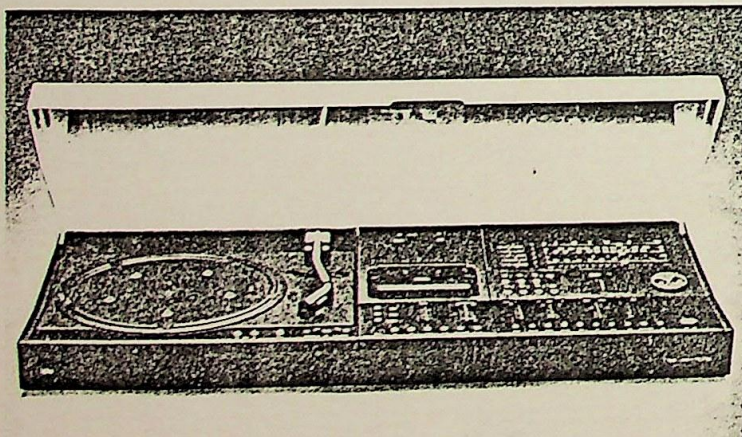
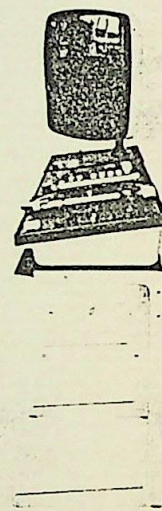
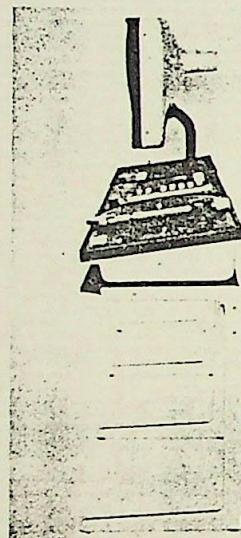
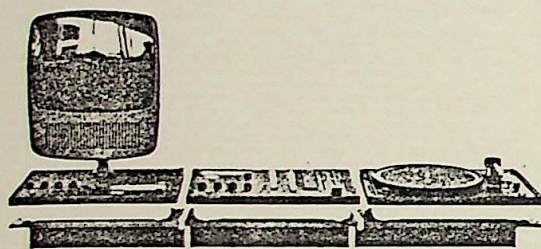
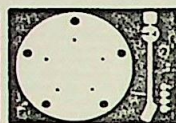
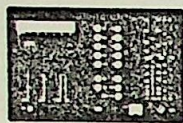


FIG. 129



or in any desired combination. Record player - receiver and record player - cassette deck - receiver combinations went into production. A combination of a cassette deck and a receiver were also considered. Dieter Rams has had a great influence in the development of the neutral and unaggressive appearance of Braun products since 1955.

#### IN RECENT YEARS.....

The world wide market for consumer electronics has undergone a rapid transformation in the last few years as new technology products were launched on a market which is highly competitive and volatile. There have been great developments in satellite and cable television and domestic use of telecommunications but two new developments which affected the existing markets for audio equipment are video discs and compact discs.

The overall pattern in the consumer electronics market in the 1980's has been a consolidation of the television and video market's dominance over audio equipment. Television and video sales accounted for over 60% of the total West European market in 1984 and could account for 80% of the market in 1986.

The audio market had reached maturity in many European countries and was in need of a new product innovation to revive the market. Audio separates have been consistently selling well but personal portable stereo players, after an initial rapid rise in sales, suffered badly from falling unit prices. In general falling prices and falling unit sales have combined to present major problems for the audio industry. A discussion on the prospects and types of equipment available today may be found below.



## COMPACT DISC SYSTEMS

Digital recording in the studio has meant a major step forward in audio technology. In the Digital recording studio of today the sounds picked up by the microphone are passed straight to a machine which encodes the signals into a series of numbers. The music is no longer stored on tape, where it would pick up extraneous sounds, but rests undisturbed in its number form until it is needed, whence it is decoded and goes, more directly and with less opportunities for distortion than ever before, onto record or tape. The Digital machine samples the sound and converts it into numbers at the rate of 50,000 times a second. Laser optics and digital pulse code modulation may have been strange bedfellows initially, but the result was, in short, the sound carrier of the future. Figs. 130 + 131.

This is the compact disc launched early in 1983. The basic software product is a 5 inch metal disc which contains on a single playing surface a digital message of millions of dots. The disc is played on a special player which scans the recording with a laser beam. There is no direct contact between disc and player, and the quality of reproduction is infinitely better than the traditional stylus and vinyl record. Almost 50 of its microscopic signal paths or grooves are contained within the width of a human hair, so running time is over one hour on each disc. Compact discs' success has been due to several factors.

Firstly, the superior quality available on compact disc had immediate appeal among the true hi-fi enthusiasts. The mass-market, being more price conscious, initially showed strong resistance, but now with a real demand growing, there is no doubt that the consumers are very



FIG. 130

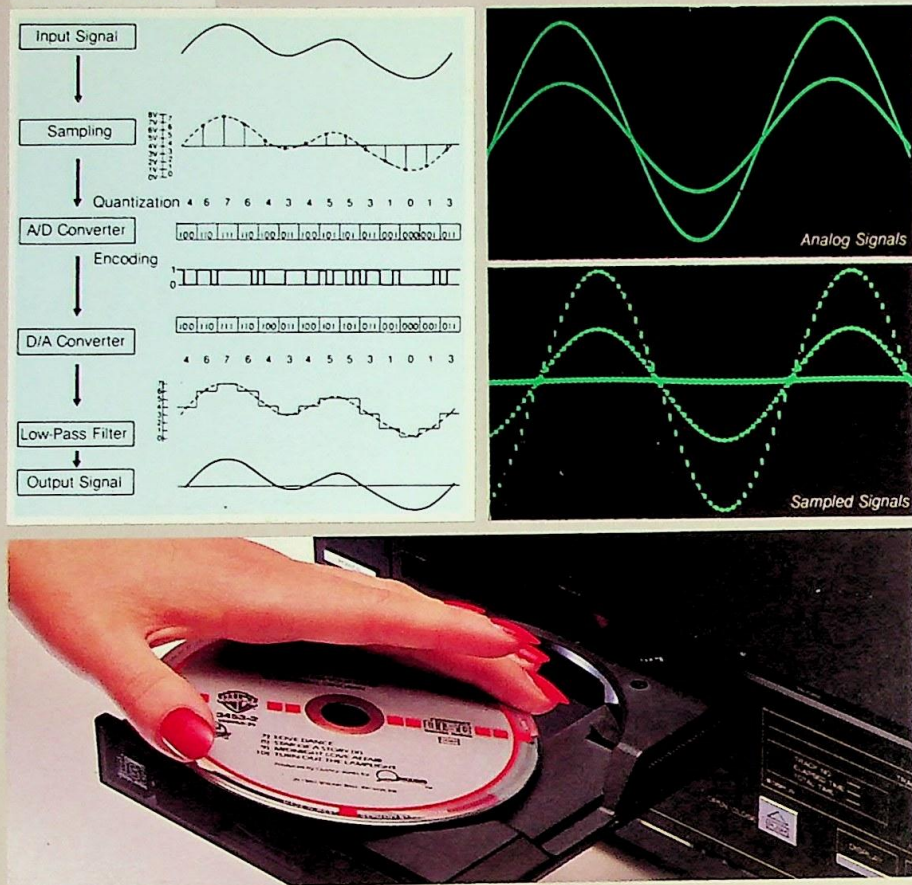


FIG. 131





FIG. 132



FIG. 133





aware of what CD is, and what it has to offer.

