March 8, 1932. E. BUTZER 1,848,314

SUCTION CLEANER

Filed Sept. 22, 1930 2 Sheets-Sheet 1

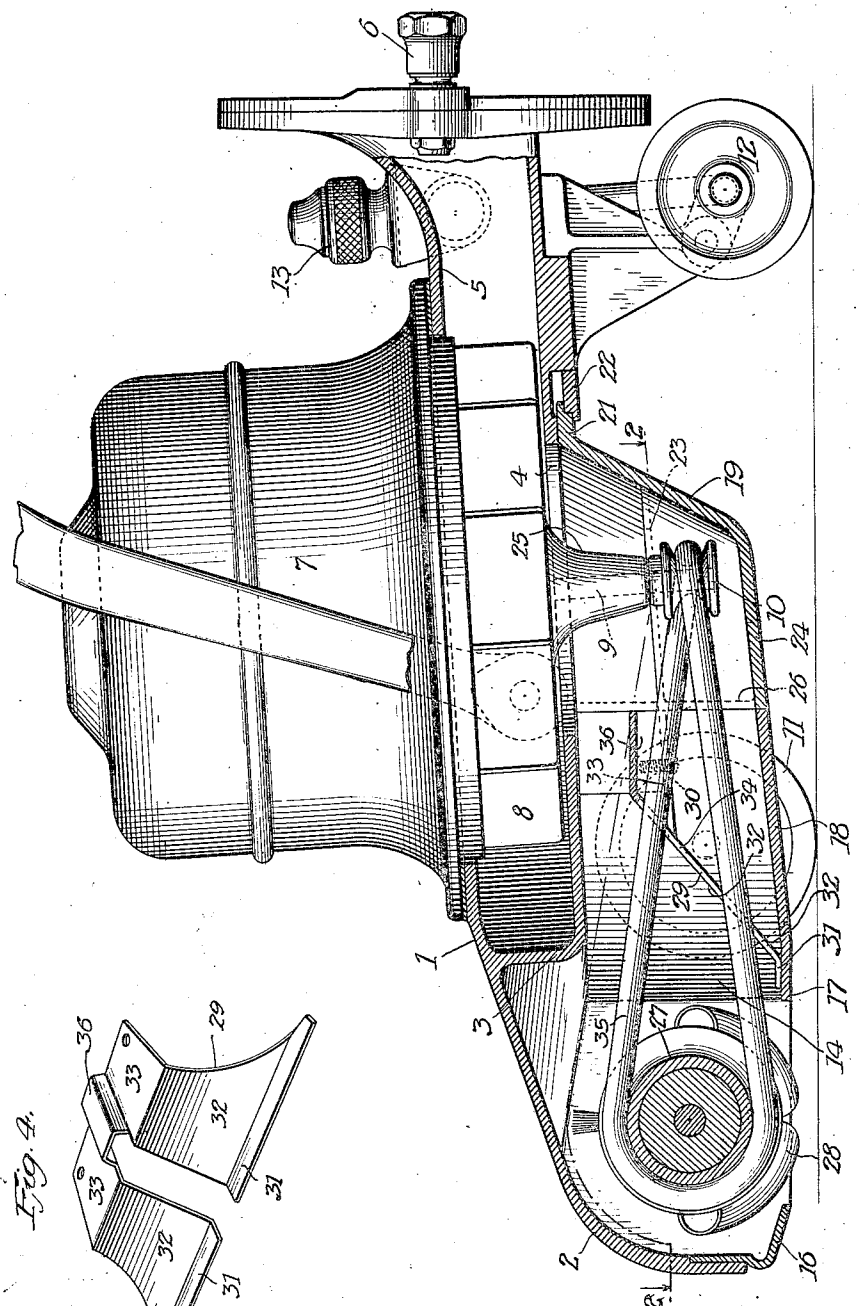


Fig. 1.

Fig. 4.

Witness
R B Davison.

