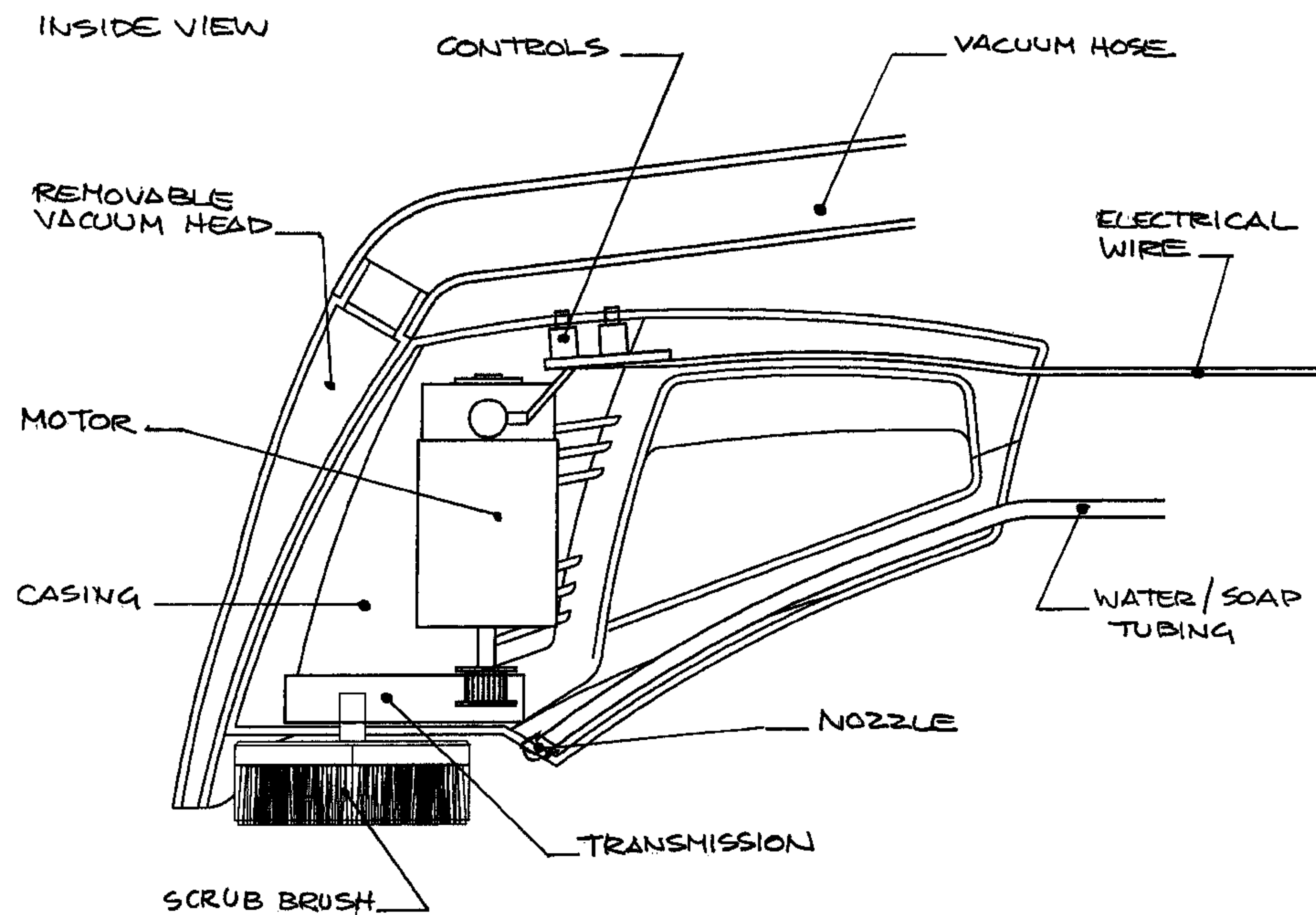


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(54) MACHINE POUR NETTOYER DES SURFACES  
(54) SURFACE CLEANING MACHINE



## SURFACE CLEANING MACHINE

### FIELD OF THE INVENTION

The present invention relates to the field of cleaning devices and is primarily concerned with a combination of a vacuum system with a surface  
5 cleaning machine, including a brush.

### BACKGROUND OF THE INVENTION

The field of surface cleaning machines is replete with various types of devices, most of which can be separated into either so called dry or wet type of cleaning devices.

10 Dry type of cleaning devices include conventional vacuum cleaners and mechanical scrub brushes.

Although efficient in some situations, they are not able to sufficiently clean certain types of surfaces, especially textured surfaces such as fabric material covering vehicles, as well as interior chairs and seats, and also  
15 textured floor coverings such as rugs.

Accordingly, there exists a plurality of so called wet cleaning devices that use water in conjunction with a cleaning agent.

Although more efficient in the cleaning operation, such devices are typically more difficult to operate and may cause damages to surfaces being  
20 cleaned if, for example, the cleaning agent is allowed to remain on the surface being cleaned for an extended period of time.

Indeed, the surface being cleaned suffers the risk of discoloration, shrinkage, mildew or the like, depending on the type of fabric and the cleaning agents being used.

Of the so called wet type of cleaning devices, two devices are particularly popular. A first type of device is known as a scrubbing device which deposits soap and water onto the fabric being cleaned before the scrub brushes work the soap and water into the carpet.