Secondly, record companies are bringing out more and more releases on compact disc. In the past, new product developments were suppressed by the lack of software e.g. microcassette and quadrophonic recordings.

Thirdly, the timing of the launch could not have been better, coming at a time when interest in audio was waning because traditional hi-fi systems had attained widespread levels of penetration.

Fourthly, the initial competitors in the market agreed upon a standard system and that prices should be held steady.

Finally, although the new system was not compatible with existing equipment it was integrated into existing systems. The prospects would have been bleak for a new product which expected consumers to abandon their hi-fi systems and their record or cassette collection at a stroke. Figs. 132 + 133.

Compact disc players incorporating amplifiers and/or tuners were launched in 1985, and these have since been followed by in-car players and then personal CD players. Figs. 134 + 135.

The growing attraction of CD to the buyer will lie in a combination of lowering prices and improving specifications. Of the very early, first generation machines, only the Sony CSP101 had full remote control and easy to use, rapid disc scanning facilities. Remote control will probably remain a luxury feature for some time to come - though some quite inexpensive models now include one. Fast disc scanning, with the audio output still present in muted form has come to be expected on



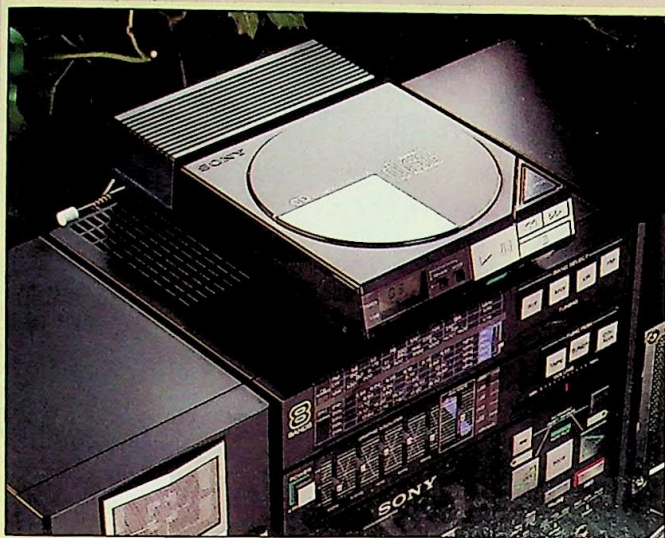
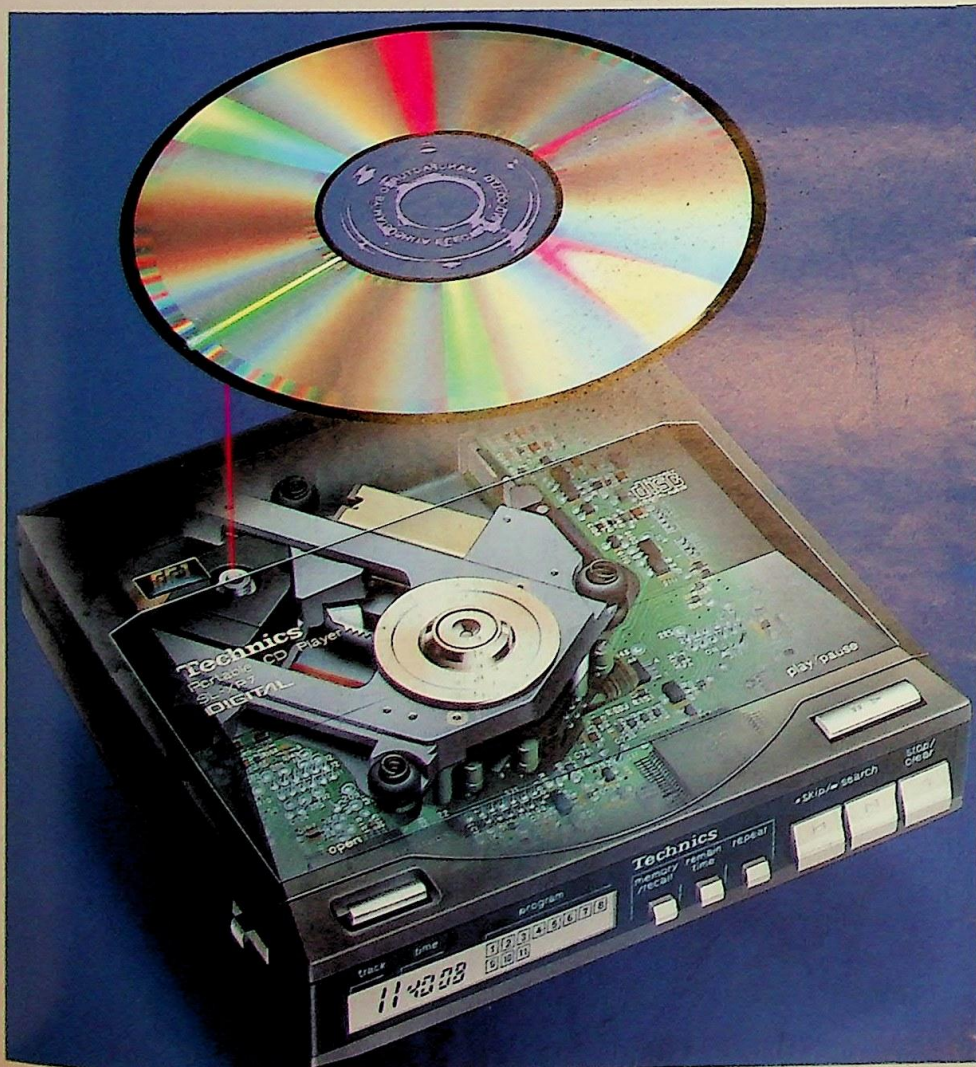


FIG. 134



FIG. 135









most, if not all, models to allow the system to behave more like the vinyl records they seek to replace. Records after all have always had random access as one of their major selling features.

Chapter search and other functions associated with CD's elaborate sub-code system look like waiting for the third or fourth generation of players which will probably arrive in a year or two. Whatever the developments, Compact Disc is in a position to tackle the entire audio equipment field and could become the standard music software by the 1990's.

#### VIDEO DISC SYSTEMS

Three video disc systems were launched onto the worldwide market in the early 1980's. The first was the Phillips Laservision, a superior product to either the other video disc systems or the video recorders but which met with considerable consumer disinterest at a time when demand for video recorders continued at high levels. Fig. 136.

The second product to be launched was the RCA/Hitachi/CED system first available in the US in 1981 which also had poor consumer response; sales to date have just exceeded one million units.