Inventor
Eugene Butzer
By Harry S. Dewarse
Atty.

March 8, 1932. E. BUTZER 1,848,314

SUCTION CLEANER

Filed Sept. 22, 1930 2 Sheets-Sheet 2

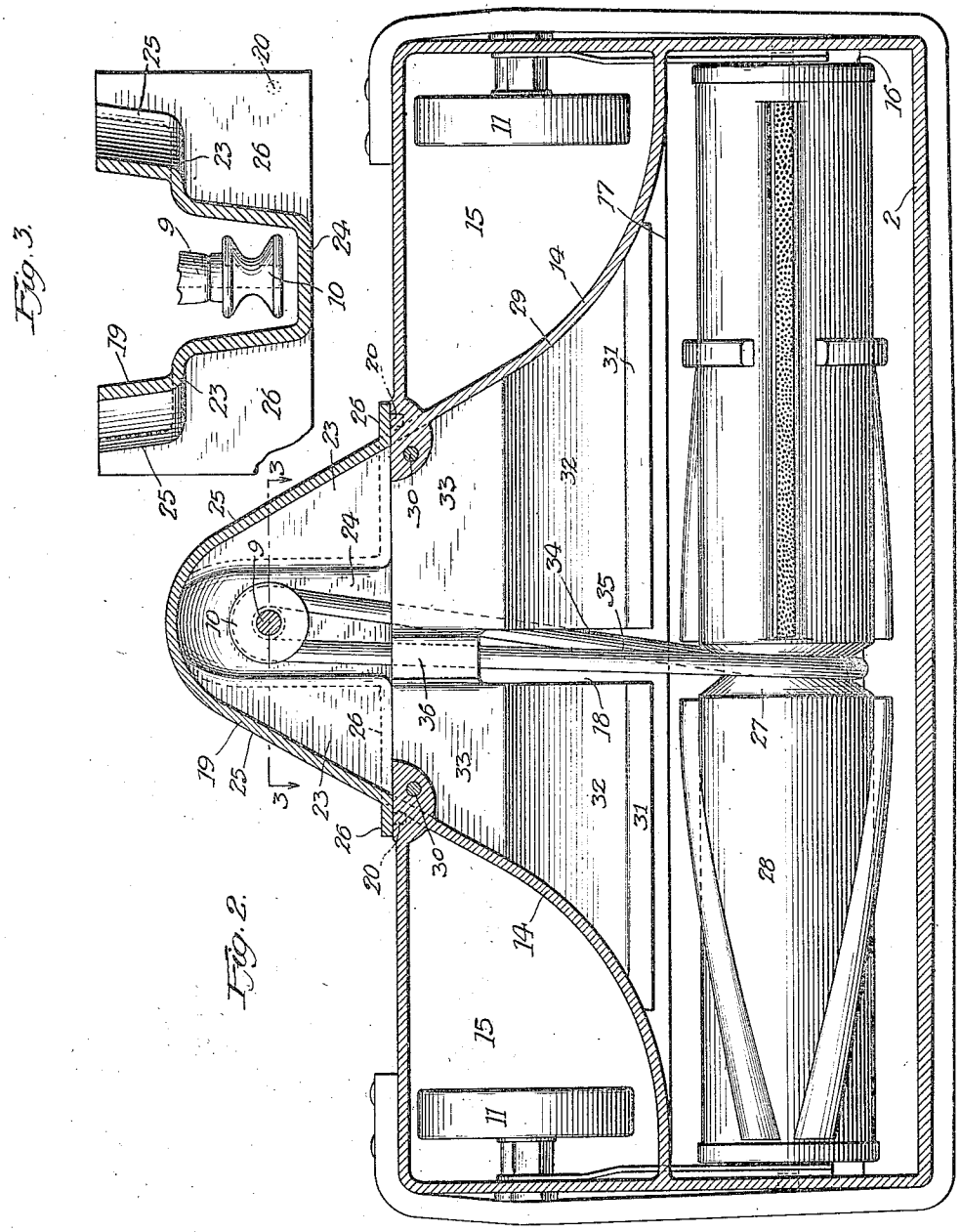


Fig. 3.