- 5 These devices suffer from a major drawback in that they are not adapted to extract the water and soap from the carpet fibres, and thus, not only subject the carpet fibres to the type of damage mentioned above but also, leave an oil film from the soap in the material being cleaned, hastening the resoiling of the fabric.
- 10 The other popular wet type cleaning device is known as steam cleaner which do not utilise scrub brushes and soap suds solution, thus eliminating some of the hereinabove mentioned drawbacks.

15 These devices attempt to remove the water and cleaning agent used in the cleaning of the fabric. The size of the cleaning head allows for cleaning of hard to reach areas and furniture. However, due to their construction, they are unable to remove enough of the water and cleaning agent to leave the surfaces essentially dry.

20 Furthermore, because of their weight and bulk, the known steam cleaning devices must be transported from one job site to another by a truck and require a crew of men to load and unload them from the truck. Subsequently, they are not adapted for use by individuals.

25 Although some devices have been proposed for combining vacuum action to a scrub brush action in the context of wet cleaning using water and a detergent, the proposed devices insofar have failed to provide a satisfactory solution, since they are either inefficient, non ergonomic or both or do not provide access to hard to reach areas.

Accordingly, there exists a need for an improved surface cleaning device.

### SUMMARY OF THE INVENTION

The present invention is a surface cleaning head that can be mounted on any standard vacuum cleaning device that deposits water and a cleaning agent. The new cleaning head comprises, essentially, a casing that can be hand held. In that casing can be found a nozzle linked with a tube to the main cleaning machine to provide the head with a cleaning agent and water. On the front of this casing is mounted a removable vacuum head that is linked with the standard hose of the cleaning machine to its vacuum pump to suck water, dirt and cleaning agent from the surface being cleaned. Mounted to the transmission is a scrub brush that can have the shape of a disk (rotating on its axis) or one or more rolls (also rotating on their axis). Other cleaning motions can also be implemented such as translation. On the casing are also mounted the controls that allow for the activation of the various components of the cleaning machine (for example: the vacuum pump, the soap pump, etc.) and of the motor.

Advantages of the present invention include the fact that the proposed device allows for selective use of water and detergent combined with a scrub brush and a vacuum action so as to provide an efficient cleaning action. The vacuum head being removable from the cleaning head facilitates the vacuum of hard to reach areas to leave these as dry as possible. The overall small size of the head allows for ergonomic handling of the latter and cleaning of smaller objects than traditionally allowed by the standard cleaning steam machines (for example: car seats, furniture, upholstery, etc.). Of course, the vacuum head can also function as part of the cleaning head, in one hand motion of the device. This built-in vacuum allows for removal of the water and detergent being used so as to reduce the risk of chemical burns, color fading, shrinkage or mildew associated with wetting by a chemical detergent of the surface being cleaned.

Physically, the new device could have, but is not restricted to, the following organisation.

The main casing, made of an impact resistant material such as plastic or metal, has a shape similar to that of a hand held jigsaw. The top part of the casing presents a handle on top of which are found the controls for the system. Coming out of the rear of that handle is an electrical wire that links the cleaning head to the electrical components of the cleaning machine and that carries power from the cleaning machine to the motor of the cleaning head.

In a first preferred embodiment of the present invention, illustrated in figures 1 to 4, the casing is a protective body for an electrical motor and transmission.

The motor is mounted inside the casing, in the frontmost section of the body. The scrub brush is linked to the motor with a transmission that slows down the "rotations per minute" to an appropriate speed for cleaning purposes. The scrub brush can also easily be removed for maintenance or replacement.

The bottom horizontal member of the casing hides the tube that links a nozzle, situated right behind the scrub brush, to the water and soap pump in the main cleaning machine.

The removable vacuum head is mounted on the front face of the casing with a sliding/locking mechanism, or any other mean that can be released manually.

In a second preferred embodiment of the present invention, illustrated in figures 5 to 7, the motor that activates the brush is located in the main body of the standard vacuum device.

More particularly, the cleaning device 10 includes a main body 12 having a frame for protectively enclosing internal components which will be hereinafter disclosed. The body 12 may be optionally mounted on base legs 14 which may optionally be provided with caster type wheels (not shown). The body 12 has a top wall 16, a base wall 18, a pair of end walls 20 and a pair of side walls 22 defining an enclosure for the various components.

It should be understood that the body 12 could have various geometrical configurations without departing from the scope of the present invention. The body 12 protectively encloses a soiled liquid container 24 removably inserted therein for containing soiled water being vacuumed by the device. The soiled liquid container 24 has a removable cover 26. A conventional liquid vacuum means 28 is located within the waste liquid container 24 for creating a vacuum therein in suctioning waste or soiled water through a conventional flexible vacuum hose 30 pneumatically communicating with a suction nozzle 32 formed in a distal section of the cleaning head 34.

The body 12 further defines a cleaning liquid container 36 for containing a liquid typically including water mixed with a suitable detergent.

A liquid pumping means 38 is operatively mounted within the cleaning liquid container 36 for pumping the cleaning liquid through a cleaning liquid hose 40 extending along the vacuum hose 40 and preferably attached thereto by suitable attaching means such as transversal attachment strips 42.

The cleaning liquid hose 40 is hydraulically coupled to a spray nozzle 44 shown in figure 6 and preferably positioned at a proximal location of the cleaning head 34.

The power means typically takes the form of a conventional electrical rotary motor 48 positioned within the body 12. The electrical rotary motor 48 has a rotating shaft 50 extending therefrom, mechanically coupled to a driving cable 52 mounted within a driving cable sleeves 54. The driving  
5 cable 52 typically has a generally square cross-sectional configuration.

