# The Development of the Vacuum Cleaner

Anne O' Brien

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THE NATIONAL COLLEGE OF ART ADN DESIGN

T H E S I S

# THE DEVELOPMENT OF THE VACUUM CLEANER

FACULTY OF DESIGN:

DEPARTMENT OF INDUSTRIAL DESIGN

NAME : ANNE O'BRIEN

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C O N T E N T S

INTRODUCTION:

A vacuum cleaner is a device which is used to remove dirt. It was first introduced as a manual device in the mid 19th century. These devices were not further developed until the introduction of the electric motor. They were very cumbersome devices at first. Some were so large that they had to be installed in the home as part of the structure. As technology developed, it was feasible to have smaller units, but it was not until 1906 that the first portable electric vacuum cleaner was realised. As the technology became more refined the development was concentrating on the visual appeal of the product rather than the technology.

From the 1920's onward manufacturers became aware of the importance of design in their products. But is was not until the 1930's that they began to employ industrial designers. These designers made the products more attractive to a reluctant public. As the form developed and the vacuum cleaner began to achieve it's own identity the designer reverted back to experimentation and exploration of materials and technology. This thesis tries to analyse why these changes have occurred and what the result of these changes have been.

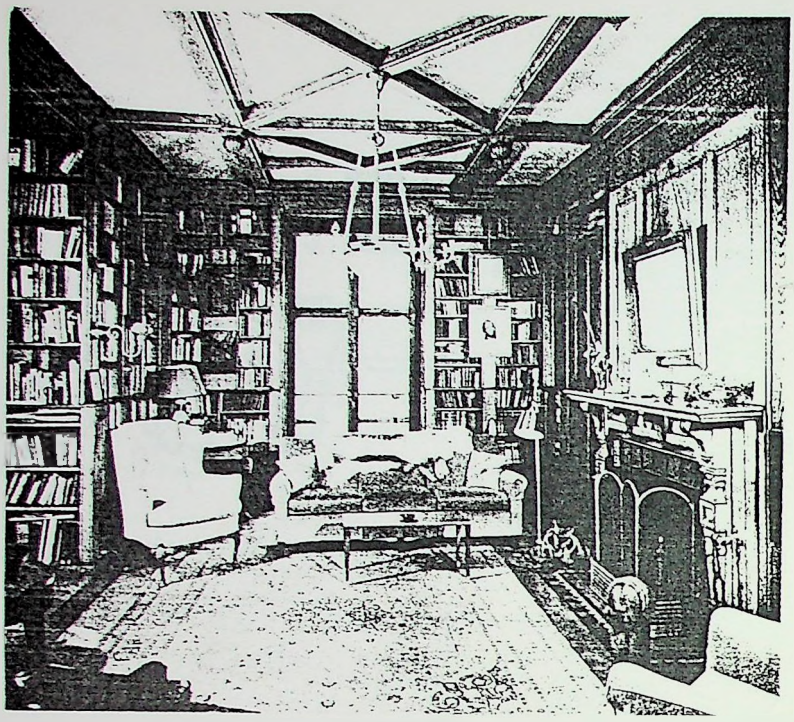
CHAPTER 1.

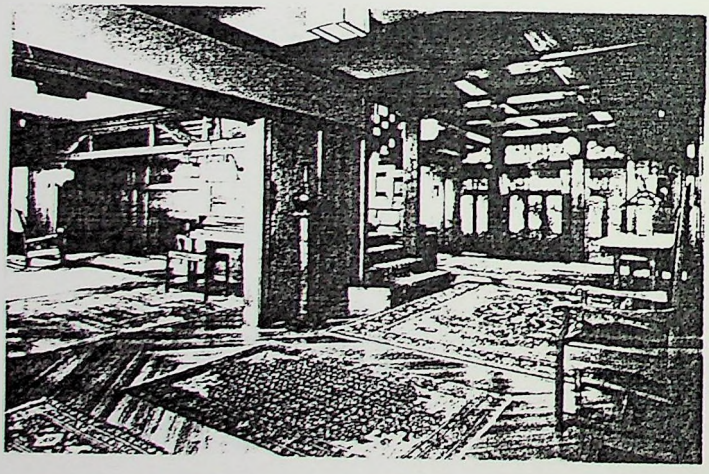
Invention Of The Vacuum Cleaner Mechanism.

The basic principle of the vacuum cleaner was developed in the 1850's before the introduction of the electric motor. At this stage they were called dust removers. As the public health movement of the 1840's and 1850's made people more wary of the hassards of dirt, people began to desire a higher standard of hygiene in the home. For the lady of the house to create the correct atmosphere in the home she had to have it clean and uncluttered. It was expected that the home was a moral haven uncorrupted by the deceits of the world. To promote this idea the furnishings in the home changed dramatically from 1850 to 1900. (Fig.1.) The carpets no longer were fitted but rugs were placed on wooden or parquet floors. The furnishings became more spaciously placed. The zymotic theory generally accepted as a method of successfully quelling germs and bacteria prevailed around the mid 19th century. This meant that the home was aired once a year to avoid the likelihood of germs and bacteria settling in the home. This was a major upheaval in the home. The carpets were removed and taken to the laundry and there the dirt was 'beaten-out-of' them. So a device had to be invented which would remove the dirt from carpets and floors in the home without removing them. "Dry sweeping and dusting was a homicidal practice" as a French doctor in 1907 stated. Also using a brush or broom meant a lot of back bending, so a number of solutions were proposed in 1858. These solutions were based on suction or a revolving brush.

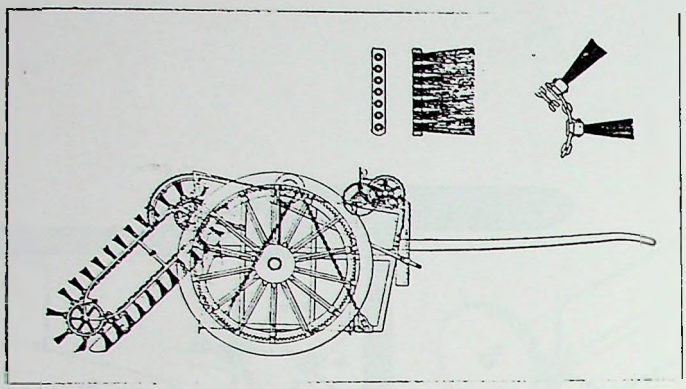
The devices based on the revolving brush were known as 'Revolving Brush Sweepers' and were patented in 1858. These devices were very similar to Joseph Whitworth 'Street Sweeper' in 1842. (Fig. 2). These revolving brush sweeper's fundamental mechanism was a brush rotating within a chasis and the brush pressed down on the floor at all times. (Fig. 3). The chasis was mounted on wheels or rollers. The brush itself was swiveled around a cylinder as in (Fig. 4). As the brush revolves the dirt is carried to the roller which is rotating in the opposite direction. The operator of this type of unit has to keep driving the unit back and forth. This is similar to the carpet sweeper of today, which is a great improvement on the brush.

A more advanced idea was developed a year later. It was based on pnematic action alone. As the wheels rotated they drove a four bladed fan (Fig. 5). The blades created such a strong air flor that the dirt was blown into a pan. The 'Carpet Fan Sweeper' consisted of four blades on a revolving spindle. The revolving motion was due to a highly geared cog which was controlled by the motion of the wheel. The blades did not touch the carpet which was an advantage over the revolving brush sweeper. It claimed that the carpet would not only be cleaned

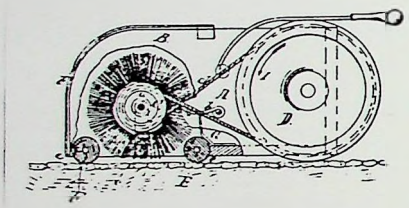




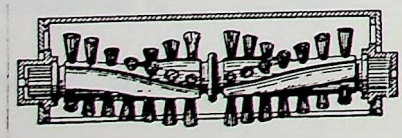
1. Interior of home.



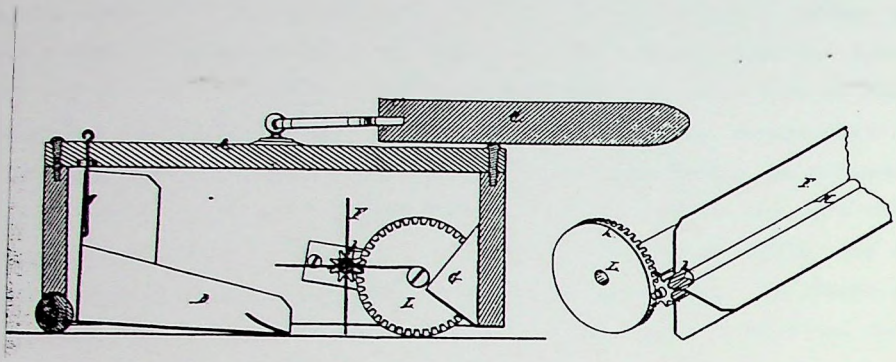
2. Joseph Whitworth Street Sweeper, 1842.



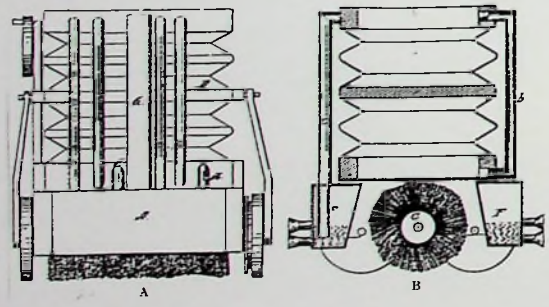

3. Revolving Brush Carpet Sweeper, 1858.



4. Revolving Brush of the 1850's.



5. Carpet Fan Sweeper, 1859.



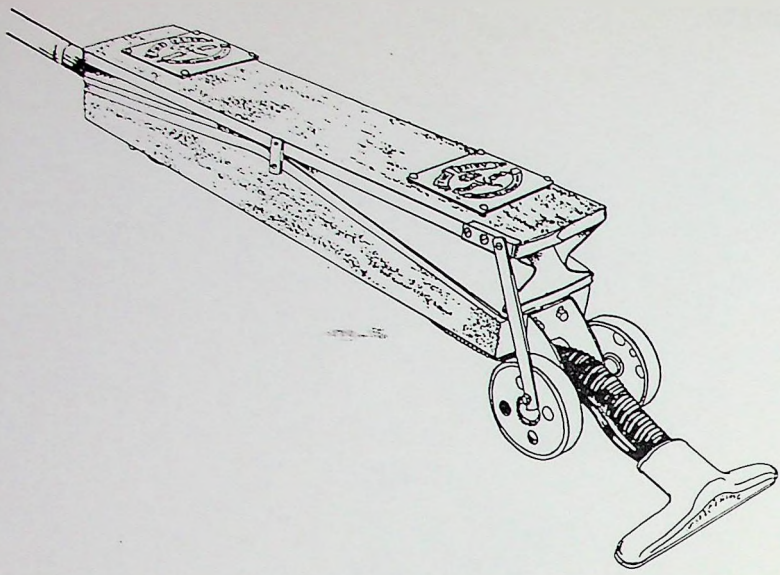

6. Bellows type cleaner, suction created by revolving wheels, 1860.

but protected and so last longer.

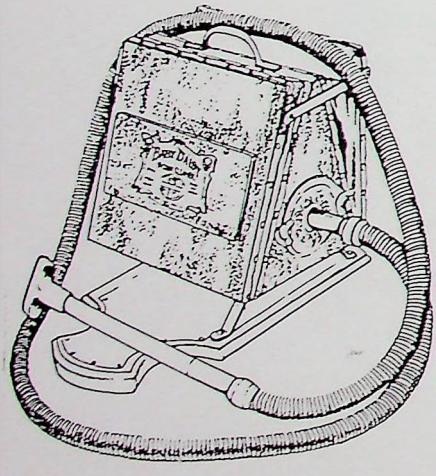
These devices might seem awkward and cause more problems than they should, but the concepts for the mechanisms are correct. But the machines themselves were not successful. A type which was more successful was the bellows type. This was a combination of the revolving brush sweeper and the idea of pneumatic action (Fig. 6). The brush swept the dirt into a draught. Rather than creating the draught by using a fan a bellows was used. The suction was constant in the bellows when it was driven by the wheels (Fig. 7). This type of one would have been used by the housewives in America in the 1880's. As the dust-laden air passed through the hose, it was deposited in a box under the bellows part. In larger types, which were more common in Britain, passed the dirt through a water chamber (Fig. 8(a)). This had to be operated by two servants, one working the bellows and the other cleaning the carpet or furniture. All these cleaners were expensive £35 to £125, which illustrates these products were not for the common masses. The 'well-to-do' people bought them for their servants to use. These cleaners were very industrial looking. There was no need for it to be aesthetically pleasing. The people who bought it never saw it, since it was only the servants who used to use them. The 1900 vacuum cleaner manufacturer in England was 3ft. 10ins. in height. The iron spoked wheels and rubber tyres are not what one would expect to see wheeling the cleaning machine in a 'well-to-do' home, but they were (Fig. 8(b)). This vacuum cleaner cost £125. This emphasises the point that they were bought by the prosperous citizens and then used by their servants.