The third available system by JVC was launched in 1982. This is middle range between the other two. Since these initial models were developed, many companies have brought out their own models often as part of an integrated system of entertainment. The problem initially with Laser disc systems was that they came too early on the back of the





FIG. 136





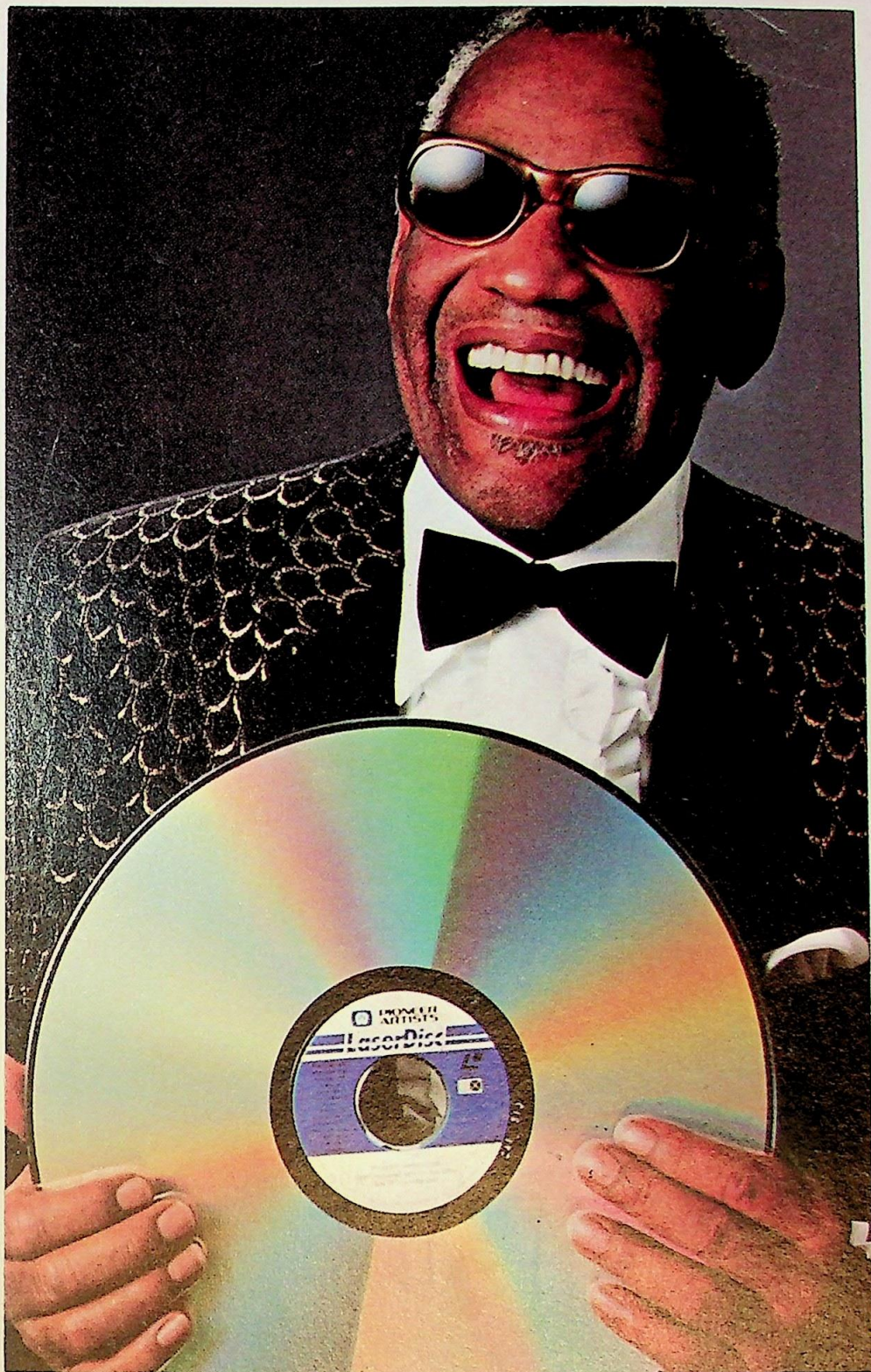
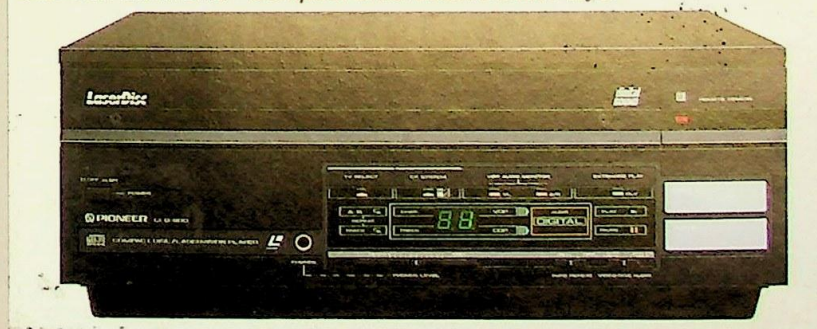


FIG. 137

CLD-900 LaserDisc™ Compact Disc/LaserVision Player





initial boom in demand for video recorders. Acceptance of consumer products depends above all on timing, so that new products arrive on the market at a point when the demand for the existing equipment is falling.

The two main advantages of video disc systems over video recorders are firstly that they offer better quality reproduction of sound and vision and secondly that they are cheaper to buy. At present it is undoubtedly the lower price that would prove the main attraction, with perhaps the cost of the discs themselves proving more important than the players. If they were reduced to approximate to the more expensive long-playing records, the market might improve, encroaching as much on the audio market as the video film market. Fig. 137.

Second generation models would be able to record, read and erase large quantities of digital data. Interactive videodisc games and realistic animation could make this medium a game players' paradise. Basically the Video Disc is a product that came too early and its future applications will probably be in combination audio/video systems in the late 1980's and early 1990's.

### INTEGRATED SYSTEMS

Integrated rack systems are now the largest and healthiest sector of the market, all but eclipsing the traditional separates, but the style of the systems has changed radically in the last year or two. Figs. 138 + 139.

The concept of the rack system arises naturally from the traditional music centre, and is entirely in accord with