Referring now more specifically to figure 4, there is shown some of the internal components of the cleaning head 34. The driving cable 52 is mechanically coupled to a supporting assembly 56 including conventional roller bearings 58.

10 The roller bearings 58 rotatably support the cable 52 relative to a head base 60 supporting a driving gear 62.

The driving gear 62 mechanically engages a driven gear 64 rotatably mounted within a corresponding casing 66 by suitable roller bearings 68. A scrub brush 46 is releasably mounted to the cleaning head 34 and  
15 releasably coupled to the driven gear 64 so as to allow easy replacement of the scrub brush for customized selection or replacement of the latter.

Typically, the scrub brush is releasably mounted to the driven gear 64 by a conventional fixing means such as a bolt 72. It should be understood that although the device shown in figures 4 through 7 uses a rotary scrub  
20 brush, the scrub brush 46 could have other cleaning motions such as a translational, vibrational or a combination of cleaning movements without departing from the scope of the present invention.

A switch means 74 preferably taking the form of a toggle type switch is used for allowing selective operation of the vacuum 28, the pump 38 or the  
25 motor means 48 so as to allow an intended user to selectively either spray a cleaning liquid through the spray nozzle 44, activate the scrubbing brush 46 or vacuum the soiled liquid through the vacuum nozzle 32.

The device optionally allows for simultaneous operation of all functions. The switch 74 is electrically coupled to the various components using conventional suitable linking connecting cables 76. The vacuum 28, the pump 38 and the drive means 48 are adapted to be powered using  
5 conventional electrical outlet and connected through a conventional electrical cable 78 having a male type plug 80 at a distal end thereof.

The casing 12 is preferably configured so as to define an integral handle 82 for facilitating handling and transportation thereof. Also, a proximal section of the cleaning head 34 is provided with a removable cover 84 for  
10 facilitating maintenance, repair and replacement of components of the cleaning head 34.