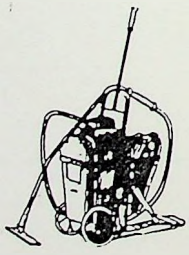
The 'Baby Daisy' (Fig. 8(a)). was less mechanical looking. It was aimed at a market that could not afford servants. It cost £35 where a servant cost £90 a year. The name even suggests that it was supposed to replace a servant. But the fact remains that the English housewife continued to organize the home, but leaving the servants to do the manual work. So these devices were used by the people they were supposed to replace.

One of the most advanced concepts was Ives MaGaffey. In 1869 he designed an upright vacuum cleaner. The basic mechanisms were the revolving brush and the fan. The brush swept the dirt into a draught as in the bellows type, but the draught was created by a fan which was manually operated (Fig. 9). The form of it is basically the same as the upright one of today, except the hand operated pedal is replaced by a motor. The fan has also decreased in size. This was the development of the upright vacuum cleaner, but it had to wait until the small electric motor was invented.



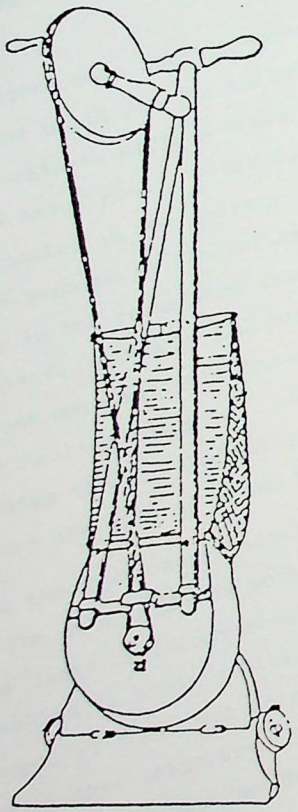
7. Bellows type, 1898.





(b) Bellows type, 1900.

8. (a) Bellows type, 1904.



9. Ives McGaffey's Upright vacuum cleaner 1869.

CHAPTER 2.

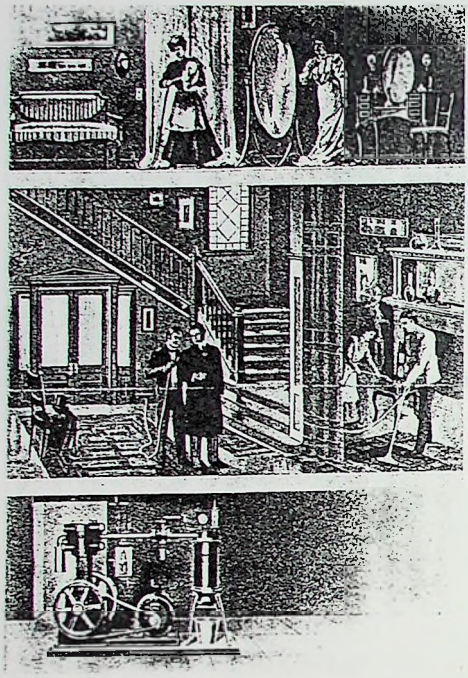
The Introduction Of The Electric Motor.

As the electric motor was invented the first vacuum cleaner took the form of very large cylinder type cleaners. The electric motor was introduced in 1890, but by this time the fear of dirt and dust was still growing. The manual bellows devices tended to be sufficient for small scale cleaning. But large hotels, restaurants and office buildings had a problem. With the advent of the electric motor a couple of solutions were proposed, the stationary and mobile units. These were much more efficient than the manual types. The stationary type was developed in America and the mobile unit was developed in Europe and Britain.

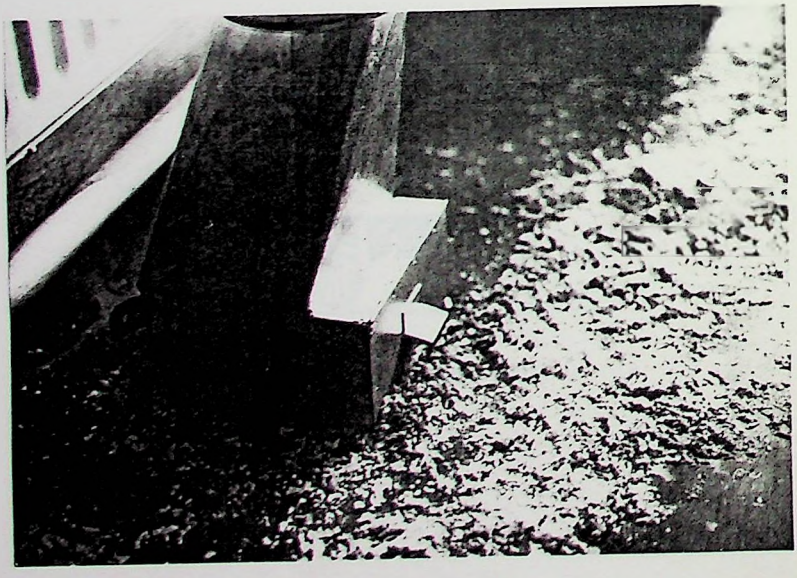
The stationary installations were first pioneered in America in 1900. They were built in the cellar of the building. The buildings which installed these units were large hotels and business offices where a cleaning staff would be employed. An example is The Astor Hotel, Frick Building. The electric motor, flywheel and airpump were located in the cellar. It worked on suction alone.Pipe-lines connected the suction machine in the cellar to outlets positioned throughout the building. The outlets in the rooms were used by the servants. They were used to clean carpets and furniture, curtains and clothes. (Fig.10). As the motor decreased in size it became more suitable for use in private homes. This type of unit was manufactured by heating companies. Interesting to note this type of system is used in workshops today. The outlet remains stationary, the dirt is brought to the outlet and the dirt is drawn into the pipe (Fig.11).

Co-existing with the stationary installations were the mobile units in Europe and Britain. The mobile plants worked on suction alone similar to the stationary unit. The large buildings such as theatres, restaurants and hotels did not want a unit installed in their cellar, because the cellars were already being used for storing items, or there was no cellar in the building. The Europeans and and British required a more temporary cleaning system. The mobile plant was being developed at the same time as the manifestations of this idea. During the 1890's the health board again emphasised the importance of hygiene which increased people's need to be in clean places, and have clean homes.

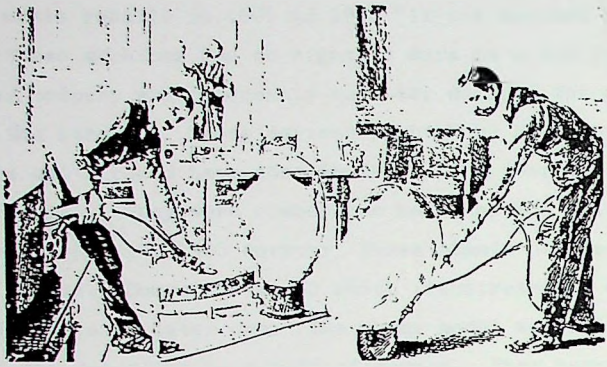
The mobile plant was pulled from building to building by a motor, horse or by hand. A long flexible hose was taken into the room which was to be cleaned (Fig.12). The other end of the hose was connected to the 'plant' parked outside the door in the street. (Fig.13). Housewives hired these units but had nothing to do with the physical side of the work. She was the organizer. At least two men were required to operate the outfit. One to look after the machine in the street and the other



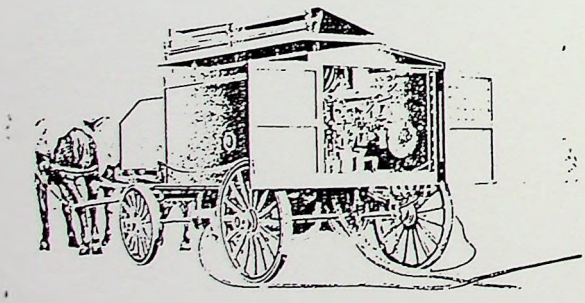
10. Residential vacuum cleaner, 1910.



11. Work shop vacuum system, 1988.



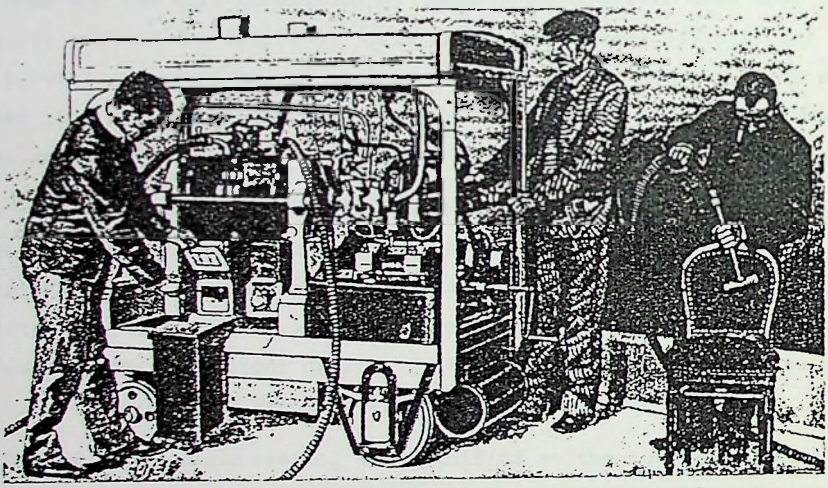
12. Cleaner furniture, 1903.



13. Air Compressed cleaner, 1903.

to do the cleaning inside.

The motors used were not always powered by electricity. Some were powered by paraffin. In France, it was claimed that 214kg. of dust was "sucked from the chairs of a single theatre". But there was apparently one problem with these units and that was that they were too noisy. As H. C. Booth, an English manufacturer of these units recalls in 1901 to 1903 "It was assumed by the police authorities that these machines had no right to work on a public thoroughfare ... The vacuum cleaner company was frequently sued for damages for alleged frightening of cab horses in the street". These devices might have been noisy but the industrial look of these units could have contributed to the fear the horses had for these machines (Fig.14). They were cumbersome machines and a totallly new machine for the people to accept. By 1903 however, these plants had decreased considerably from the earlier models. Compare Fig. 13 which illustrates an earlier model and Fig. 14 which illustrates a later one. The newer model was being pulled by hand whereas the older one was drawn by a pair of horses. They have not got only smaller but lighter as well. The mobile 'plants' were 'engineering works of art'. But people perceived it as a purely functional product where aesthetic consideration, as they visualised it, was non-existant. However, these machines do represent the transition phase prior to the introduction of the portable cylinder type vacuum cleaner used in the private homes.



14. French vacuum cleaner mounted on a truck, 1903.

The Introduction Of The Portable Vacuum Cleaner.

The real obsession for hygiene began in the 1890's. The health reformers increased people's fear of "the dangers of dirt and dust". Anything carrying germs for example, flies, dirty clothing and dust had to be moved from the home. Everything that might be considered dirty had to be removed from the home, because it was linked with the transmission of disease. This was the beginning of people's belief that a clean home produced a healthy nation. All the dirt which was in the home had to be removed and the manual cleaners tended to keep the customers content. As people's responsibility of parenthood and the importance of hygiene became ever more important, the desire to remove the germs and bacteria from their homes on a weekly basis was becoming evident. The situation was similar in America, except the American housewife did not have servants to do her housework.

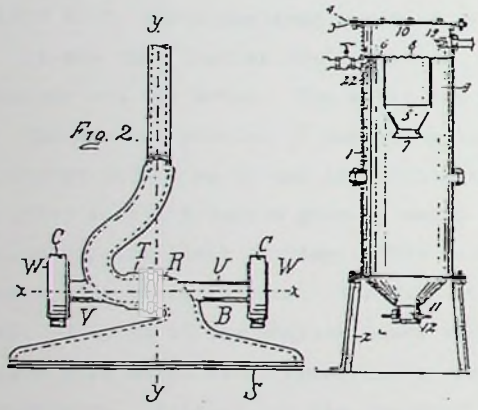
The mobile or stationary installations were used for large scale cleaning. But the majority of cleaning in the home was achieved with the aid of manual devices The bellows type was the most successful of these units and were used both in England (Fig.15) and America (Fig.16). Here there are similar devices, but one is used by the servant and the other is used by the lady of the house. These were both in use between 1890 and 1920. But once a motor small enough to use in portable domestic appliances was invented, these manual type cleaners became obsolete.

Nikola Tesla, a Yugoslav in America invented the one-sixth hp. motor. In 1900 the American Company Westinghouse put it on sale to drive a domestic fan. This unit was adapted for the vacuum cleaner. It was not until 1903 that a suitably small motor was fitted to the portable vacuum cleaner. The portable vacuum cleaners proposed were based on the inventions created in the mid-19th century. There was the development of the upright and cylinder type vacuum cleaner.