FIG. 138





FIG. 139



FIG. 140

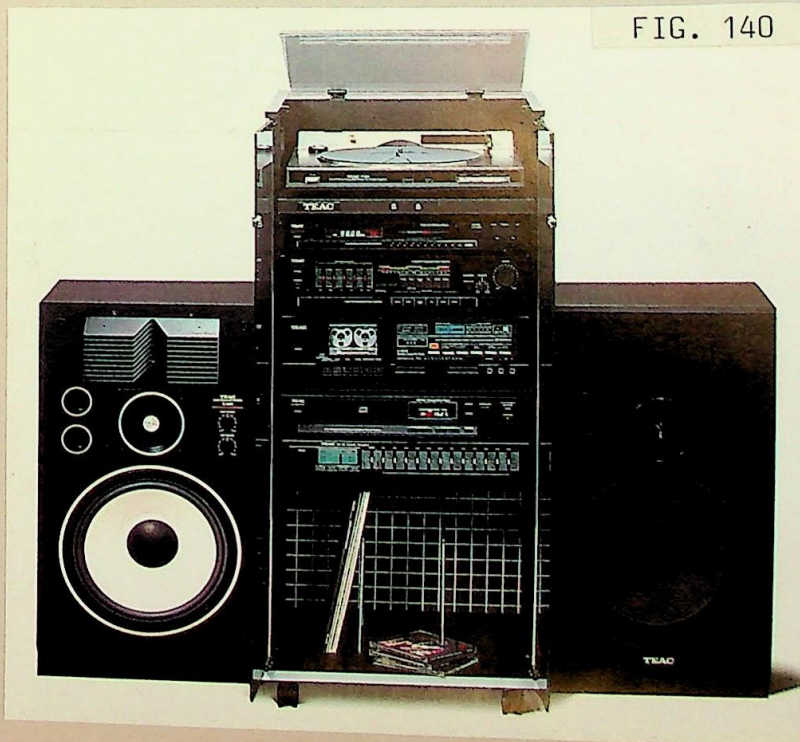




FIG. 141





FIG. 142

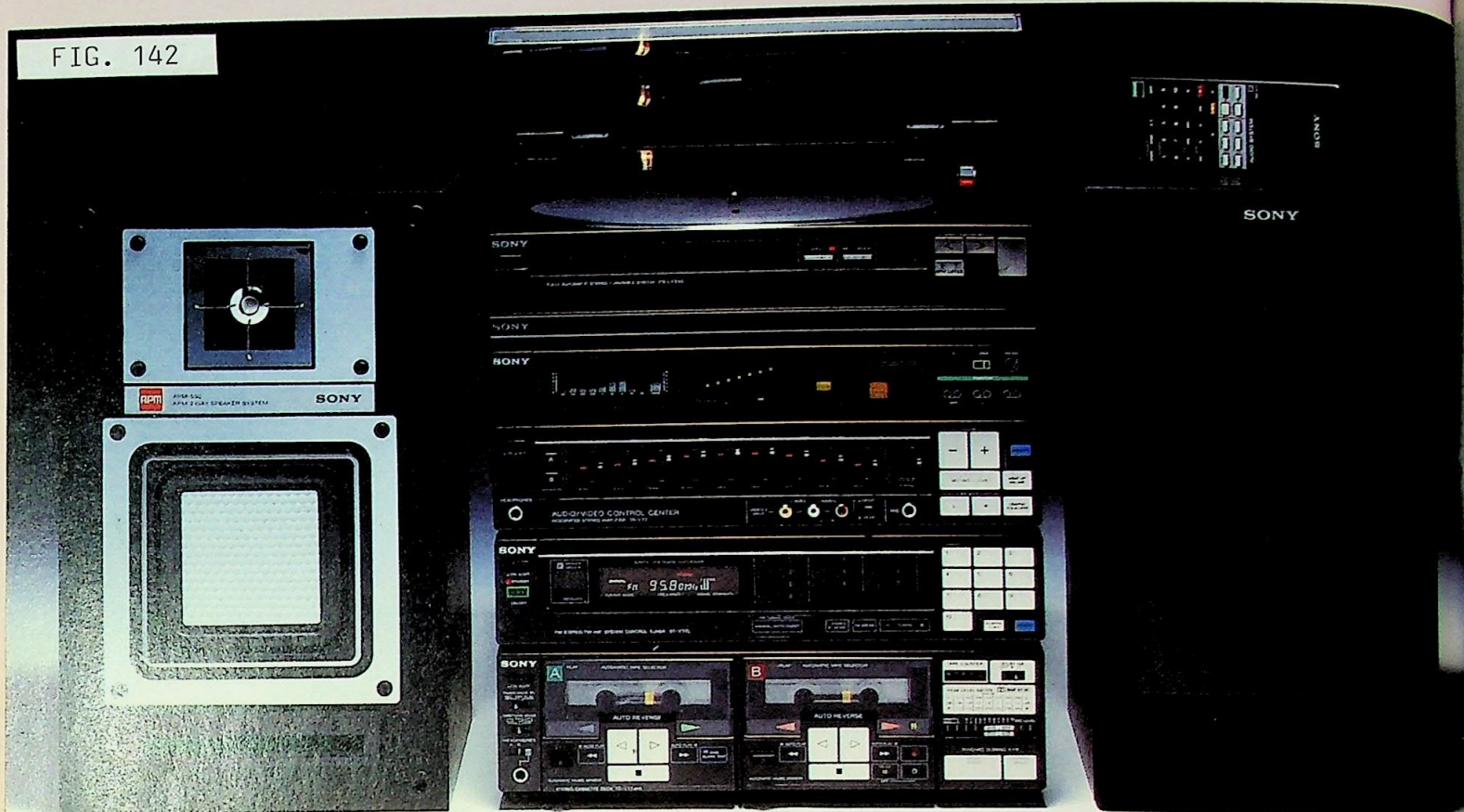


FIG. 143





changing life-styles. The old idea of high fidelity has been replaced by equipment that is easy to set up, easy to use, and visually attractive and uniformly styled. Fig. 140.

The music centre achieved these aims admirably in the past but it did not offer the prestige of component-based high fidelity. The integrated rack system appeared to answer this requirement perfectly. Here were all the packaging advantages of a music centre but achieved using high fidelity components or items that looked like high fidelity components. Fig. 141.

The disadvantage of the typical rack system is that it takes up a lot of space. 1984 was the year that people began to buy smaller size systems and 1985 and 1986 have seen this trend continue. Fig. 142.

The move to physically smaller systems has coincided with a number of changes to the electronics which together are making systems both easier to use and more versatile. Some systems now include a digital clock/timer and a significant proportion also have automatic source selection instead of traditional input switching. The modern breed of parallel tracking turntables lend themselves particularly well to the inclusion of various programming and in some cases an introsearch which plays the introduction of each track. The latter is also fitted to some recent cassette decks supplied with systems. Another increasingly popular feature is automatic tape type selection on cassette decks which is also paralleled in turntables by automatic record sensing and speed/size recognition. Sensibly employed, many of these features can make audio equipment very accessible to those who find the traditional type of product daunting. Fig. 143.

The features outlined above will become common place in



FIG. 144





FIG. 145

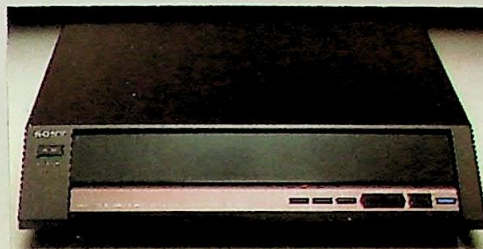


FIG. 146



FIG. 147





time to come but the most interesting recent development is the introduction of the Compact Disc player as a standard item, not an optional extra, in some rack systems. CD is now being promoted to the public at large and not just the wealthy record collector or avid hi-fi enthusiast. Fig. 144.

## SEPARATE COMPONENTS

### Turntables

With the recent trend towards more compact audio components and systems the turntable has had the hardest job adapting to the demands of miniaturisation. The traditional pivoted arm is wasteful of space, and the last 12 months have seen a mushrooming in the number of space-saving parallel tracking mechanisms from the major Japanese suppliers. Figs. 145 + 146.

Direct-drive motors continue to hold sway on the major part of the market as in years past, and the trend towards straight arm tubes with detachable headshells on pivoted arm-equipped turntables was also strong in 1985. Compact Disc continues to make inroads on the mid-market for turntables. Fig 147.

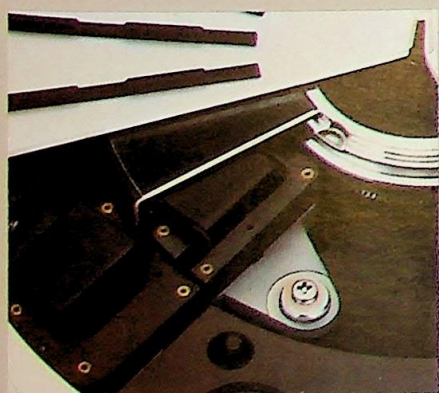
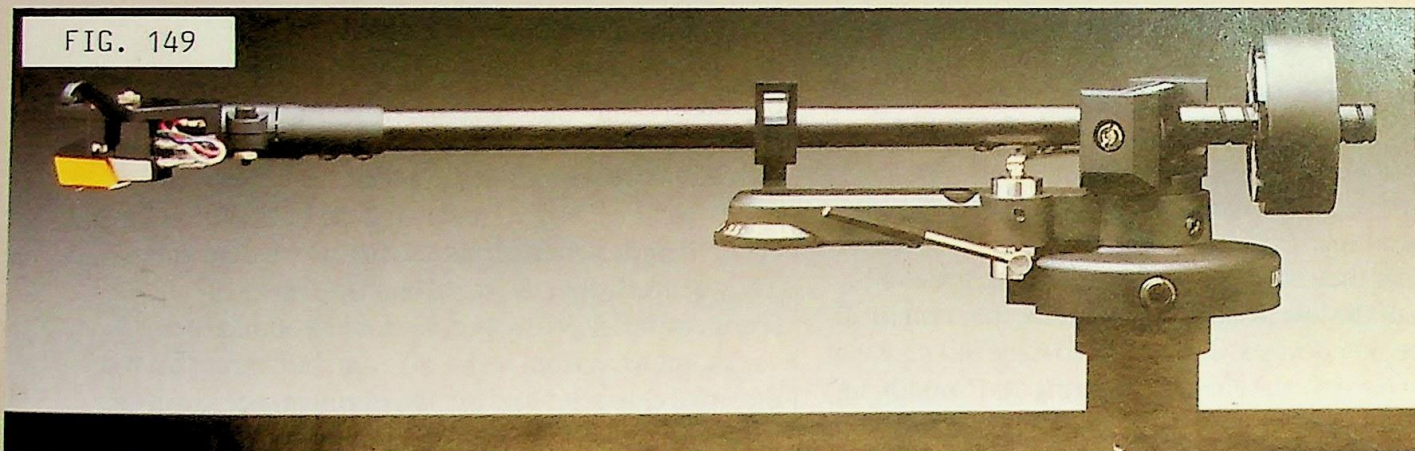
The up-market turntables are primarily belt rather than direct driven, and manual rather than automatic in operation. Most importantly, they are noted for the high level of mechanical engineering content they include. Typical up-market models have a heavy platter, suspended sub-chassis, manual speed change and an optional arm. Figs. 148 + 149.