OUTSIDE VIEW

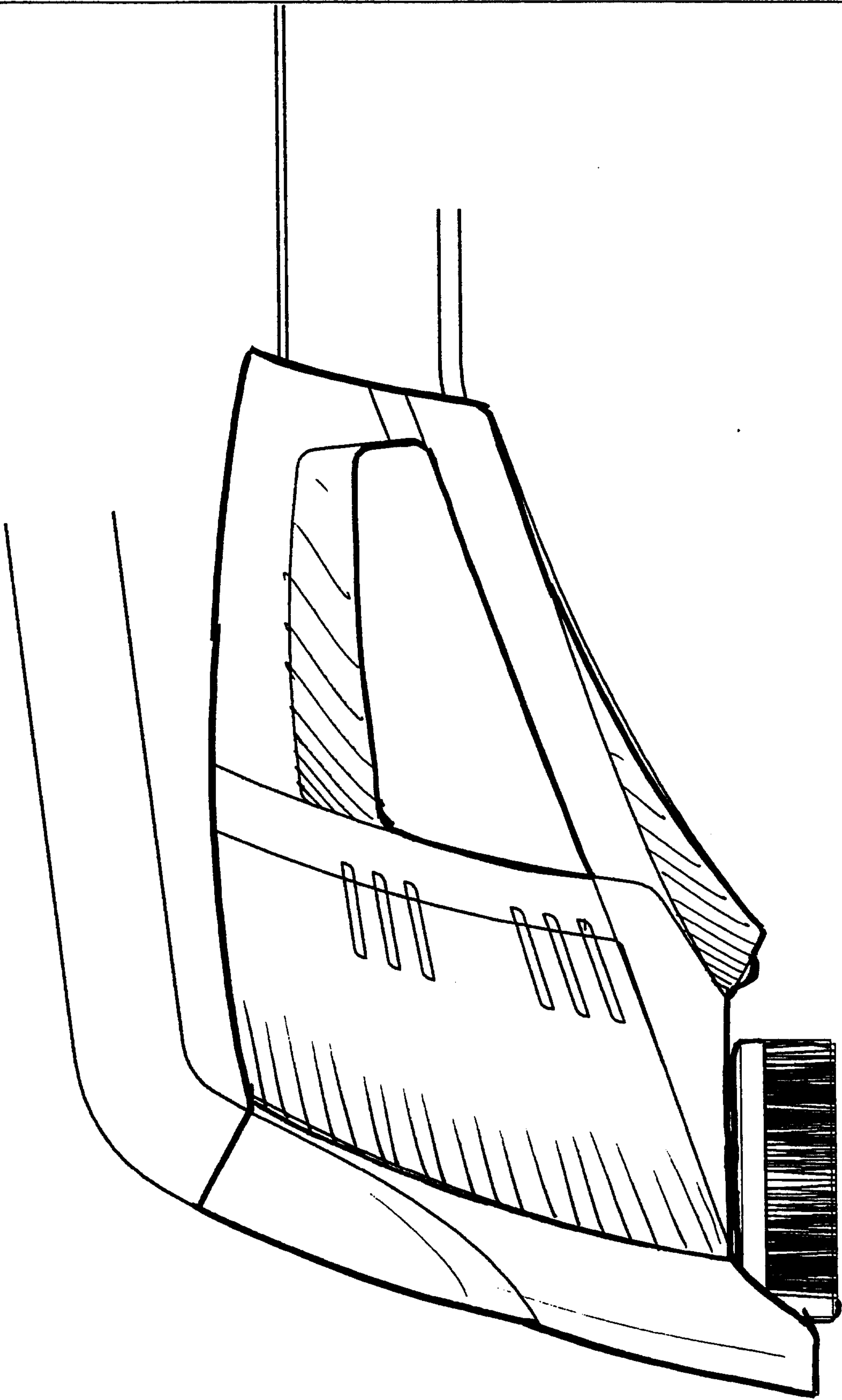


Fig. 1

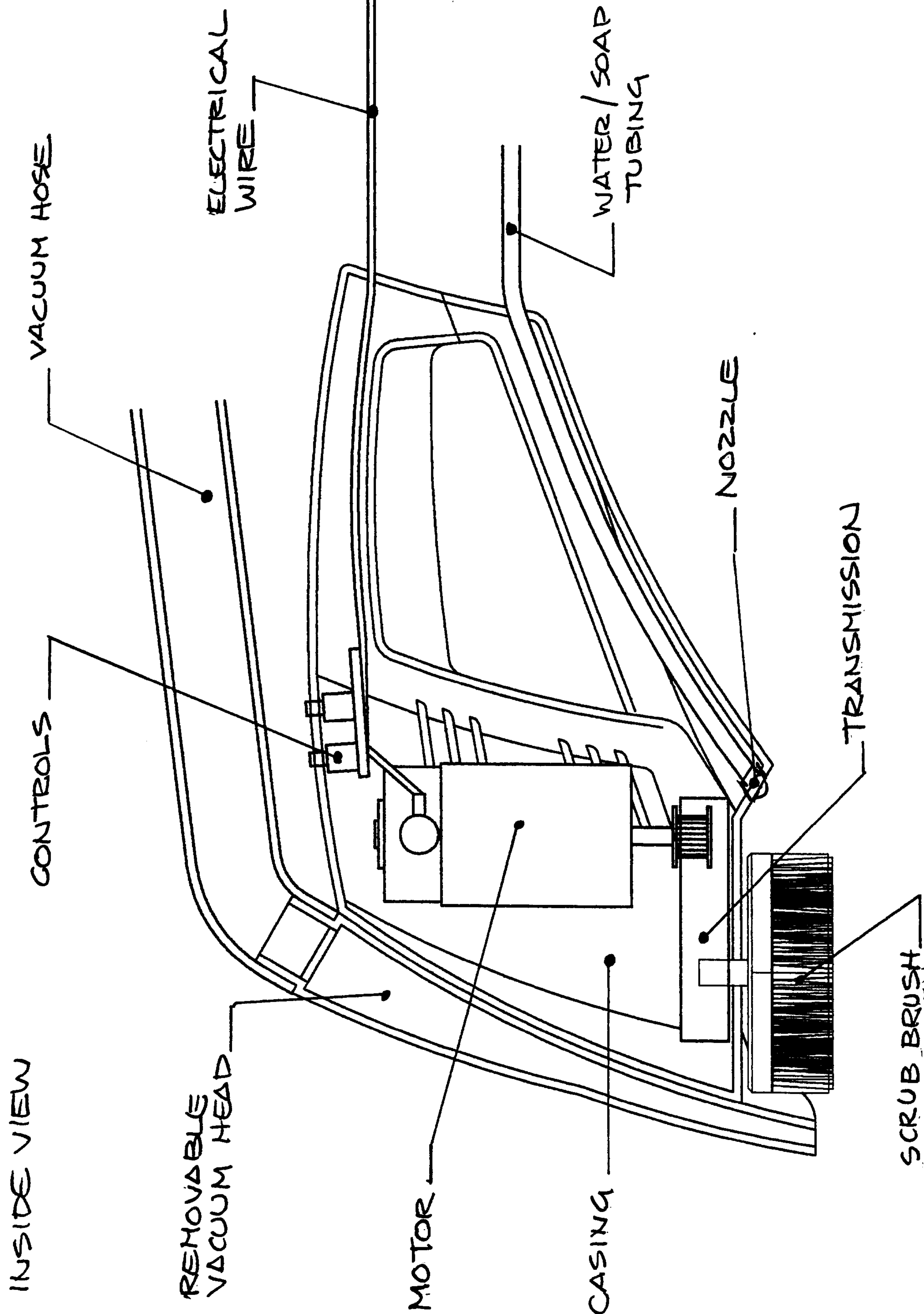