The cylinder type vacuum cleaner was magnified in the stationary installations and the mobile units. D. T. Kenney improved the stationary installation, by mounting it on wheels and making the unit smaller, in 1903. (Fig.17). The motor and dust bag unit were drawn behind on a sliding frame similar to the sledge cylinder type most popular in the 1940's and 1950's (Fig.41). This type of unit required only one person to operate it while the manual ones in England required two people to operate them (Fig. 8(a) and (b)). In D. T. Kenney's type one held the suction hose as in the earlier stationary installation types, or the mobile unit in Europe and Britain. It was still rather voluminous but easier to use than the manual ones. It was less noisy than the 'wagon outfits' (Fig.13). The manufacturer claims that only the"soft purr of a little motor can be heard".

15. Bellows type cleaner in England, 1908.

16. Bellows type cleaner in America, 1908.



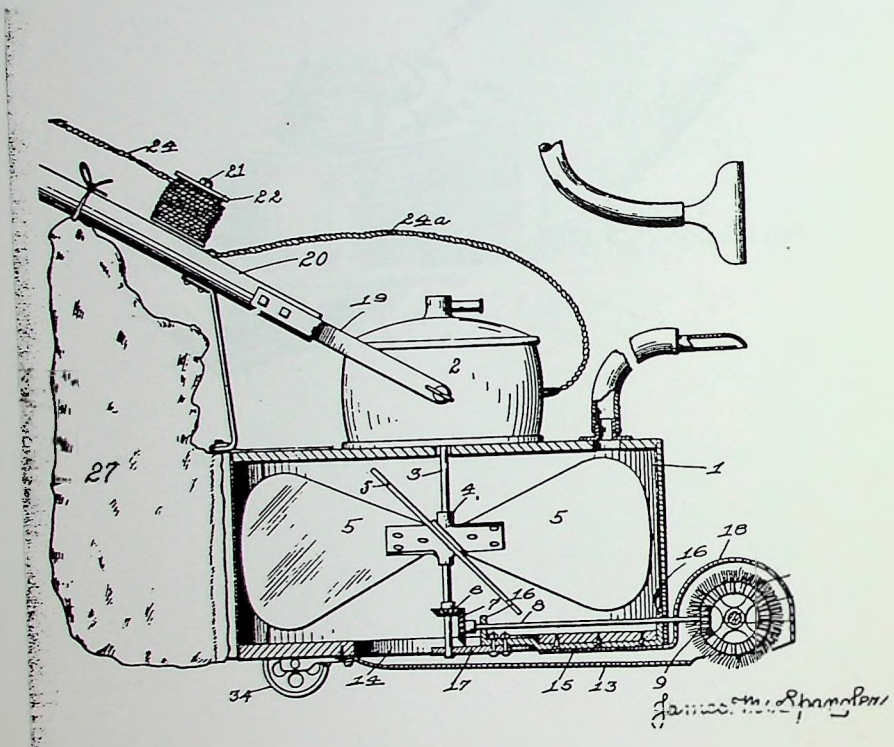

17. D.T. Kenney Patent, 1903.

The principle of the first carpet sweeper using suction alone was developed by Spanlger in the 1900's.(Fig.5). The electric motor, dust intake, suction, beating mechanism, and bag are mounted on a compact trolley (Fig.18). Spanlger who was a janitor allergis to dust. He finally went into partnership with W. H. Hoover. Ives MaGaffey had invisaged the form so all Hoover had to do was to combine both Spangler's mechanism and MaGaffey's form and the end result was the Model O.(Fig.19). This was one of the most successful vacuum cleaner ever. It remained the same for the next 30 years approximately. The brush changed from the type illustrated in Fig.4 to Fig.20. This is reverting back to the idea of not wearing the carpet with the brush pressing down on it in 1859. This is achieved as before by having blades rather than brushes. The blades blow the dirt into the draught created by the fan as can be seen in Fig.18. The dirt is then blown into the bag at the back. The motor, fan and blades are covered by sheets of steel. The steel is riveted together which is a visual feature on the body. There is also some decoration applied which makes it more pleasing to the housewife in America.

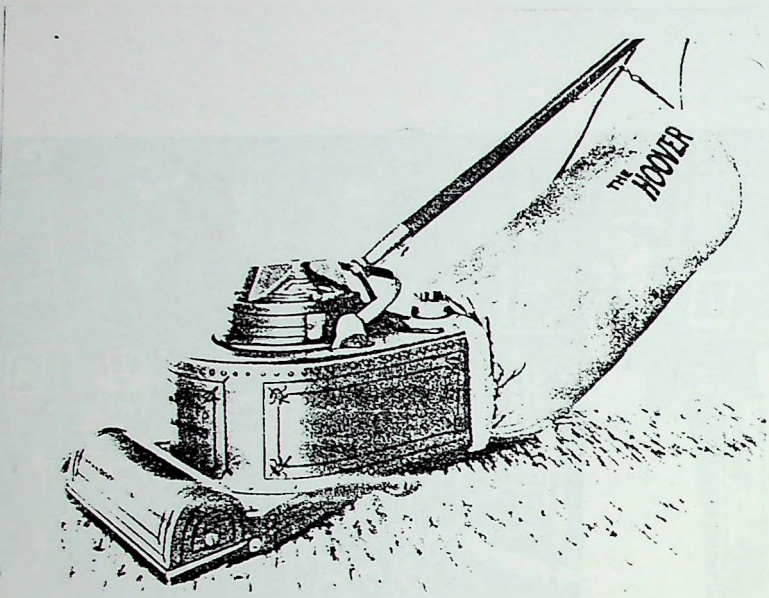
In 1906 H. C. Booth designed a miniature type mobile 'plant' vacuum cleaner (Fig.21). It was the 'Trolley Vac' cleaner. It consisted of the nozzle, the water container and the motor. The motor was mounted on a trolley similar to Kenney's. The servant wheeled it according to where it was required. It weighed nearly a hundred weight so it was impossible and impracticable to take it upstairs. The motor drove a rotary vacuum pump by means of a belt. It was connected to a supply source via the light fitting. This unit was definitely aimed at the 'well-to-do' people, for three reasons. The first being that this unit was powered by electricity. Only 2% of the English homes were wired with electricity in 1910. All those who were wired were 'upper class' in the social scale. Secondly, the unit was expensive. Finally, it was designed to be used by servants. It was very mechanical in appearance because those who used it had no say in the buying of it.

This type of unit was developed into what is a recognizable form by 1914. The 'Econo' was designed to meet the requirements of the small household and those who could not afford to have a servant (Fig.22). It cost £15.15's. But the industrial look is still prevalent.

If one compares the type of design in America to that in England one notices that the Americans tended to produce more visually attractive designs. While in England the manufacturer produced very industrial products in appearance. This reflects the social situation in both countries. In America the middle class housewife did most of her own housework which was the case science about 1890 (Fig.16). In England servants were still employed by the middle class to do the housework. The American manufacturer was forced to consider not only the machine's

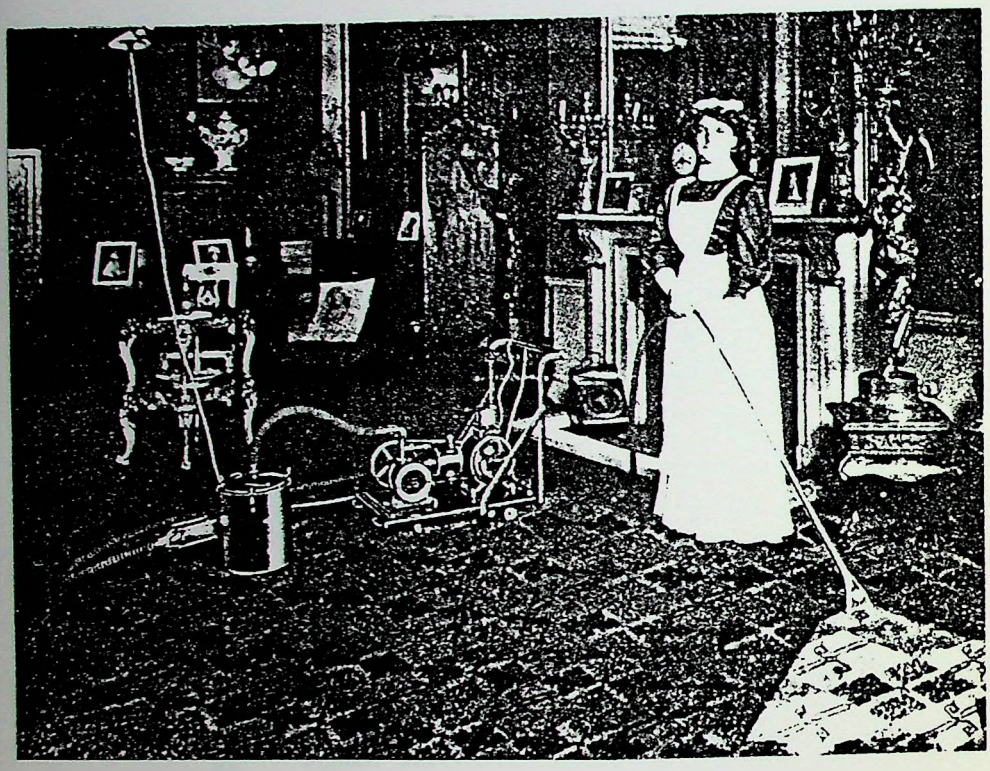



18. Electric vacuum cleaner, 1908.




19. Hoover Model O, 1906.


20. Revolving Brush used in bag type vacuum cleaner.



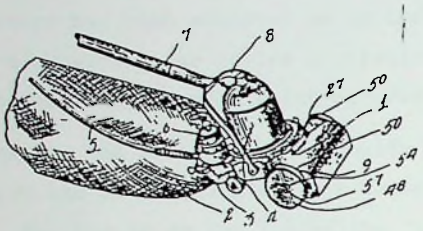
21. Trolley - Vac 1906.


22. Econo, 1914.

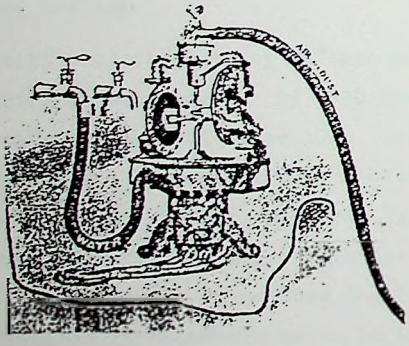
efficiency but the visual appeal. Hoover's Model O is a tidier form than that being manufactured in England (Fig.23). The English version makes no attempt to unify the different parts. The bag, motor, brush and handle are totally separate. The American Hoover (Fig.19) tries to achieve a sense of unity by using embedded motifs along the steel casing. As a result the vacuum cleaner was more really accepted by the American housewife. This product was firmly established in the American home by 1920.

There were other types of vacuum cleaners which were not as successful as the Hoover. An example is the Water Witch (Fig.24). It operates on water pressure. The dirt and germs are drawn into the unit and are automatically mixed with the water and carried away. It is set temporarily in the kitchen sink or the bath tub, or wherever a water facet and drain are convenient. It weighed less than 23 pounds, which was very light at this stage. It cost $75, which was expensive. It was introduced in 1910. Nearly the entire body was made of aluminium. A water wheel creates the suction, so no electricity is required, just a supply of water. Accessories were delivered with this unit. A message vibrator, or a hair-drying apparatus are the type of accessories which were used. The Vacuum Hydro Company developed this concept. It could have been a worthwhile product to develop further, but it was not.

As a result of the first fourteen years of the 20th century two forms had been developed, the upright type (Fig.19) and the cylinder type (Fig.22). All that was required of the manufacturers was to minimise the number of components and minimise the cost. One of the more successful ways of reducing the cost of an item is to produce larger quantities and thus sell more. This allows the cost of items to be reduced. To reduce the number of parts is more difficult, but during the 1920's and 1930's it was achieved by moulding the casings in a single form.




23. Electric suction Carpet Sweeper, 1915.



24. Water Witch, 1910.

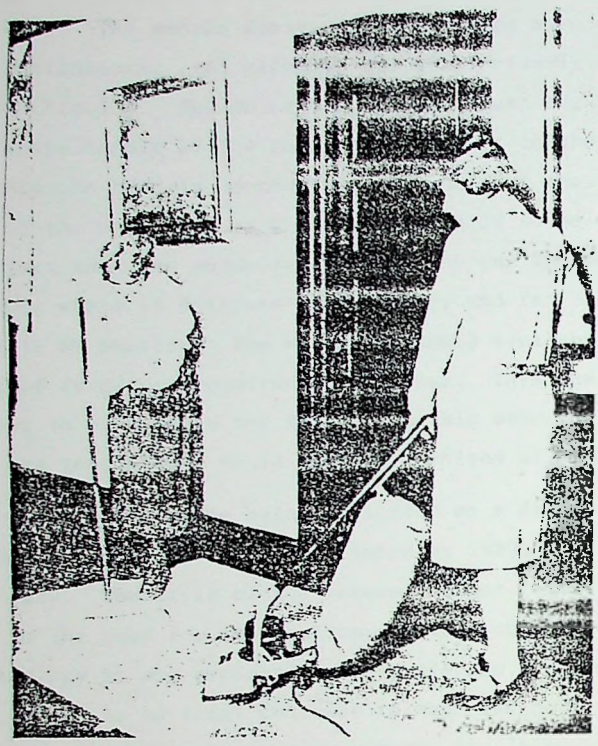
CHAPTER 2.