FIG. 148



FIG. 149









## AMPLIFIERS, TUNERS & RECEIVERS

In a fairly superficial way, Compact Disc has made itself known to amplifier designers too. A large number of 1984 models began sporting CD inputs. 1985 saw a rash of CD-ready amplifier designs where the power amplifier has been tailored for use with this medium. Fig. 150.

Most changes however have been cosmetic. As many separate components serve the dual purpose of being sold for use within systems as well. The number of compact amplifiers has increased recently. Aside from this, there has been a noticeable swing toward a slightly simpler front panel presentation with less superfluous facilities and the omission of the once ubiquitous power output level metering. Fig. 151.

The market for receivers in place of separate components now appears to have bottomed out, and they are now taking a substantial and increasing slice of sales. With the trend away from the complexities of traditional component high fidelity obvious in many markets, there are good reasons to think that receivers will become more, rather than less popular in the short-to-medium future. Fig. 152.

## CASSETTE DECKS

The very crowded market for cassette decks has seen a fairly considerable amount of activity in recent years. The most interesting development concerns a major innovation that has not been widely adopted.





FIG. 151

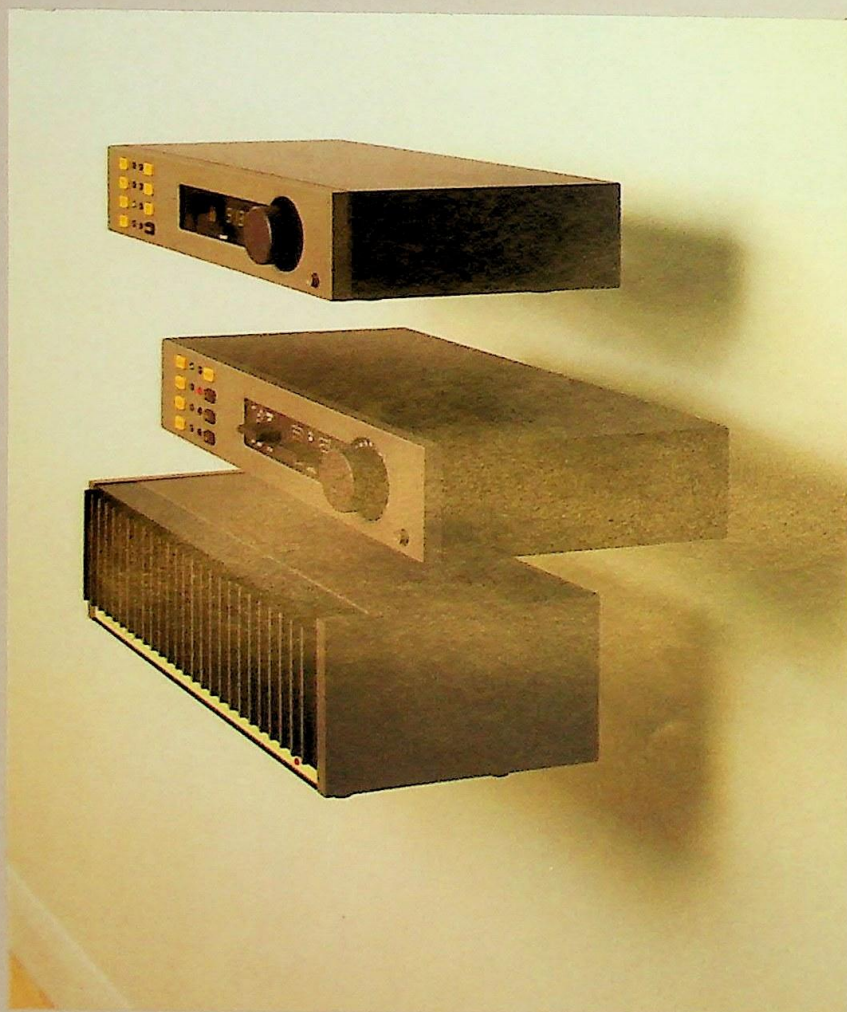
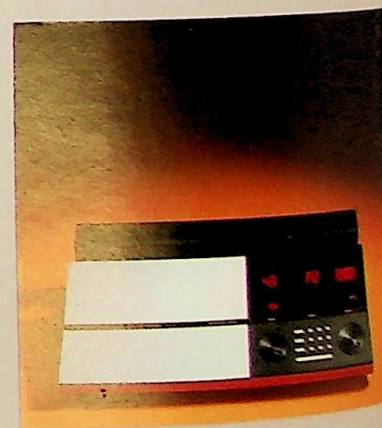






FIG. 152





This is Dolby HX Pro, which continuously varies record bias to take into account the self-biasing contribution of high frequency signals being recorded. The actual bias reaching the tape is designed to stay constant with HX Pro, and the result is a clearer, more dynamic sound especially when using lower bias Type 1 and 11 Formulations. Although manufacturers have been slow to adopt the system, 1987 should see some of them joining in. Fig. 153.

Otherwise, auto-reverse decks have appeared with elaborate rotating head assembly designs to avoid any tracking errors. The traditional 'counter memory' has now all but disappeared, its place taken by track search functions which look for the gaps between tracks. Virtually all mid-price and higher specification decks are equipped for track search, and there is a visible trend for this feature to creep down market. The replacement of mechanical tape counters by electronic ones scaled in minutes and seconds has been much slower to take off. More expensive models with real-time counters and incorporating such features as a 'time remaining' indicator should be seen in 1987. Figs. 153 + 154.