FIG. 2

ASSEMBLY OF  
THE VACUUM HEAD

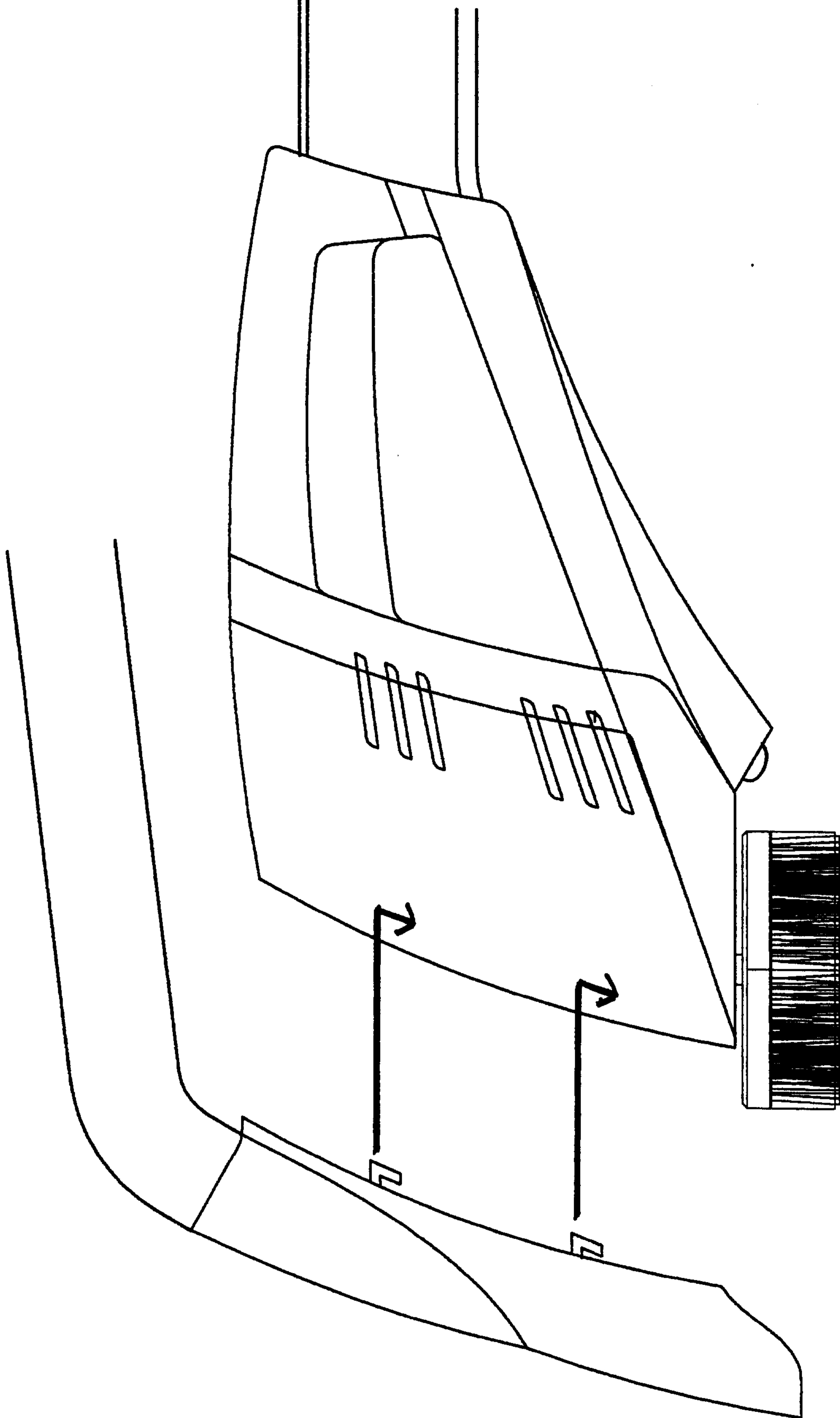


Fig 3