Styling in the 1920's.

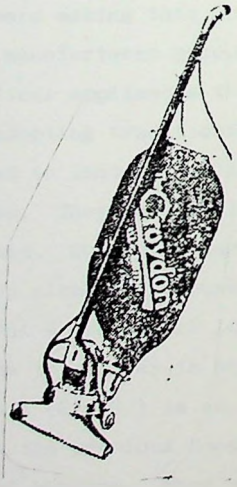
After World War One there were many changes in society in England and Europe. People now had the money, there was electricity and there were very few servants available to do the manual labourious housework and as a result created a need to have the electric appliances accepted in the home and used by the housewife. While in America the vacuum cleaner had been accepted as an essential device in the home before the 1920's. Before examining the styles available in England and America, it would be beneficial to study the changes which occured in both countries.

In England since the War the role of the housewife had changed. There were few servants to be employed and so the middle-class housewife was faced with having to do her own housework. She had to do the job of the 'skivvy' which most housewives"did not want to do". But the people who used the servants had the opportunity of having better jobs. Also these housewives were the children of the 1880's and 1890's. They were taught the importance of hygiene in the home. So they tried to raise the standard of hygiene, but this was not really noticable until the 1920's. Also money was available for these people to do so. During the War women had worked and they continued to do so with no real need to do so. This was due to the fact that they did not want to relinquish their independance. These women did not want to return to the 'kitchen sink' to be dependant on their husbands again. So it was no longer a question of breadwinner and wife, but a joint income. This meant that they had more money to spend. However, since the time required to vacuum a house with an electric device was claiming to save time, it was a desirable product to have. But more importantly, it cleaned one's home efficiently. The germs and the bacteria were removed. This resulted in the vacuum cleaner becoming an essential appliance to have in the home. This was reinforced by high powered advertising and door to door selling.

Also the availability of electricity influenced the sales of the vacuum cleaner and other electrical appliances. By 1920 the number of houses which were wired was 12%, this was a rise of 10% since 1910. By 1930 it was 32% and 1938 it was 65% of houses were wired. This meant that electricity had become more affordable since the introduction of the National Grid in 1926. Electricity was considered a more convenient, time saving, versatile to perform tasks beyond any other form of energy. As a result, if one had the 'right energy source' and the 'right machine' the drudgery of housework could be no more (Fig.25). "One would not regret one's maid leaving". "One does not have an overworked woman in unsightly attire", but a lady who is neatly dressed and who "keeps her self-respect because she uses an electrical cleaning service".



25. English Hoover, 1927.

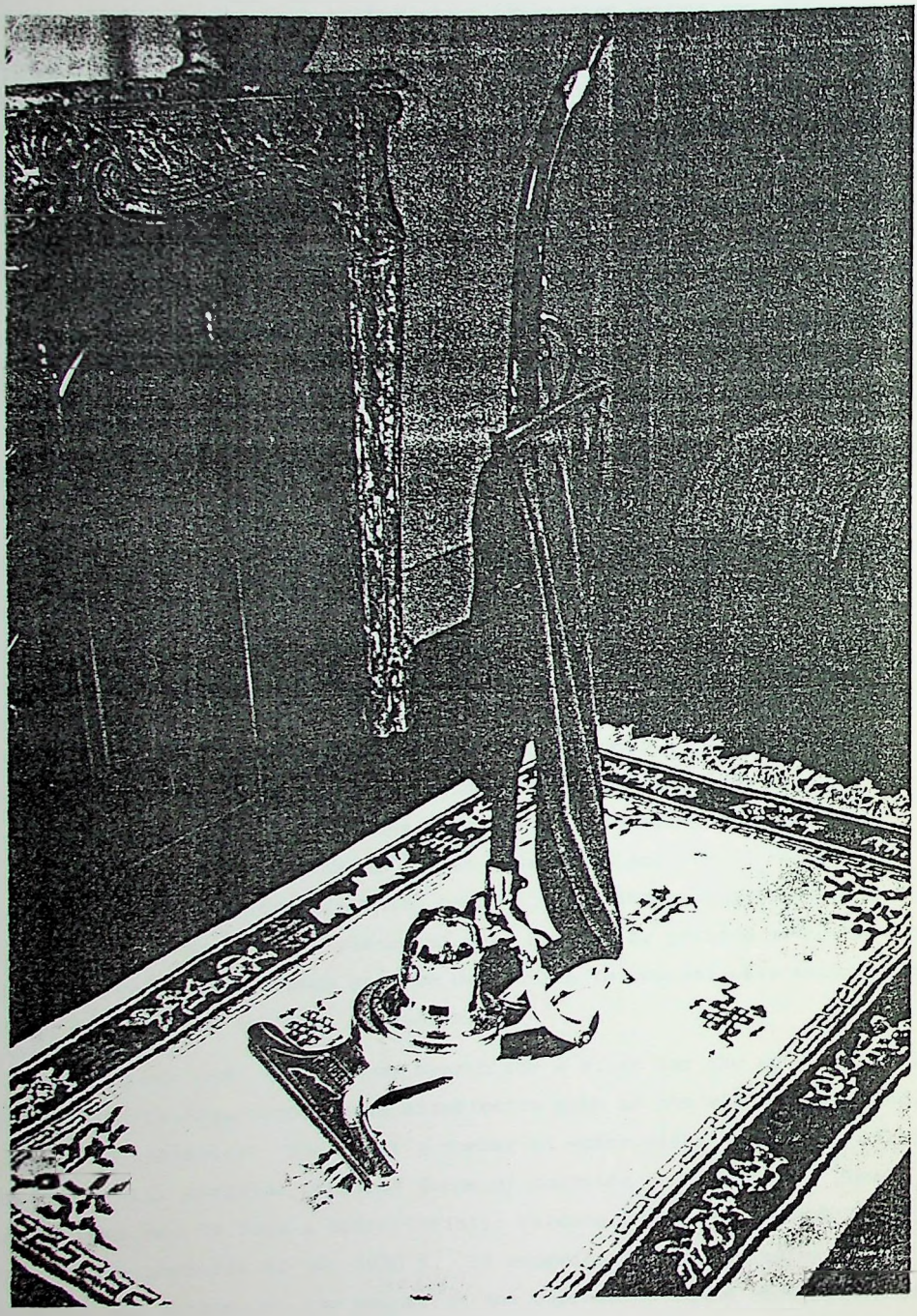



26. Upright Vacuum Cleaner, 1925.

The vacuum cleaner had to portray an image of hygiene. The English tried to achieve this by making it aesthetically very functional. It was a 'professional' type of machine. The models designed at this time were designed in a spirit of technological rationalism. The elements are still clearly identifiable as in the earlier models (Fig.23). The motor, fan, nozzle, dust bag are all separate parts. The fork shape handle at the base connecting it to the body gives the impression that only one hand is needed (Fig.26) and that the machine is doing the greater part of the work. It is a machine which is to be used by women. To emphasise the fact that the motor is not like the one in the 'Trolley vac' the bag gets thinner where it attaches to the motor and fac casing. The motor appears therefore to be smaller. The vacuum cleaners available in England were functional pieces of furniture required in the home. This was the type of equipment which was seen to be used in the future. So this made the people the people more inclined to use them. "They could use the machines of tomorrow today".

In America the emphasis were being indicated on a different aspect of production. The vacuum cleaner was well established by 1920. Most homes would have possessed one by 1920. The style of the vacuum cleaner reflected America's tendency to look to the past for inspiration. Rather than welcoming a new aesthetic of technology in the products, they preferred to remain fixed aesthetically to the past. This is in total contrast to what was happening in England. But during the 1920's companies established committees for 'product styling'. As W. F. Morgan stated "It is gratifying to note that a change of sentiment is taking place. The average citizen is beginning to understand that an article may be useful and beautiful at the same time ... We are realizing that there is really no essential distinction in artistic character between the commonest household object and the rarest production of artist genius".

As the manufacturers and the committees were making this 'change' they had recognised the importance of design and art in manufactured products. However, the manufacturers did not give these new electrical appliances their own type of forms. They sought to mask their identity by adopting traditional forms and details (Fig.27). Since the manufacturers wanted to imitate the features from the past, their products tended to appear antiquated. They were stylistic forms to satisfy the women who were going to be using them. She was a lady of the house and did not want to be persuaded to buy a vacuum cleaner, because this was achieved between 1900 and 1920. She did not want a functional looking appliance in her home, but she required an elegant machine to aid her in her work. This did not effect her social status. The Singer A-1 (Fig.27) is an example of this type of product. It was much more elegant than the previous Hoover (Fig.19). The gleaming aluminium form imitates the idea of hygiene. When the unit was



27. Singer A-1. 1920.

clean it emphasised the fact that it was a machine to make one's home clinically clean. This reverts back to the ideas prevailing around the 1900's. A home had "to shine and be spotless" to be free from germs and bacteria. Despite this artificial elegance, these appliances were basically dirt removers. The 'masks' applied to these machines did make them very attractive, but these costumes were inappropriate and ill-fitting.

Later in the 1920's the Americans became aware of what was happening in England and it was not until after the stock-crash in 1929 did they begin to produce products with their own identity, known as streamlining. The industrial designer came into existence and the importance of styling both in America and England.

Streamlining Decade Of the 1930's:

The vacuum cleaner was designed, developed and marketed with the object of creating an opportunity for greater cleanliness. The advertising, and products had more success than the hygienest themselves ever had in realising higher standards of hygiene. Health education and paternalistic responsibility made people prejudice against hygiene rather than convince them of its necessity, but much more effective were the products themselves, particularly when these were designed in an aesthetic way, which appealed to the people. This occured during the 1930's. The English manufacturers had developed their products with a more 'machine aesthetic' and the Americans were trying to achieve this in their products. As the 'machine aesthetic' began growing in success in England in the 1920's the American products gradually began to drop their decorative disguises and to look much more like the pieces of cast stamped or pressed metal that they actually were, with only enough surface decoration to conceal ugly seams". This developed into what we now call streamlining.

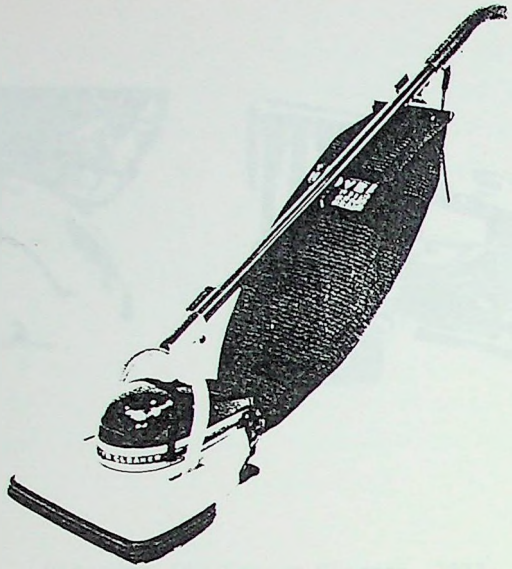
The Americans made a conscious search for a style for the age. The style derived originally from aerodynamic experiments such as the wind-tunnel testing for objects of transport. There was a number of other visual sources including Futurist painting, airships, tapered forms of dolphins or porpoises. These influences combined to form a characteristic buldous 'tear-drop' shape which can be seen in many products of the 1930's. It represented new technologies and artefacts of the future. So for people in the Depression found consolation in the fact that the electric appliances they used mirrored the hope people had for better things in the future. Also, the vacuum cleaner which they used was probably used by the 'well-to-do' as well (Fig.18) which deminished the barrier between the classes.

between the classes.