#### THE FUTURE

The argument that music listening is waning as a leisure pursuit is not supported by any survey findings, and is largely based on the depression in various sectors of the market. This, however, has come about because of other factors: the record industry is depressed because of illegal home-taping; the audio market has been saturated by portable products, in-car products and audio separates,



FIG. 153

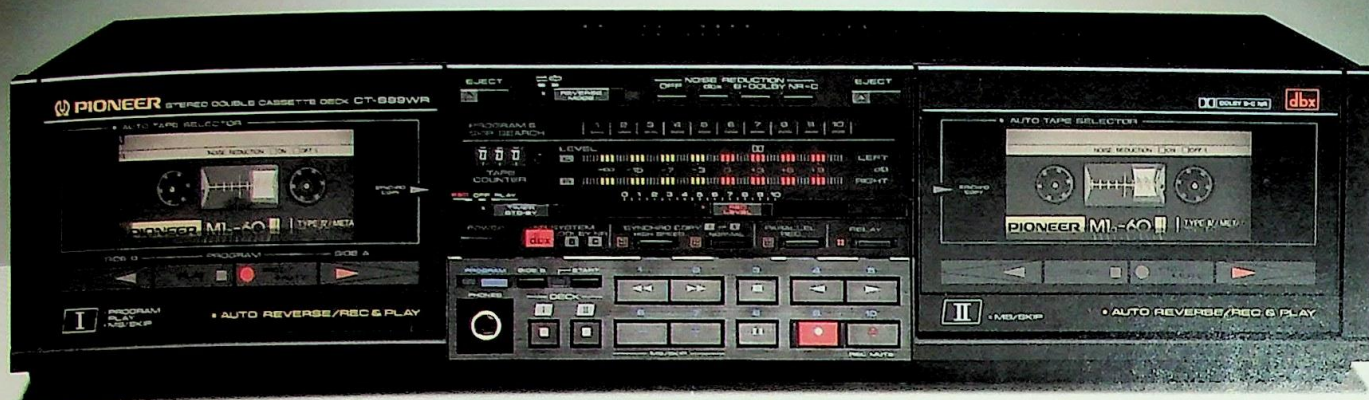


FIG. 154



Counter display



Lap time display



Remaining time display



Music search display

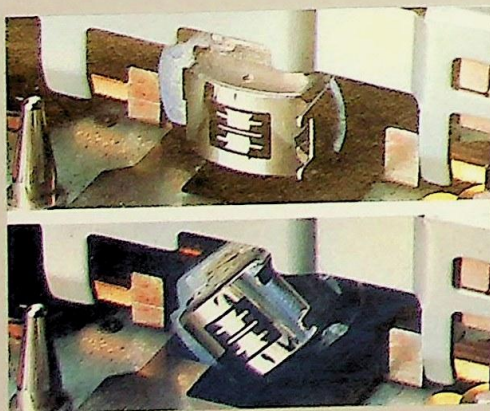






FIG. 155





and ownership levels by people is at deterrent level.

Clearly records and cassettes are having to compete with independent local radio and music videos, but this is not an indication of a decline in music listening per se, only a shift in the way that music is heard. In this sense a new medium offering superior quality has a real chance of success. Fig. 155.

The prospects for compact disc systems are encouraging, but it will take a few years for audio to re-assert itself following the video and television boom. The widespread development of cable television will keep the pressure on audio, but it looks like compact disc systems will enjoy massive growth in the 1990's.

As hi-fi equipment becomes ever more ingenious technically, so a few pioneers are simplifying things aesthetically and making brave attempts to break traditions of current high tech design. These designs are often developed by applying sculptural wit to hitherto dull consumer electronic products. The boom in personal portable cassette players in recent years has led to a few similar design concepts which may well appear before the end of the century. The Personal 3D TV is an idea developed by PA Design. It would be a stereo, 3D, panoramic, twin screen, portable, personal, battery powered, Walkman-style colour television receiver and video cassette player. Figs. 156 + 157.

With each eye viewing a separate screen, the user would see specially filmed television as three dimensional thanks to a unique combination of cleverly integrated design and technology. From a battery of video microcassette stored in his headband the viewer could select anything from Bruce Springsteen to the Whole Earth Catalogue, windsurfing technique action replays to



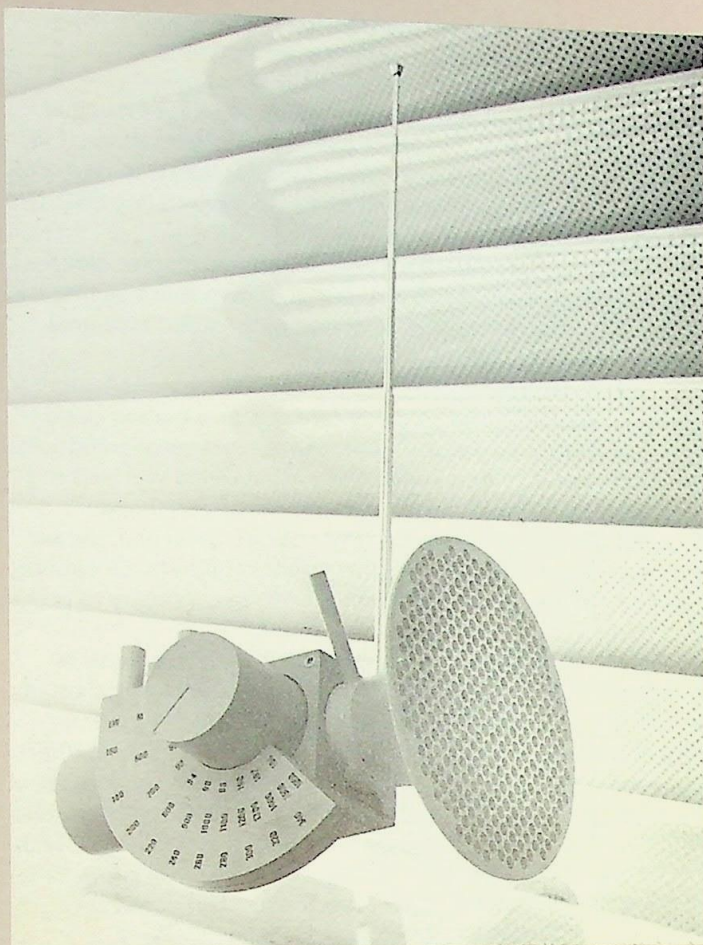
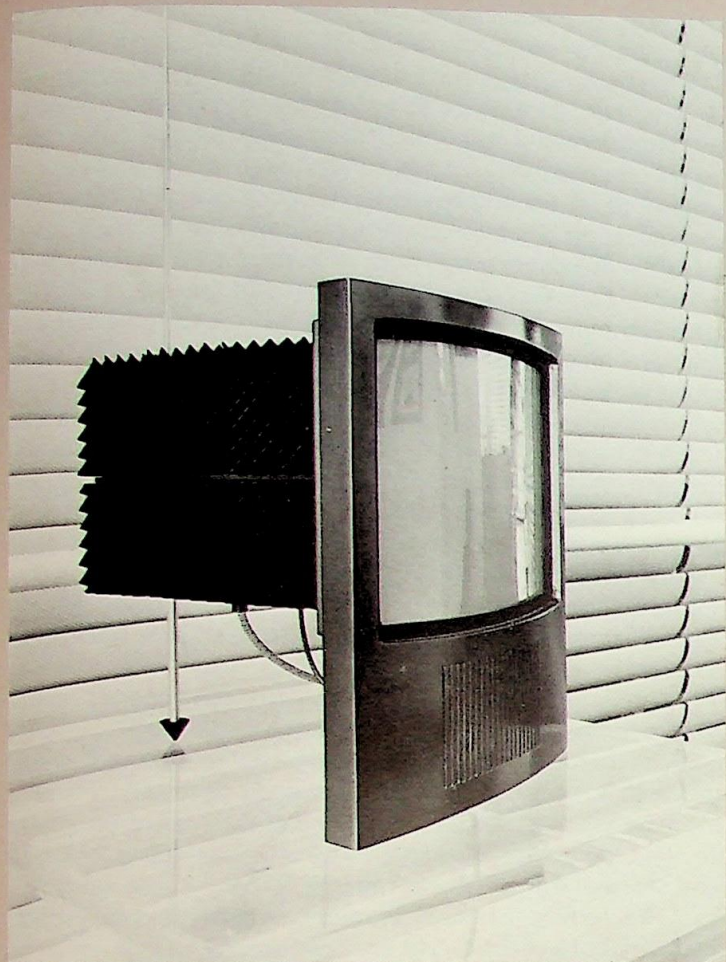