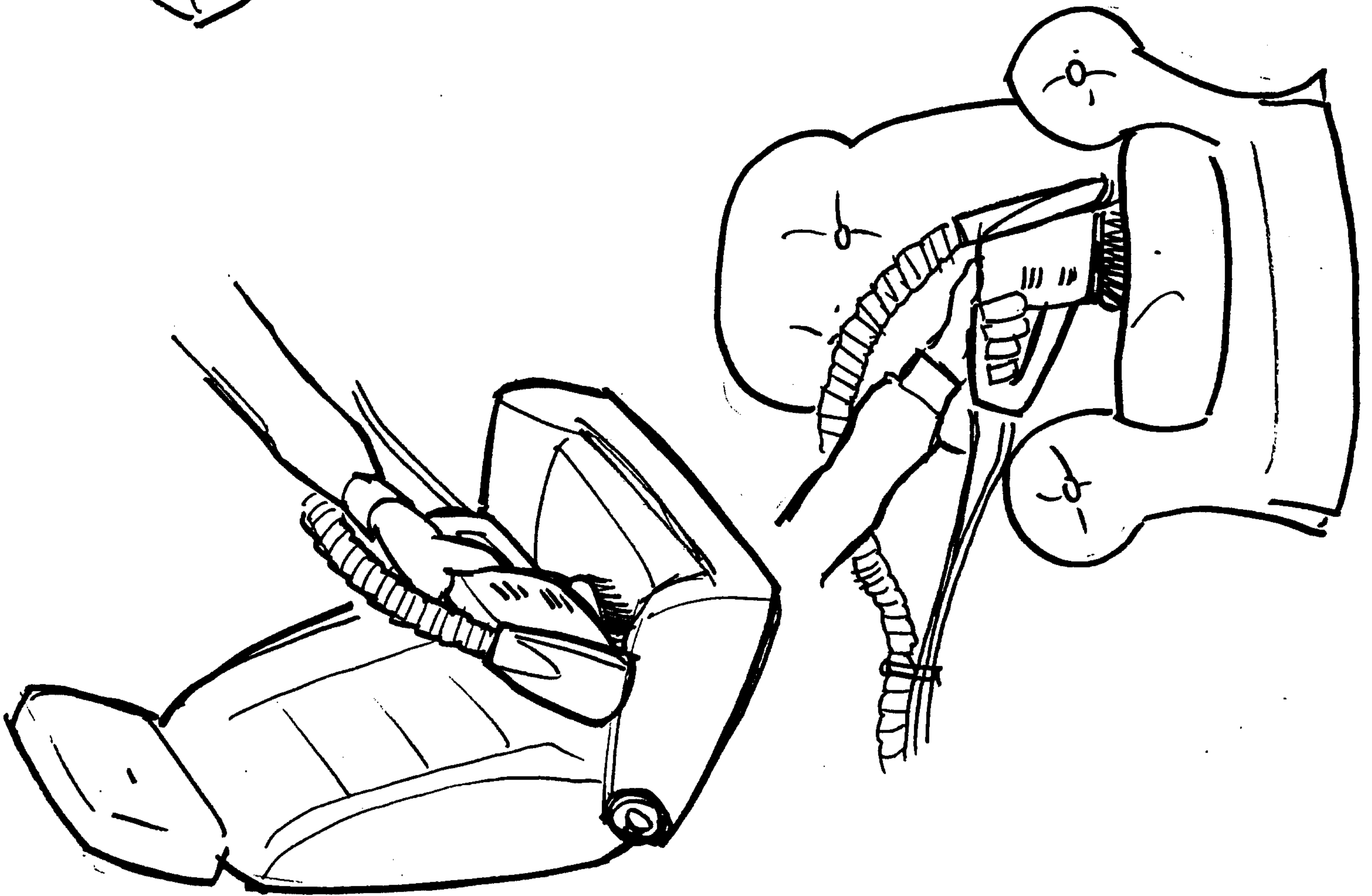
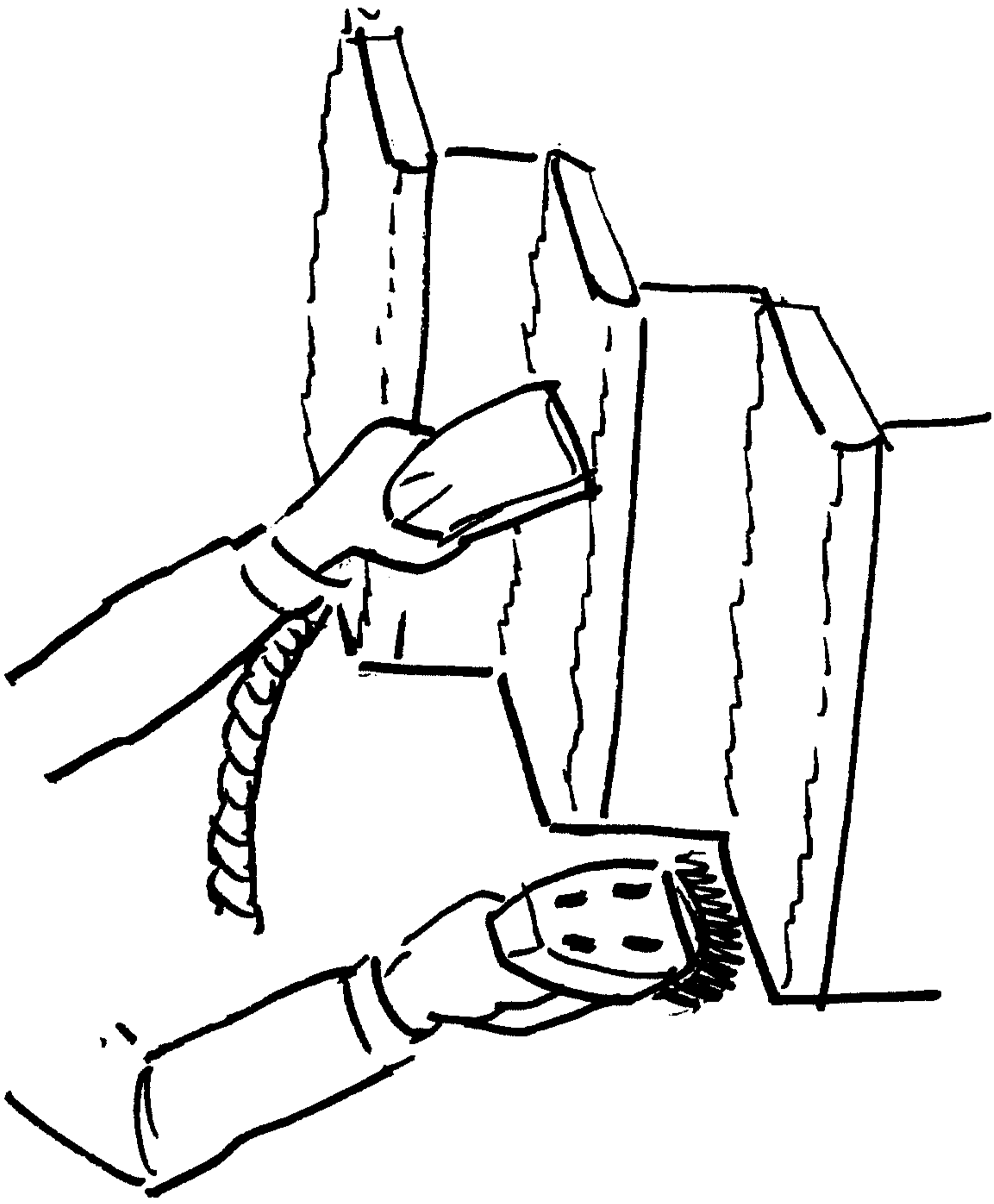
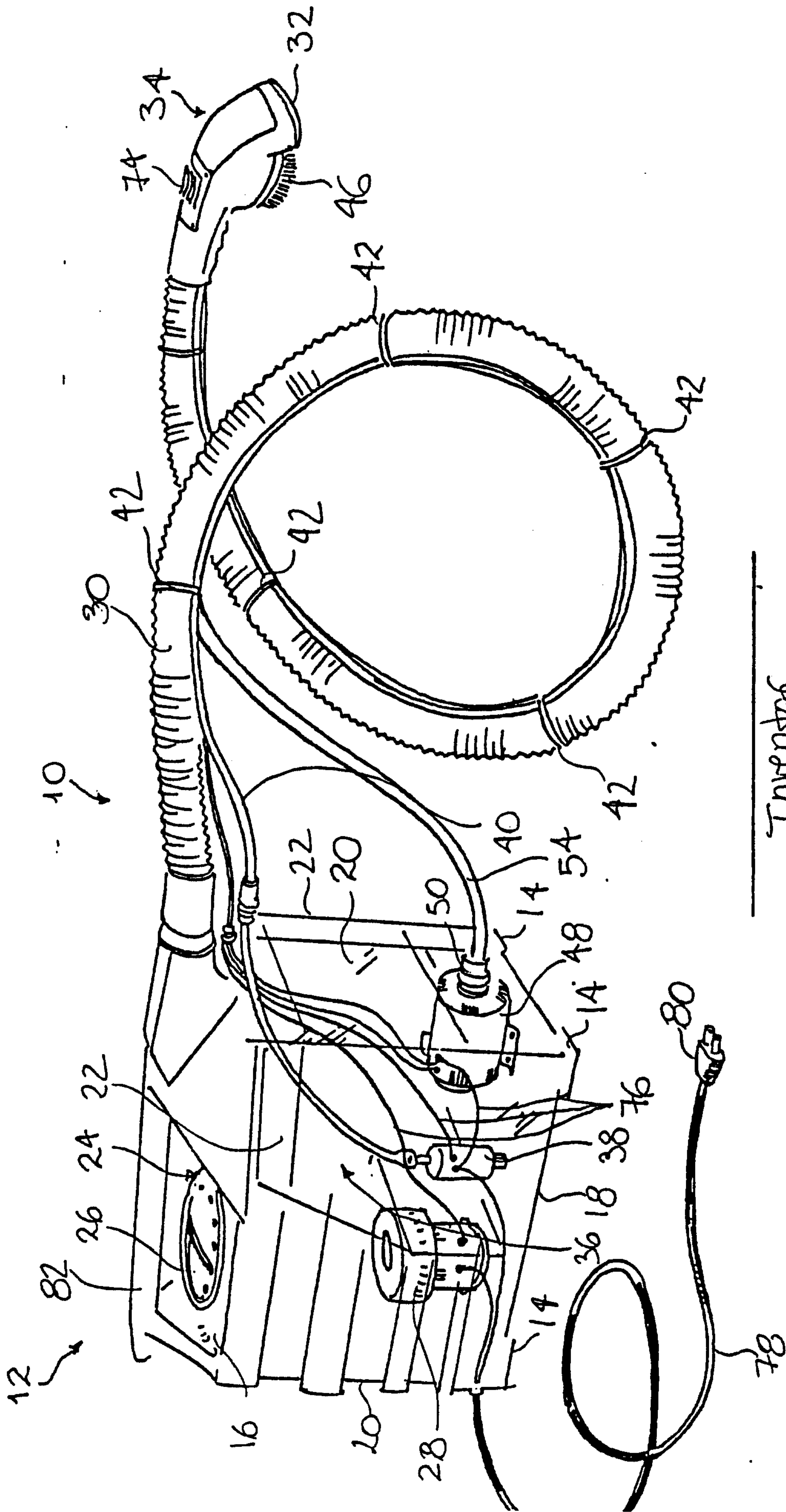