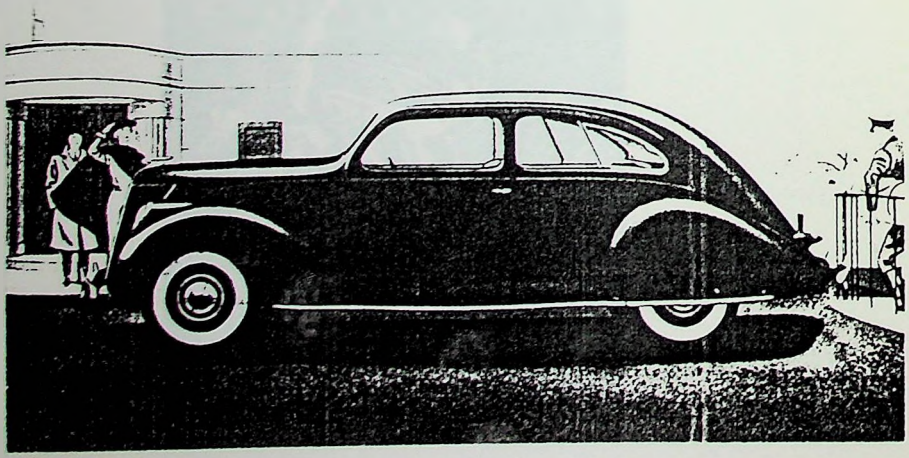
Not only were the people looking for a new style but the manufacturer realized that the appearance of a product was indispensable to its success in the market place. By 1930 the market was 'glutted' and manufacturers were desperate to sell their products, so industrial designers were employed. This, one could say was the first major step for designers. They had broken the barrier into the factory. These designers worked mainly for automobile factories at first. Designers demonstrated their ability to make manufactured products attractive to a reluctant public. They were creating a style which was uniquely American. It was a style which turned from the past to look to the future for their sources. Stream-living was based on scientific theory and empirical data. It served the taste for speed and efficient operation far better than did the angular shapes of Art Deco, or other forms favoured by earlier 'taste makers'.

These new 'taste makers', the Industrial designer, designed the vacuum cleaner to imitate the new technology available. It used forms from cars making vacuum cleaners look like baby cars (Fig.28). The new designs lost the protuberance of the earlier machines. The works were encased in smooth, sleek sheels of cast alloy as in the Eureka Model M of 1936 (Fig.31). The electric motor had progressed to be more efficient, but the mechanism used is basically the same as that of 1914. The casing shines with cleanliness as previous models. The single casing conceals the untidy works from view. Eureka's solution to hiding the motor and fan was a magnificent integrated casing designed by Theodora Schaad.

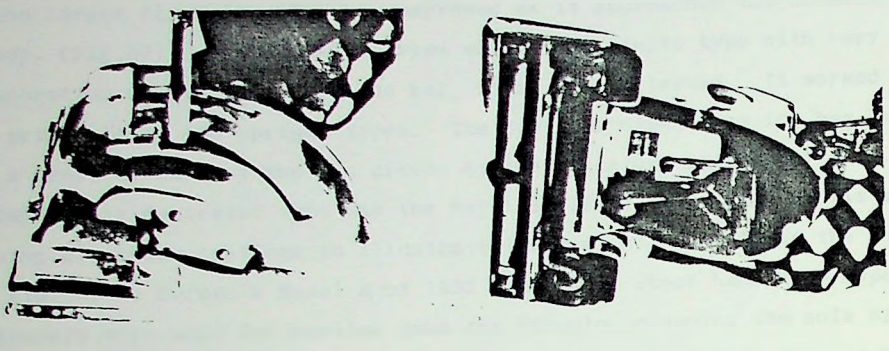
Hoover, which has become another name for the vacuum cleaner, was redesigned by Henry Dreyfuss in 1936. The basic design was set by the engineering staff in the 1900's, and has remained the same with only cosmetic changes. When Henry Dreyfuss redesigned it he not only changed it aesthetically but mechanically as well. The manufacturers employed Dreyfuss because their model no longer looked different enough from the designs of other manufacturers (Fig.25). The Model 150 (Fig.28) used magnesium alloy castings, and moulded bakelite to make it considerably lighter. The low streamlined form distinguished it from models similar to Eureka's model (Fig.31). It was so much smoother and even looked more hygienic which was a great advantage over elaborate models of Eureka and Hotpoint (Fig.30). It is astonishing the automatic imagery which is used in this product. If one compares it to the Lincoln Zephyr in 1935 (Fig.29) one can see the form is adapted to suit the vacuum cleaner. The back is shaped to a 'V' similar to that of the top part of the Model 150. There is a large bumper in the front of both. The handle reaches down over the tope of the hoover as if it is connecting to the wheels of a car, similar to an axle from underneath. The whole form remains as if the developing technology had and still was taking place at that time. But most subsequent vacuum cleaners have worked the basic design principles of the Hoover 150 lightners and cleanliness in appearance.



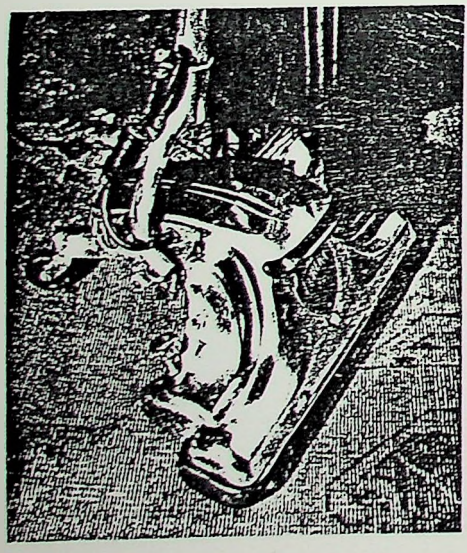
28. Hoover Model 150, 1936.



29. The Lincoln Zephyr, 1935.



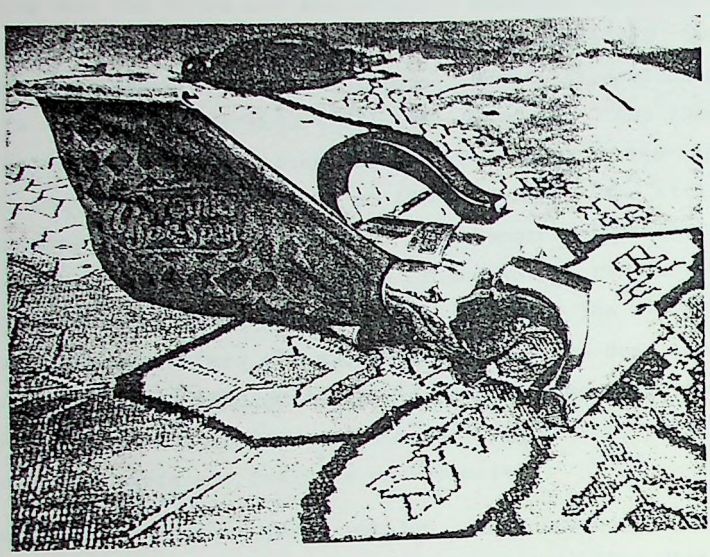
30. Hotpoint 500 Vacuum Cleaner, 1937.



31. Eureka Model M : 1936.

Hand-held Type:

As the electric motor became smaller and lighter manufacturers began to produce vacuum cleaners which were carried while being used. They tended to imitate the larger cleaners. The bag narrowed as it approached the connection to the body. (Fig.32). The Spic-Span type was a very simple type with very little decoration on it except for the bag, which was patterned. It worked on the same principle as the upright types. The dirt was drawn into the bag by means of a draft created by the fan driven by the miniature size motor (Fig.18). A more elaborately decorated type was the Royal 65.(Fig.33). These models again were shining aluminium castings to illustrate the hygienic quality of the product which is similar to Eureka's Model M of 1935 (Fig.31). These hand-held type vacuum cleaners were used for smaller jobs for example, cleaning the sofa or picking up spillages of cigarettes, or crumbs. They were not very popular because the motor was so weak and it did not do a very good job. It was developed further in the 1970's and 1980's.



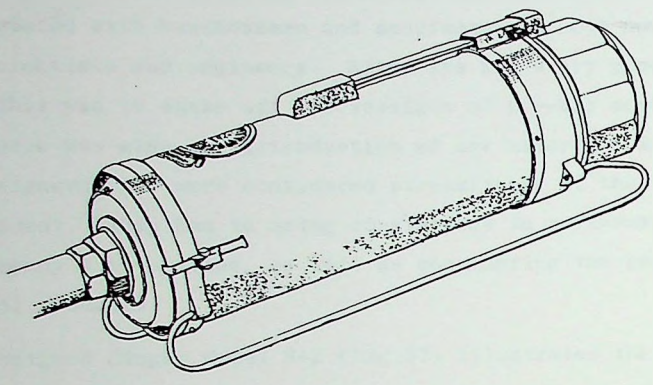
32. Premier, Spic-Span, 1930.


33. Royal 65, 1930.

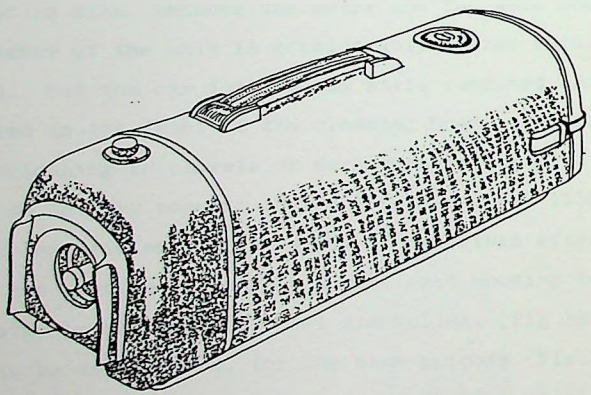
The Cylinder Type Vacuum Cleaner:

Streamlining was the first new and uniquely American approach to form that the public could associate with progress and a better life. This view also spread to England and Europe by the late 1930's. Before streamlining influenced European products they were very industrial-type products. They identified the separate parts as was previously stated and is illustrated in the canister-type of 1914 (Fig.22) and the more modern one of 1933 (Fig.34). The attachment of the hose was very angular, it was a 'screw nut'. The handle attachments are not concealed in any way. The cylinder consists of the motor, the dustbin and the hose attachment. These are made of different materials. The casing for the motor and the hose attachment are alluminium alloys,and the dust section is made of a textured plastic. This relates it to the upright type where the motor and fan are incased in alluminium casting and the dust bag is made of fabric. The clips and the attached parts are features on the unit.

Once streamlining had taken the direction, these products followed in form. The form became more curved (Fig.35). As Dreyfuss claimed "The designer learned a great deal about clean, graceful design. He learned to junk useless protuberance and ugly corners". This is what was achieved with the sledge type vacuum cleaner. The change was more subtle because the rationalist idea still is a major influencing factor. The different components are still identifiable. The motor has been moved to the front, so that the power of the motor to draw in the dirt can be greater. The clips are still obvious, but by the 1950's the form was cleaned and totally streamlined (Fig.41). The Europeans developed a more subtle style of streamlining after the 1940's.



34. Sledge Type electric cleaner, 1933,Electrolux Model.

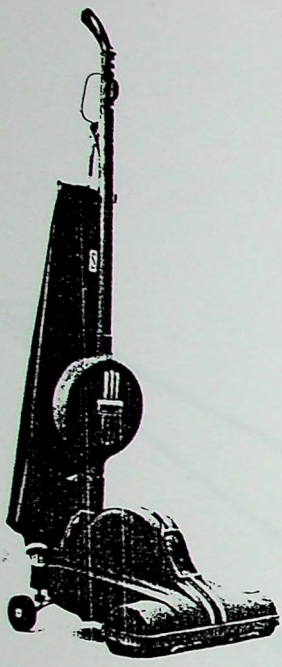


35. Later Model, 1940.

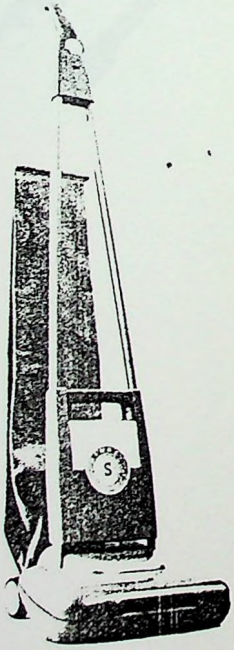
Design After The War:

During the War design activity was minimal. A few designers remained in practice, but turned their energies to designing the products demanded by a nation in peril. Designers at this stage were awakened to the part that they could play in product development. They were now, in the 1940's asked to apply their analytical capability and their sensitivity to form and utility in a climate that was controlled by technologists. Before the War the designer had been associated with businessmen and manufacturers, but now the designer was directed by scientists and engineers. After the War every product had to be redesigned. This was to shake off all vestiges of pre-war aesthetic and war-time aesthetic. There was also the introduction of new materials and methodologies. Industrial designers, who were considered streamliners of the 1930's, now became part of management. They had to bring consistency in performance and appearance to all the company's activities, as well as considering the packaging, display and graphics of products.