FIG. 156

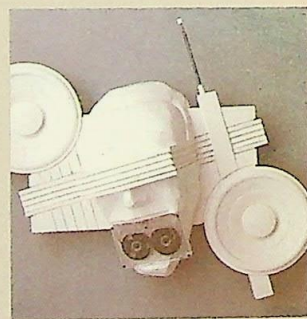




FIG. 157

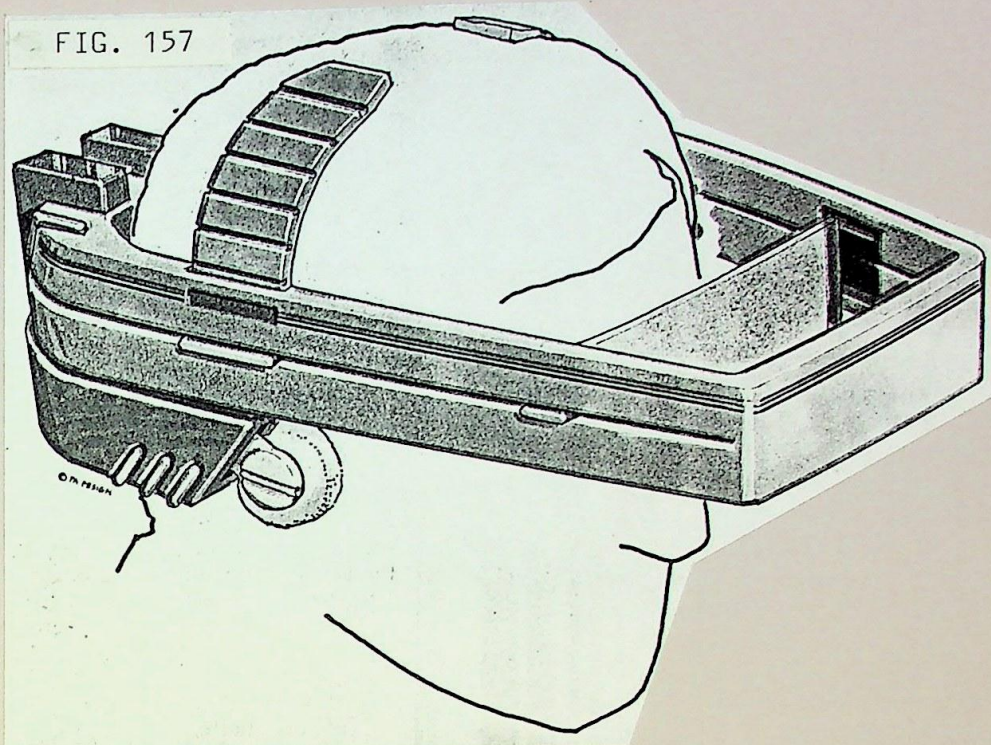
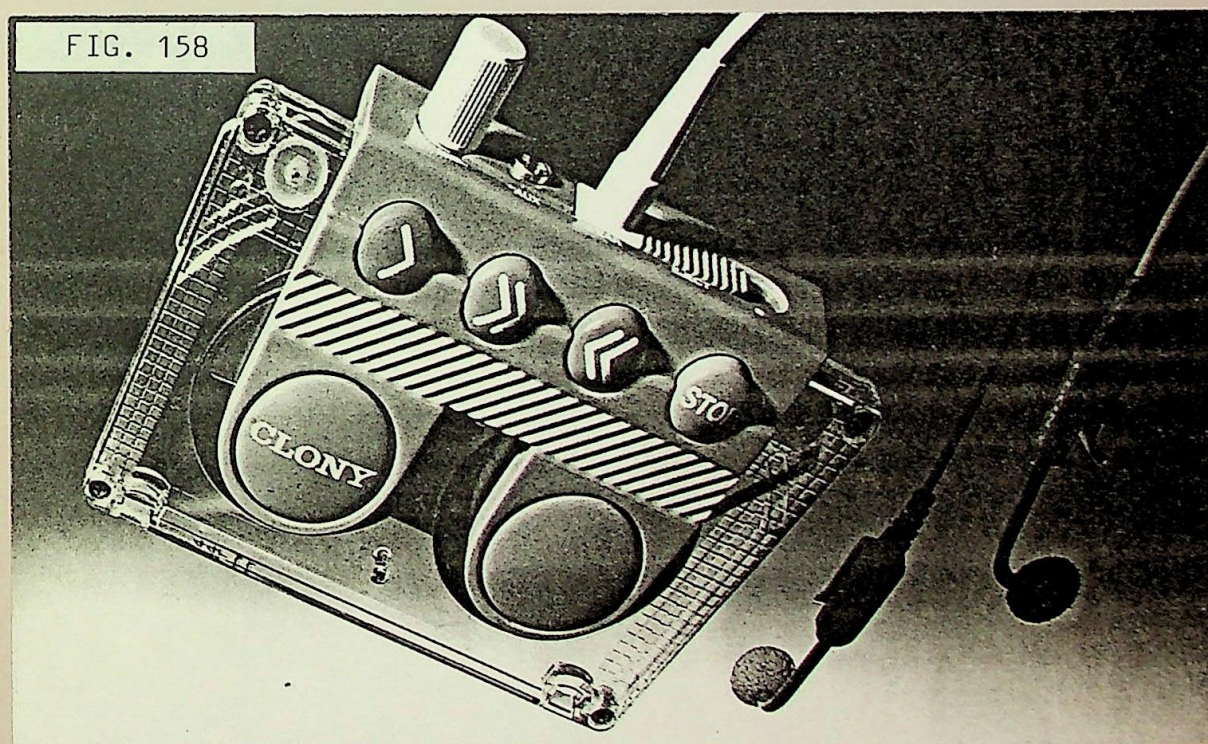


FIG. 158





confidential stockbroker client reference files. In addition, the viewer could receive select broadcast channels on his integral loop aerial, or plug into his keyboard and use the product as a computer visual display unit. Then there is the add-on video camera facility.....

A concept for an ultra compact Walkman, so small it clips directly to a standard cassette is one of a series of ideas for the future from Fether & Partners, design consultants. Design and miniaturisation skills would combine to produce one 44mm x 60mm world beating, ghetto-blasting trend setter, hi-tech, high fashion and fun. Fig. 158.

So where does the future lie for Edison's fabulous invention, - 'the industry of human happiness'. Developments in the future will take two forms - fashionable and technological innovation. There has been some degree of product innovation, although recent changes in specification have been largely cosmetic such as the fashion change from horizontal to miniature rack systems. The compact disc should prove a major growth area but it may be some time before consumers are inclined to spend large sums replacing their existing equipment. In terms of technological innovation, the future probably lies with integrated home entertainment centres which will incorporate stereo television and video records as well as hi-fi. Such systems should appear on the market in 1987. However, with the visual element of increasing importance in musical entertainment, it may be that the future will lie with the hi-fi stereo video recorder and the video disc rather than with hi-fi systems as they are currently understood. Figs. 158 + 159 + 160.