FIG. 4

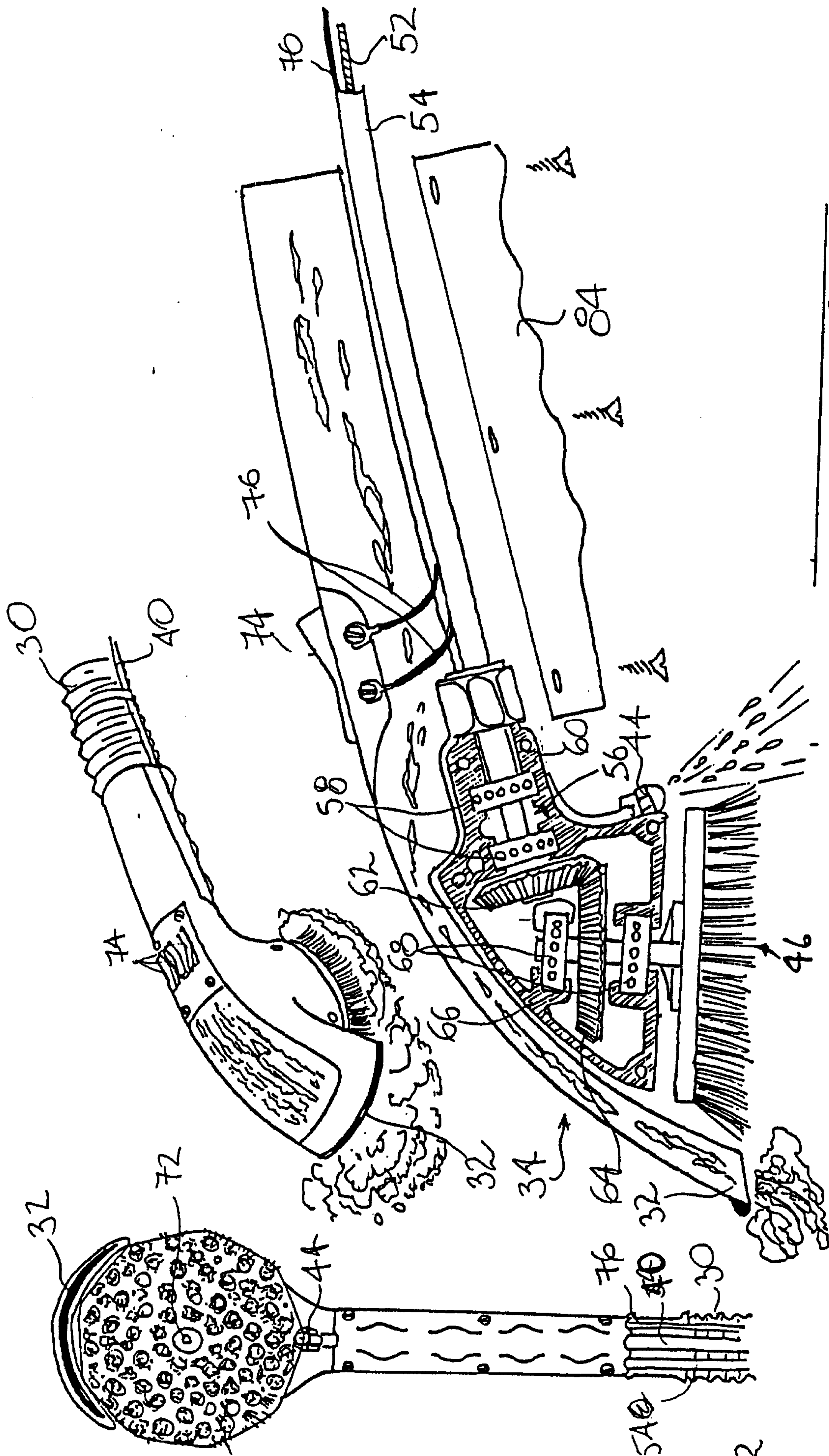
APPLICATIONS.