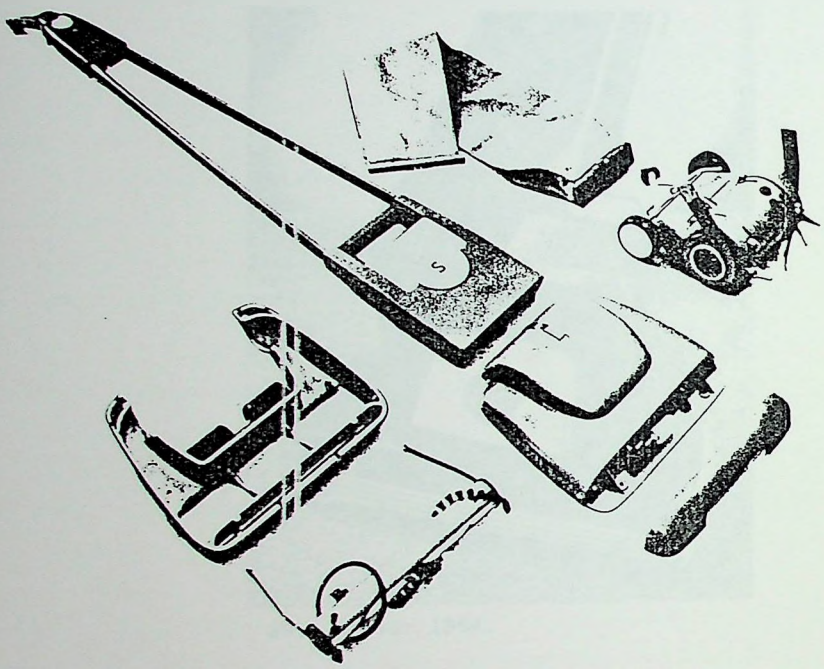
The redesigned Singer Model S-2 (Fig.37) illustrates the new role the designers now played. It's form, which was neater, was not the only aspect of the product the designer considered, the solving of the problems was one of the major criteria (Fig.36). It was difficult to carry and storage space caused problems. There was difficulty in cleaning under low furniture, because of the high casing which was prominent in most vacuum cleaners up until 1946. This later Model, Singer S-2 (Fig.38), was designed so that it was easier to transport it because the handle divided into two. It also could be hung in the closet. The cleaning head was reduced in size, because the motor and fan were now placed on their side. The maintenance of the unit is considerably easier because the unit was so simply dismantled. But the car imagery has still remained an influencing factor. A light if fitted to the front of the cleaning head, similar to a headlight, claiming to make cleaning in closets or dark corners easier. Adding features like this seem to be very popular in the 1940's and the 1950's. Designers were also faced with the problem of a scarcity of materials after the War. Henry Dreyfuss overcame the problem by using a single cast housing to enclose the motor chamber, the agitator brush, and the wheel assemblies. (Fig.39). Two parts and two materials used to be used before, for the same purpose (Fig.28(a)). Thermoplastic materials are used for the furniture guard, the switch cover plate, and the hand grip of the bail. Baked-enamel finishes are applied to the die-cast and sheet-metal parts. This use of new materials allowed this design to be possible.



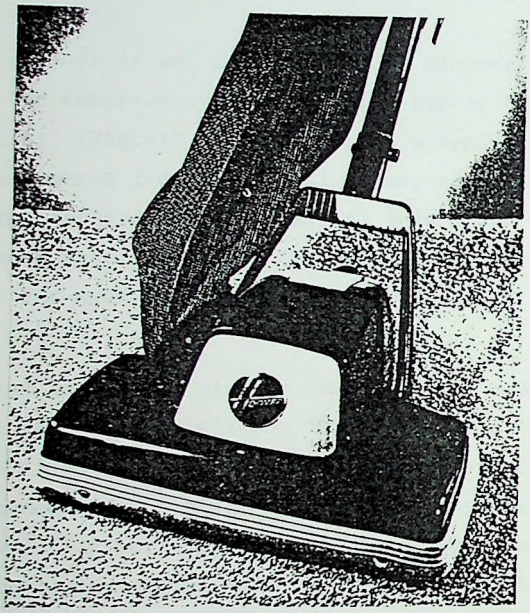
36. Singer S-1, 1940.



37. Singer S-2, 1946.



38. Exploded of Singer S-2.



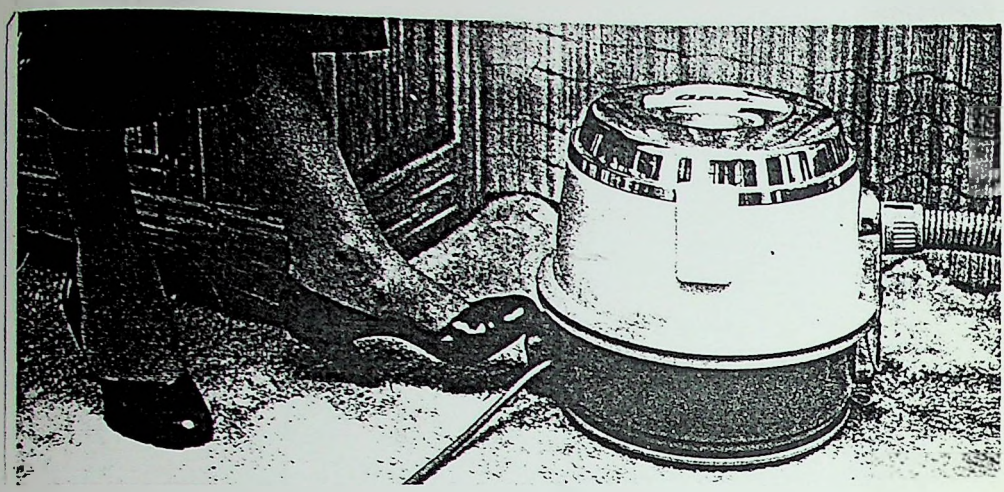
39. Hoover 1954.

However, during the 1940's and 1950's the canister and cylinder type vacuum cleaners were more popular. They were more convenient to use. The canister type, which is basically the same as the Nilfisk of today, produced by the Apex Electric Manufacturing Company was visually appealing (Fig.40). This meant it could be left in sight in a small house or apartment, where there was a problem of storage space. This unit was designed by Dave Chapman. It was turned on by a foot switch and had a rubber bumper around the mid-section that protects furniture while concealing the jointing of the two-piece stamped metal housing. The body was balanced to swivel, when pulled from any direction by the hose.

A similar type of cleaner is the cylinder vacuum cleaner, which was popular for the same reasons as the canister type. They were curved and the form tried to achieve a sense of unity. (Fig.41). The mini maid,a typical example of the type of vacuum cleaner one would find in a small house, or an apartment. The legs were similar to the sledge types of the 1930's. At this stage different attachments for the nozzle became available. The different shaped attachments made 'tricky' jobs easier. It was made from bakelite, which made it very light to carry around.

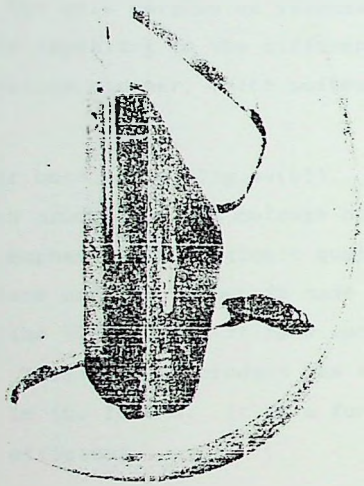
One can now see that the vacuum cleaner form is being redesigned. A particularly interesting one was the Castiglion's 'Spalter'. (Fig.42). The Italian's had adopted the ideas of streamlining, but had modified it to produce a more elegant form. The emergence of this style in Italy was attributable to a rapid post-war industrialization, a general decision to move away from geometric forms of rationalism, and taking organic sculpture of men like Hans Arp, Joan Miro as a stimulus, rather than as square and cubes of the Modern Architecture. The Castiglioni's have used plastic, which lightens the unit, so that it can be carried on one's shoulder while working. It was manufactured in 1956 by the R.E.M. de Rossetti Enrico company.

As a result of the developments over the last 60 years a range of vacuum cleaners are now available, the upright (Fig 37), the cylinder type (Fig.41),the canister type (Fig.40), the hand-held type (Fig.32) and the shoulder type one (Fig.42). They were technologically advanced, so all that remained for the designer to do was to style the existing products and add features.



40. Apex Electric Canister type cleaner, 1954.


41. Cylinder type Vacuum cleaner, 1958.



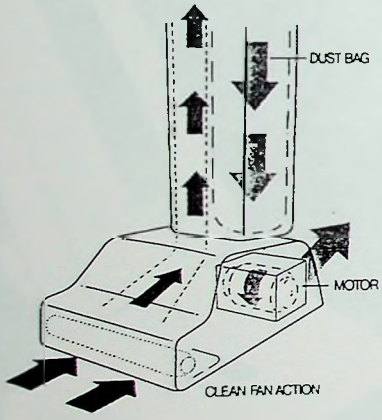
42. Castiglionis Spalter, 1956.

Design In The 1970's:

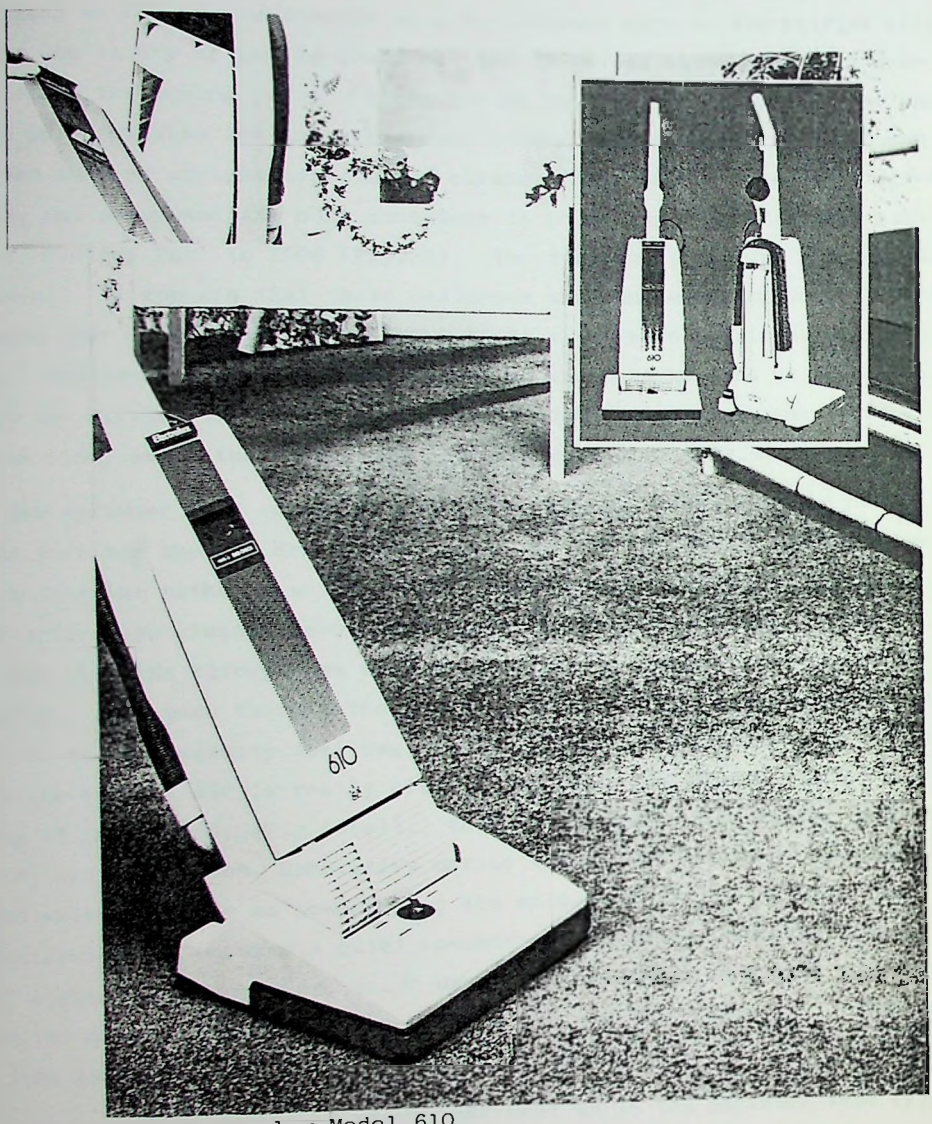
The 1970's seems to be similar to the 1920's and 1930's. A high-technological image was being sought. In the 1920's and 1930's products required an image which reflected the technological developments of the time, a similar requirement was needed in the 1970's. The designers derived inspiration from the high-tech electronic imagery used in other domestic appliances.

The upright type vacuum cleaner has used the same mechanism for the last 60 years (Fig.43). There is an improvement which is the dirt no longer is directed through any moving parts, which makes it easier to maintain. Also the bag is incased inside a box (Fig.44(a)) which is accessed by opening the front. This type of unit has began to follow the ideas of the cylinder type cleaner. Having the bag inside a box reduces the change of the dirt escaping, and so it becomes more hygienic, which is the sole purpose of vacuuming. The unit has added features which make it more appealing to the different market requirements. It can be used like a cylinder vacuum cleaner, which solves the problem of vacuuming above the ground.

The form has become angular once again (Fig.44(b)). This imitates the forms used in hi-fi's and other hi-tech products. The colours however, tend to be whites or creams, which try and emphasise the hygienic quality of this product. The unit is made from polypropylene and the bumper is made from P.V.C. The bumper is not as dominant as it was in the 1930's, but it is a requirement to have it so as to protect the furniture. This type of product has reverted back to the idea which prevailed in England in the 1920's. It is a functional product and has to be efficient as well as look efficient.