Yet whatever is to come, the phonograph has passed its centennial (1877 - 1977) with a sense of a mission fulfilled. As it heads into its second century the crude



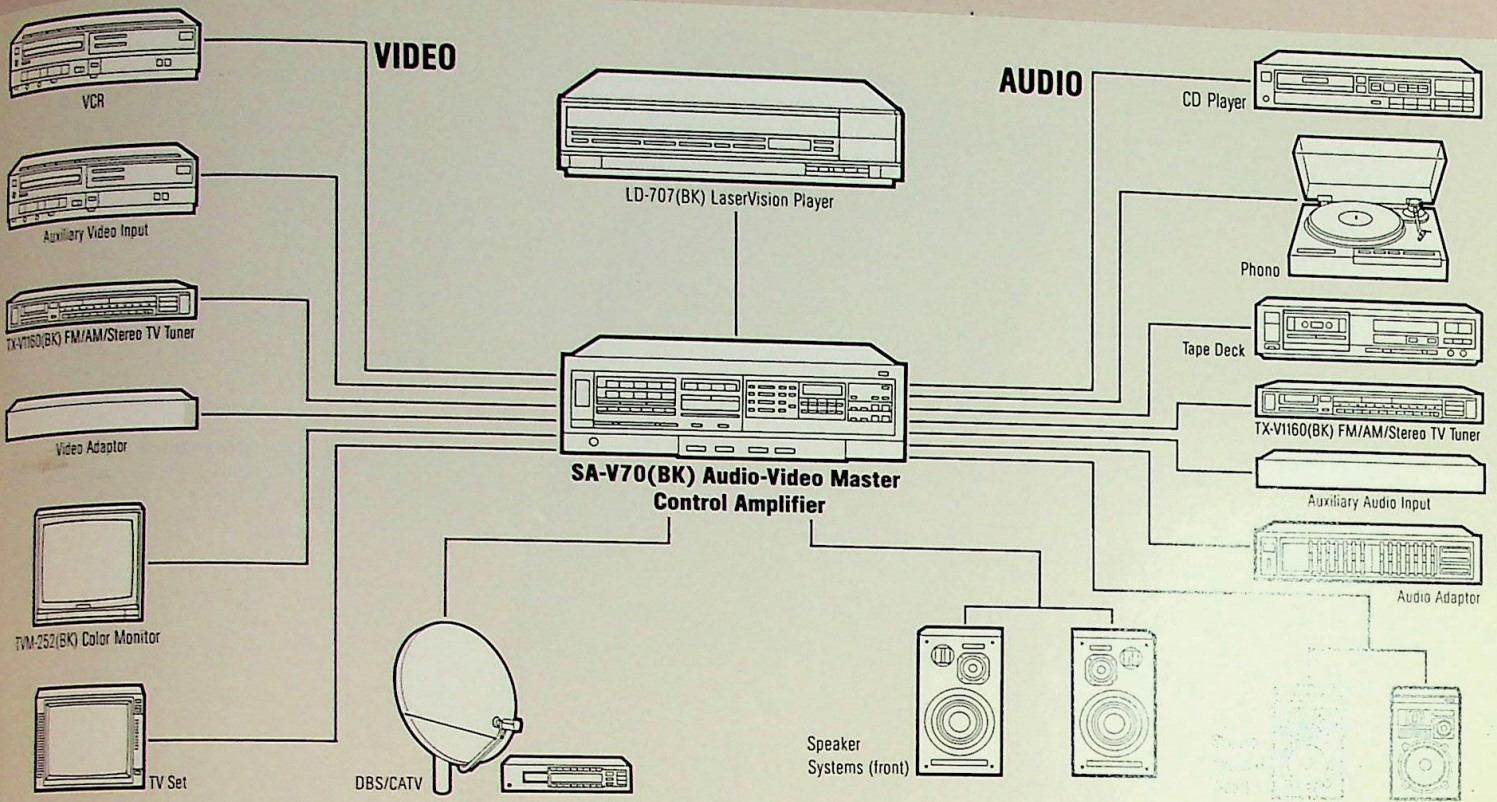


FIG. 159

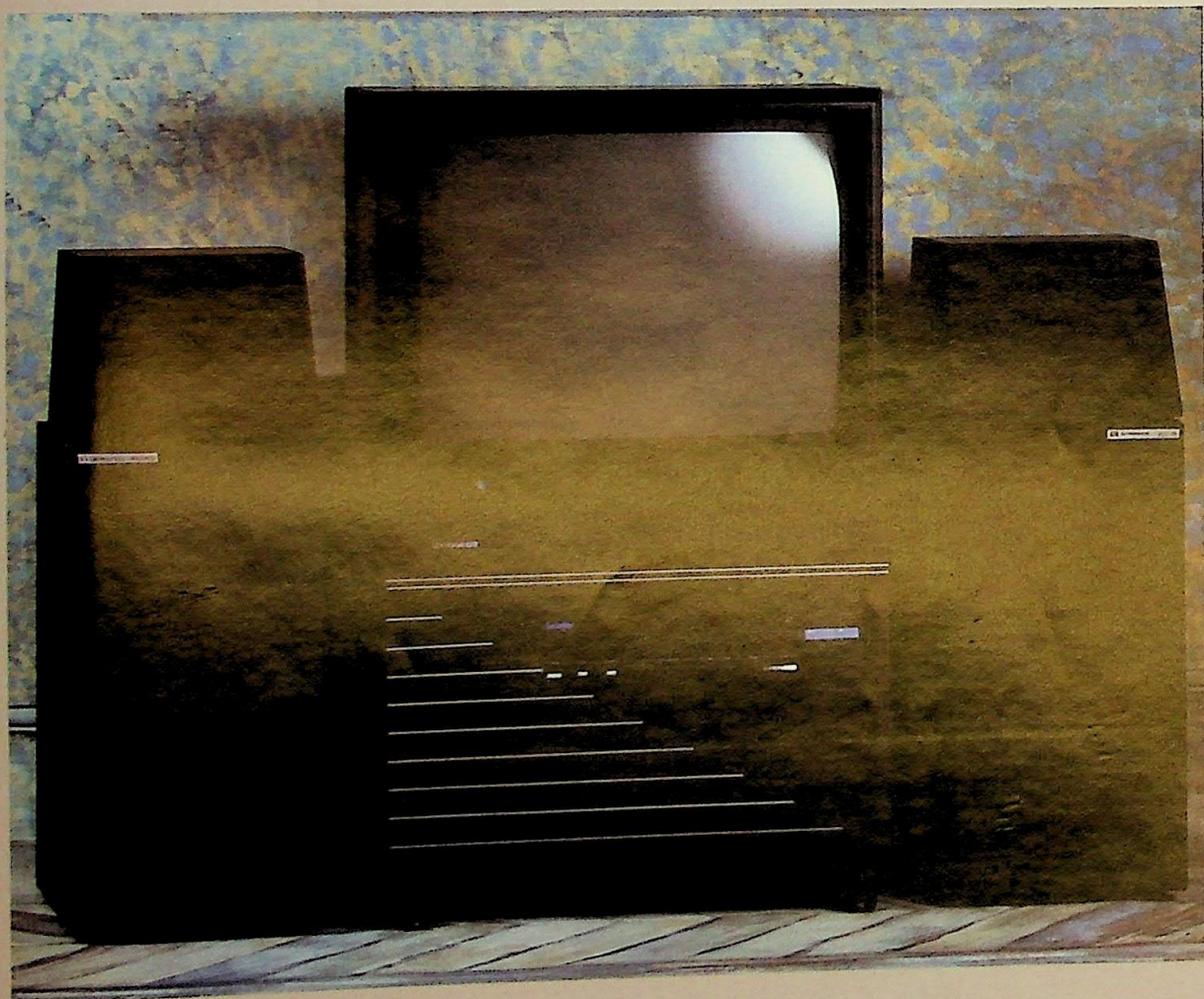




FIG. 160









instrument that talked has developed into an instrument of infinite resource. A partisan historian could perhaps be forgiven for claiming it as the chief marvel and solace of the century.



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