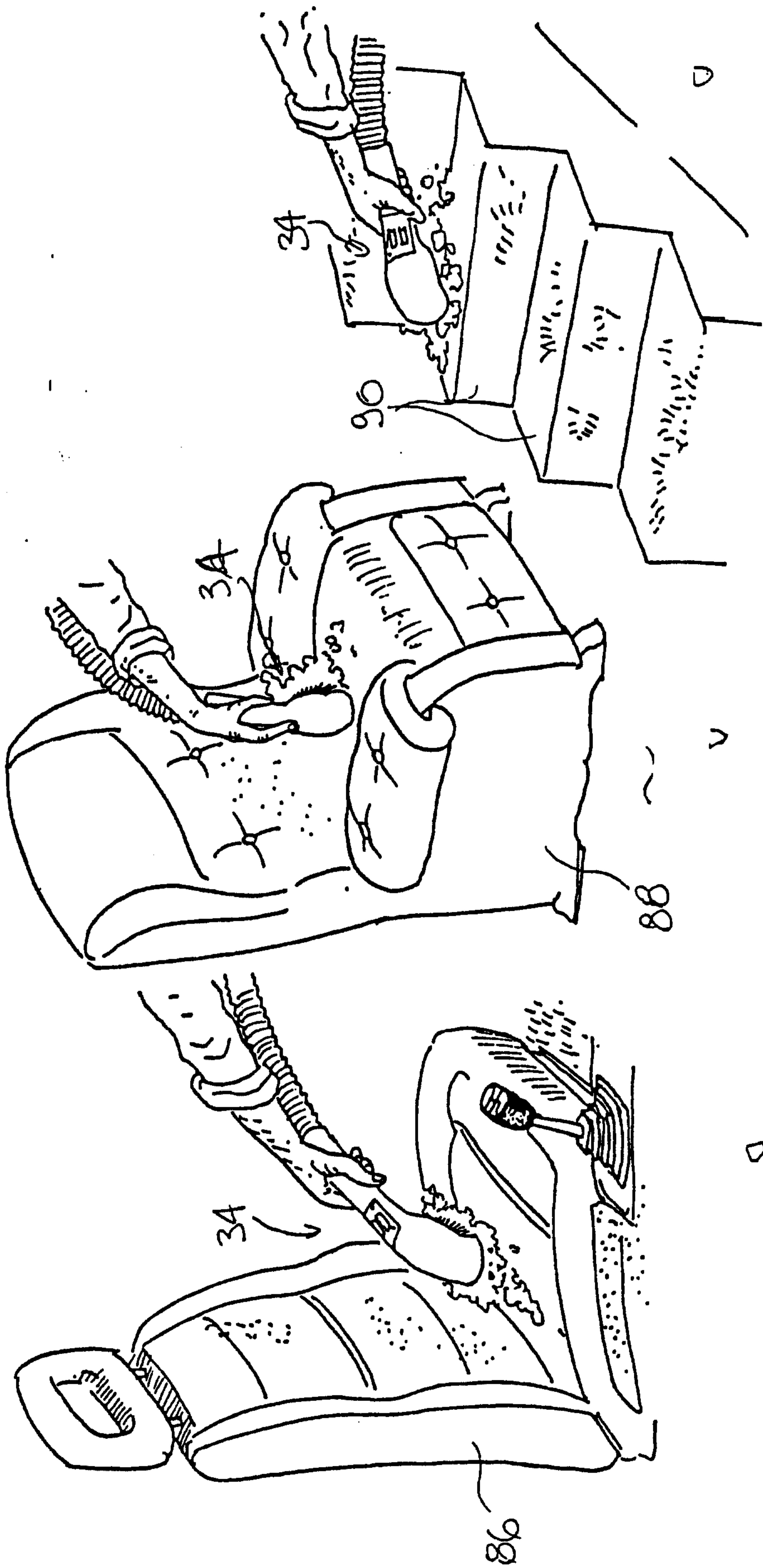
Inventor.

Fig. 5



Inventor.

FIG. 6



Inventor.

Fig. 7