43. Upright Valuum Cleaner Mechanism.

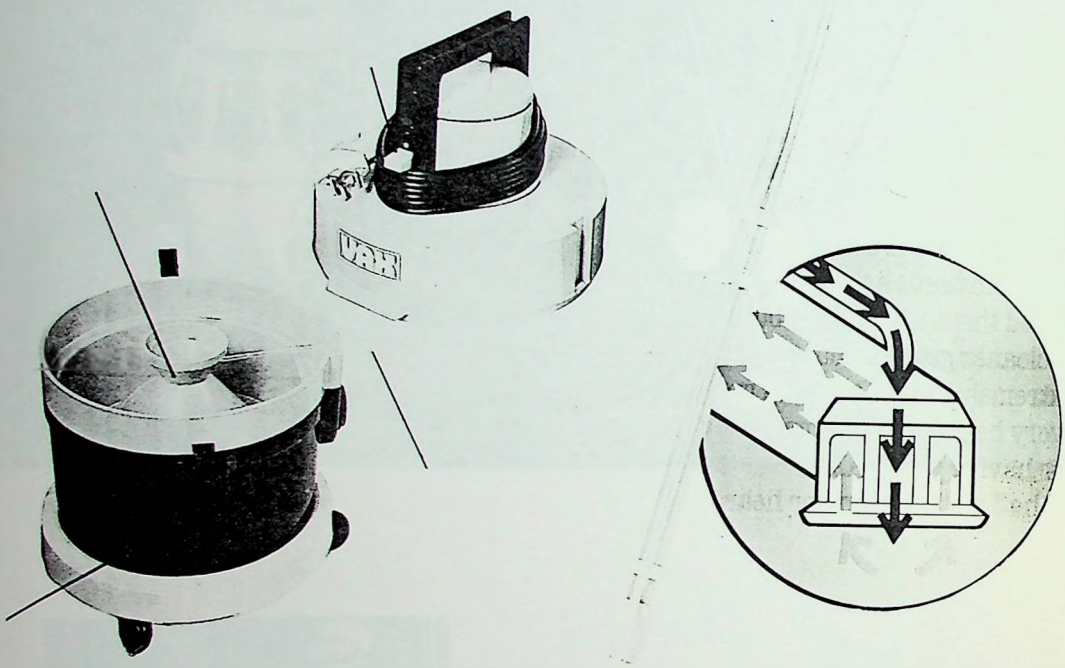



44. Electrolux Model 610.

The canister type cleaner has not changed its basic form since its introduction in 1914. But now it is designed not only to collect the dry dirt but also collects spills and liquids and cleans carpete and upholstery (Fig.45). It is based on the same principle as a dry cleaner such as the Nilfisk (Fig.46(b). The dirt, be it dry or wet is drawn out and it passes into a drum. It does not pass through the moving parts. A bag can be used for more hygiene. The canister type is more suitable for industrial use rather than domestic use. It can be converted into an upright type vacuum cleaner.(Fig.46(c)), which is steered by a handle and motor and the dust container is on a tray. This is very similar to Booth's 'Trolley Vac' in 1906 (Fig.23). The form for this type has remained very industrial. It appears that these designers are concentrating on it's performance more than it's aesthetic appeal. These types were manufactured in the late 1970's. The idea of aluminium portraying an image of hygiene is used once again, because the Nilfisk is basically alluminium with a plastic bumper to hide the division line, as in the Apex Electric cleaner in 1954 (Fig.40).

The cylinder type vacuum cleaner is mechanically the same as in the 1930's, but the form has changed dramatically over the last 40 years. The form has become more rectangular rather than the curved form of 1958 (Fig.41). Both the upright and cylinder type cleaner have become more related to each other (Fig.47). The dirt does not pass through the moving parts but is deposited in a bag, but the exhaust air does pass through the motor. The container (Fig.47(b)) cassette holds the larger capacity dust bag, which assists the quadruple aid filtering to ensure the exhaust air is really clean. The tools are stored neatly in the housing of the cleaner (Fig.47(c)). These consist of a nozzle for awkward corners, radiator brush, upholstery nozzle with fluff brush. A 1,000 watt motor is used which is twice as powerful as the motor used in the upright type, but it is insulated which ensures a quiet operation. There are features like a 'bag-check' light, a wind-up flex, which usually winds the flex around a spindle behind the motor. The weight ranges from 5kg. to 7kg. which is a large reduction from Booth's one hundred weight unit of 1906.

The bumper is continued around the unit as in the canister type (Fig.47). The wheels complement the unit rather than the bent steel piping in the previous sledge type units. The graphics are more symbolic. This is because a unit, which is manufactured in England is used by people who cannot read English as well as those who can. Therefore, there was a need for universal symbols to be used (Fig.48).




45. Vax-Carpet Cleaner.

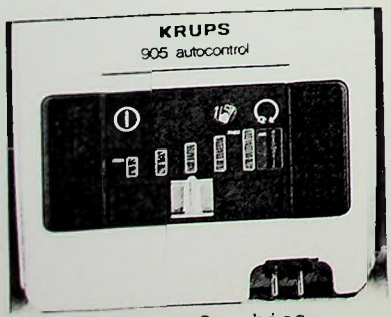

a

c

b

46. Nilfisk.


47. Electrolux Model 350.



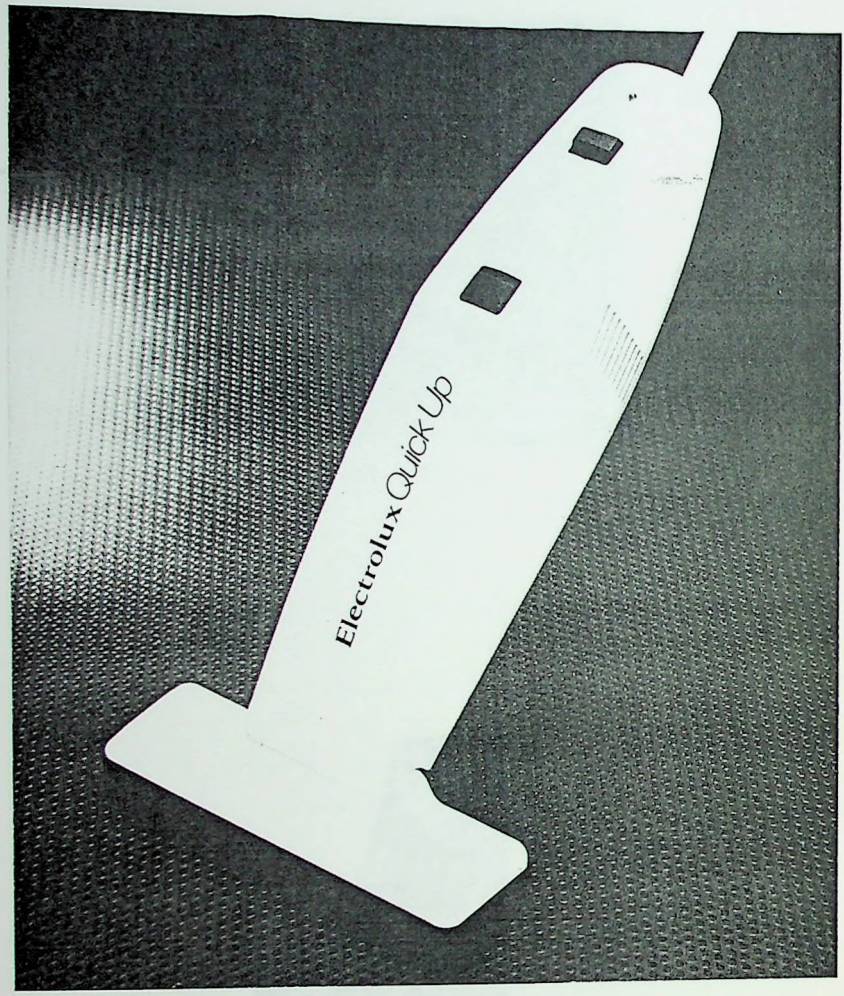

48. Krups - Graphics.

It has been designed to be easier to carry and more suitable for reaching under low furniture. The vacuum cleaner by changing its form has been adapted by the young housewives of today as a way of life. It also has become a tradition that one cleans one's home at least once a week, Saturdays usually. It has become a ritual to perform every week, if one doesn't, one is failing to look after one's home and family, which is the same ideal which prevailed at the beginning of this century.

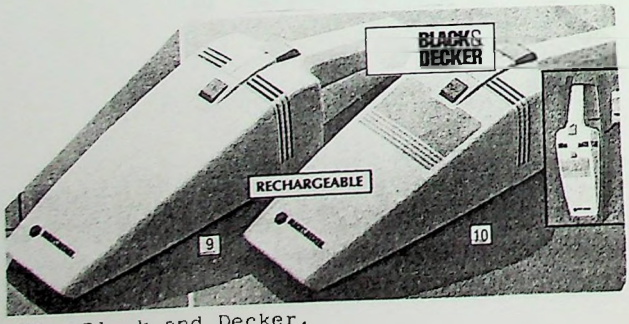
Hand-held Vacuum Cleaner:

The hand-held type cleaner is a small version of the upright or the cylinder type. It appeared first in the 1920's when the motor was adequately small to be carried while using it. The Spic-Span of 1930 has developed into a unit similar to the electrolux "Quick Up" (Fig.49) and the BLACK AND DECKER type (Fig.50). They are similar to the upright vacuum cleaners except smaller and with a small dirt capacity. But they are useful for small spillages and quick'clean-ups'. The problem with them is the exhaust air tends to blow up at the user, which still has dust in it, no matter if it passes through a filter or not. These units are also rather noisy in comparison to their size because the motor is small and is under pressure to get the dirt in and the air back out. They weigh 2-3kg. and are priced at £30 in 1978. There is a wall mounting unit and a plug charger supplied with this unit. It is the more advanced type of small-cylinder available.

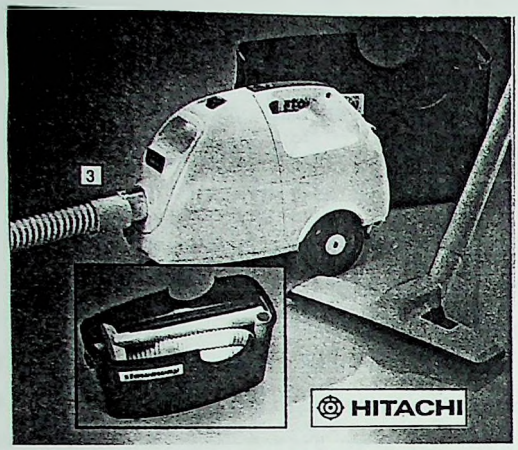
The second type of small vacuum cleaner is the shoulder held one of 1956. These are basic cylinder type units which are smaller. The dirt capacity is less than half.(Fig.51(a)). The features of the large cylinder types are incorporated such as the auto-cord rewinds. This unit uses a 600 watt motor which makes it less powerful than the upright or large cylinder type. This type of unit is convenient for cleaning stairs, cars and light cleaning. These units would not be bought to replace an upright unit, a cylinder type or a canister unit but would be bought to supplement one of the larger vacuum cleaners.




49. Electrolux Quick-Up




50. Black and Decker.




51. (a) Hitachi, 1978.

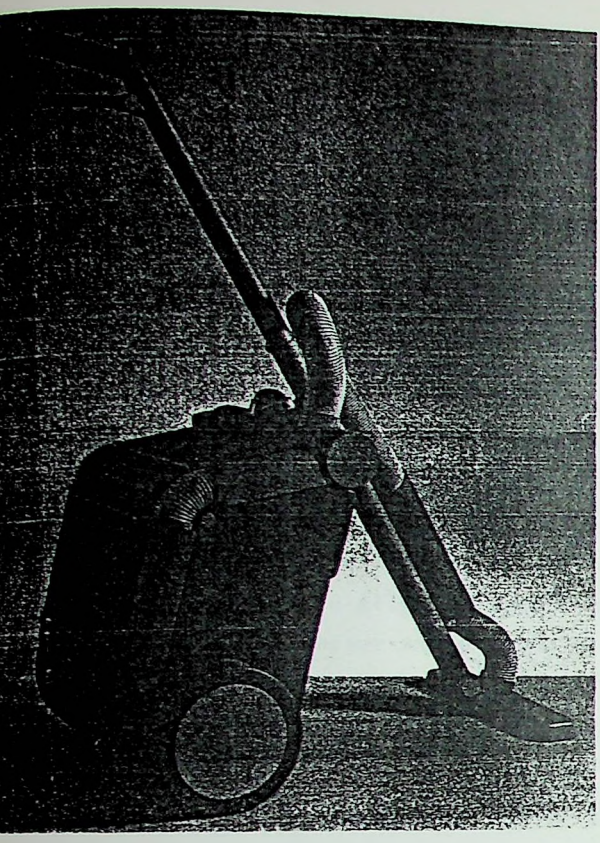
(b) Toshiba, 1978.

CHAPTER 3.

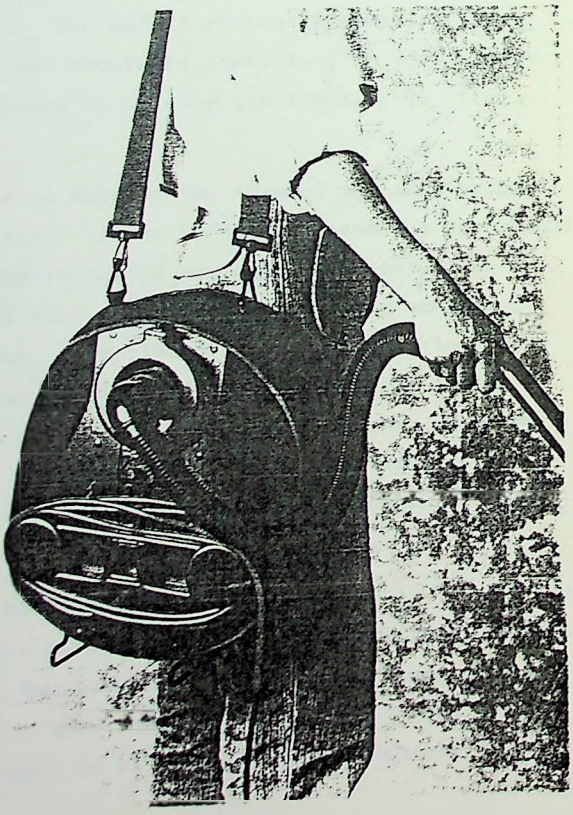
Innovative Styling:

The preceding designs have been very standard. Standard components were used to achieve a hi-tech look' which resulted in products not differing to any great extent, as in the designs before streamlining began to dominate the style of electric appliances. However, the 1980's have been an opportune time for designers to explore the possibility of new materials and forms. Andrew Howard and Robert Wolfe have been the first to do so.

Andrew Howard's Model is not too 'over the top' (Fig.52). It would be used for light industrial use in both dry and wet conditions. He has explored the use of colour and of standard materials. The end result is he produced a visually different and attractive machine. However, Robert Wolfe has approached achieving a new aesthetic in a similar way. He uses materials to produce a new aesthetic (Fig.53), similar to Howard's one. But Howard used the hose not only where required but also on the corners, which produced a more unified form. The large wheels are repeated at the hose connection and at the brush connection. The use of colour reflects a Michele De Lucchi influence from Manphis and many other sources. The shoulder type vacuum cleaner designed by Wolfe uses standard components such as the hose connection, which is also used in the electrolux Model 350 (Fig.47(b)). The use of fabric makes the unit more comfortable to use. It can also be left standing while the user moves around with the hose. The attachments are once again visable and the legs are similar to those used in the sledge type cleaner of 1958.(Fig.41). The bag holds all the tools and the unit can be left in the corner of a room without being too much of an obstruction.



52. Andrew Howard, 1987.



53. Robert Wolfe, 1987.

New Technology:

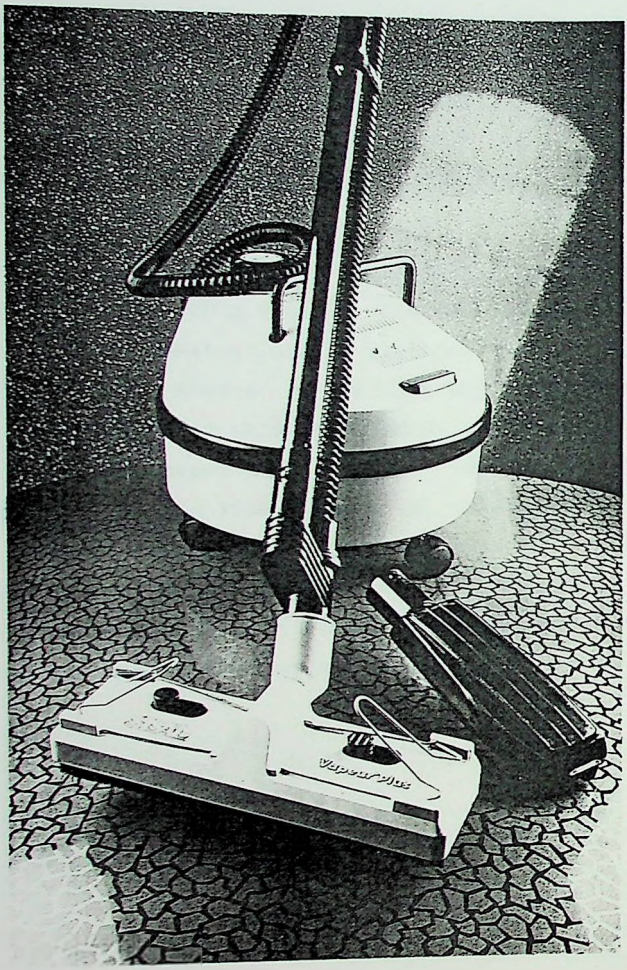
The science and technology which is now available is being developed by designers to produce new mechanisms. The steamatic and the cyclonic vacuum cleaners are examples of this.

The use of steam to clean the outside of buildings and large surface areas is an old idea. But steam has never been controlled to clean a small area using an appliance which could be used by the housewife. Housewives could rent out a team which would do this, similar to the mobile units of the late 19th century. But now the unit has been minimised and can clean mostly any surface in the home with little difficulty. The advantage is the steam not only cleans the dirt but also kills the germs and bacteria.(Fig.54). It can steam-clean ovens, curtains, tiles, carpets and even remove wallpaper. A litre and a half of water is placed in the tank and the unit is switched on. The water boils via a control valve ensuring a constant pressure slightly above atmospheric pressure is applied. A theremostat controls the heater and ensures that the tank does not boil dry. After five or six minutes being on, there is steam. The nozzle consists of a washable towelling cover which absorbs the dirt which has been dislodged. A litre and a half gives fifteen minutes of steam cleaning.

The form is contradictory. The wheels which are used are an old style of wheel. It does not enhance the product. The on/off switch is similar to that used in a Nilfisk. This is a new idea and should be identified in form as such. It has taken the vacuum cleaner fifty years to develop its identity to it's present state.

The cyclonic vacuum cleaner has also adopted the form of the past vacuum cleaner, but it's technology is innovative. James Dyson has based the new method of cleaning on the centrifugal force and is called cyclone technology. The problem that was presented to Dyson was that dirt came out with the exhaust air in both the upright type and the cylinder type cleaner. The unit, while empty, allowed the dirt to be expelled out with the air. 30grms. out of the first 100grms. of dust collected is expelled out of the back of the cleaner. When the pores in the filter become clogged up, it does not act as an efficient filter. But in the dirty bag state suction is reduced by an astonishing 70% and it goes on declining as the bag fills up.

The cyclone vacuum cleaner (Fig.55(a))works on the principle as the dirt is drawn in, a tube at the side carries the dirt to the top of the cyclone's smoked plastic cylinder. It is drawn up by a fan which is mounted on the base. The air moves at a tangent and reaches speeds of more than 300 kmh. This is the first cyclone. Particles of dirt revolve around in it and fall to the bottom through

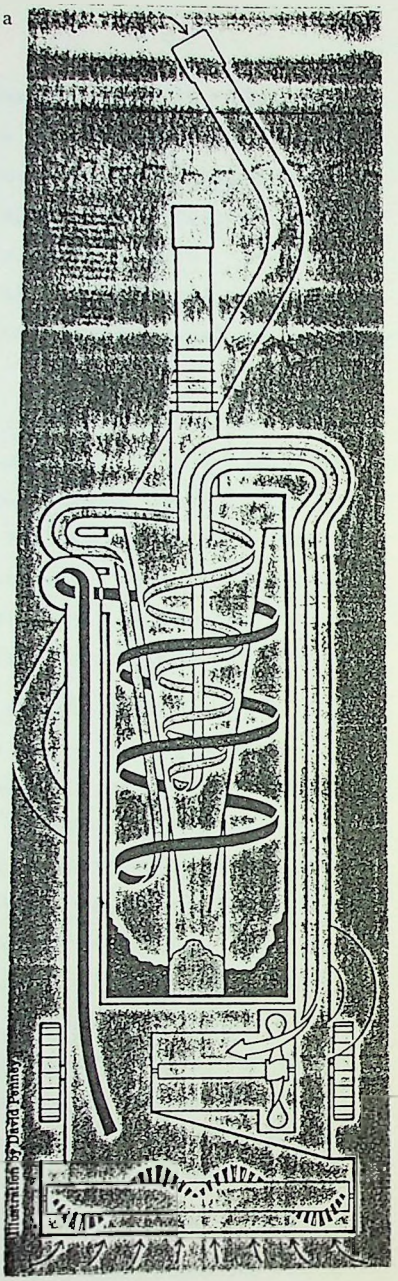


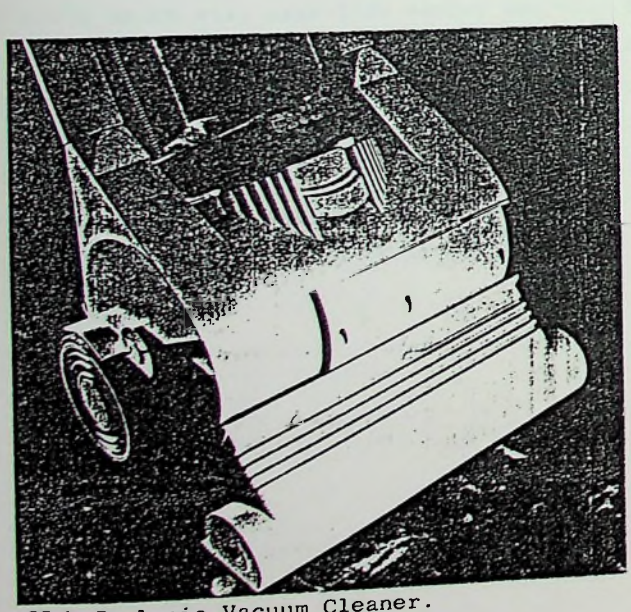
54. Steamatic, 1988.

a combination of their own speed and gravity. This air, with the large particles removed is funnelled up the middle of the cylinder. It passes through a hose and is forced to enter a second cyclone. In the second cyclone the airstream reaches velocities approaching the speed of sound. The particles in the airstream are forced against the inside through centrifugal force. The dirt then falls down. All the dust is collected at the bottom of the smoked plastic cylinder which surround the main cyclone. No dust is expelled out with the exhaust air, so it is more hygienic. Also, suction remains at full strength no matter how full the cylinder is. When the cylinder is full, it is clearly visible because of the use of smoked plastic. It has the added feature that it can be converted into a cylinder type cleaner. When the handle is detached from the body, it modifies to be a retractable hose and pipe unit.

The appearance is a mixture of Memphis, Star Wars, Art Deco, Alien and Centre Pompidou styling motifs (Fig.55(b)). The centre of gravity has been positioned, so that a vertical position can be achieved with the use of 'catchs'. The two large wheels are used instead of the four small ones which allows greater manoeuvreability. As a result of this the head of it 'floats' over the carpet and so adjusts to different carpet pile heights. The form can be compared to Hoover's first model (Fig.19) in 1906. The brush is emphasised in both and the motor and fan are held by the handle. Dyson in many ways has taken the odd form and placed a new mechanism inside. But the use of materials is very successful, as it was in 1906. The smoked plastic avoids the requirements of indicator switches, and so keeping the cost at approximately £100 to £200.

a



55.b. Cyclonic Vacuum Cleaner.

Conclusion:

Since people's desire for cleanliness had intensified over the years and had reached its climax in the 1920's, a device had to be developed which efficiently removed the dirt from the home. Once the mechanism was developed and worked efficiently, the visual aspects became more important. Industrial designers were employed for the first type by manufacturers in the 1930's. These designers analysed what people needed and satisfied it. So when the designer was first employed he made the product reflect progress and technological development, called streamlining.

However, industrial designers were not only stylers. After the war they applied their knowledge of materials and processes to achieve a more appealing product to the customer and to the manufacturer. The customer wanted to reflect the products and the imagery used before and during the Second World War and the manufacturer required a more economically produced product. Once the designer had achieved a more economically manufactured product, all that was required of them after the 1950's was to style the product, as was their job in the 1930's.

But now industrial designers are beginning to explore and experiment with material and technology. More hygienic cleaners are being developed after a period of 50 years of technological dormancy. But the new developments are adopting the old forms, as was the case in 1920, in America. Designers are facing a period of change, as the manufacturers were faced with in the beginning of this century. Designers have to work in harmony with innovators and produce new products which will make life easier and will be more hygienic. This was the aim of the people with the advent of the vacuum cleaner 100 years ago. Maybe a designer will devise a way which will eliminate the necessity of a vacuum cleaner by removing the dirt and dust, before it even settles in our homes. Designers have to be willing to explore all possibilities, similar to the way designers explored the imagery of success in streamlining. It is the designer's job to continue exploring as James Dyson and Robert Wolfe.

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