Fig. 2.

Witness
R B Davison

Inventor
Eugene Butzer
By Harry S. Bruaset
Atty.

Patented Mar. 8, 1932 1,848,314

UNITED STATES PATENT OFFICE

EUGENE BUTZER, OF BASEL, SWITZERLAND, ASSIGNOR TO THE HOOVER COMPANY, OF NORTH CANTON, OHIO, A CORPORATION OF OHIO

SUCTION CLEANER

Application filed September 22, 1930. Serial No. 483,431.

The present invention relates to suction cleaners, and particularly to improvements in that type of suction cleaner which employs a motor-driven agitator, and in which the power transmission is positioned within the dirt-laden air passageway.

An object of the invention is the provision of an improvement in suction cleaner construction through the incorporation of which the performance of the cleaner will be improved. A further object is the provision of means in a suction cleaner to increase the life of the power-transmission. A still further object is the provision of means, in a suction cleaner of the type in which the power-transmission is positioned within the dirt-laden air passage, which will divert the dirt-laden air from the power transmission. Another object is the provision in a suction cleaner construction, of the type in which power is transmitted from the driving pulley positioned substantially in the eye of the fan chamber to an agitator positioned in the nozzle mouth, of improvements, through the incorporation of which, the dirt-laden stream of air is diverted from the power-transmission pulley. Other and more specific objects will appear on reading the following specification and considering the drawings annexed thereto.

In the drawings in which like reference characters refer to like parts in the various views.

Fig. 1 is a side view partly in section, of a suction cleaner embodying the present invention.

Fig. 2 is a section upon the line 2, 2 of Fig. 1.

Fig. 3 is a section upon the line 3, 3 of Fig. 2.

Fig. 4 is a view in perspective of the air-directive baffle which comprises an essential element in the present invention.

In the modern suction cleaner embodying positive agitation means, such as a rotary brush or rigid agitator within the suction nozzle in such a position that it is adapted to rotate in contact with the surface covering in the operation of the machine, it is a common means of providing the rotating torque for such an agitator to continue the motor shaft through the fan chamber, in which the suction-creating fan for the cleaner is usually mounted, into the air passage immediately adjacent the fan chamber, which is commonly called the eye of the fan chamber, and there to connect said shaft to means which transmit the rotating torque to the agitator. This power-transmission means may be a rotatable shaft, in which case a gear would be mounted at the end of the motor shaft in the fan chamber eye which would mesh with a gear positioned upon the shaft. It is a more common method, however, to position a pulley upon the end of the motor shaft and also to place a pulley upon the rotating agitator and to convey power from one to the other by means of a belt. Inasmuch as this belt is positioned in the passageway used by the dirt-laden stream of air which passes from the mouth of the nozzle to the fan chamber in the response to suction created by the fan therein, it is clear that foreign matter suspended in the air may come into contact with the driving belt throughout its length and at the point at which it makes driving contact with the driving pulley at the eye of the fan chamber. Such a condition is undesirable whether the foreign matter be dirt, grit, strings or hair or matter of similar character. If the matter which contacts the belt and the driving pulley be dirt and grit it is ground into the belt and the life of the belt is materially shortened. If it takes the form of strings and hair, etc., in many instances the belt is thrown off the driving pulley and it is necessary, if the machine is to be continued in operation, to disassemble it, remove the foreign matter from the pulley, and replace the belt. In many instances the belt is broken through stretching by an accumulation of foreign matter which becomes wrapped around the pulley and so increases the effective diameter to such a point that the elastic limit of the belt is exceeded. Such a condition not only results in an unnecessary load upon the motor, but further in loss of efficiency and time loss to the operator. It is to avoid and overcome such objectionable results that the present invention is directed.

Referring now to the drawings, a preferred embodiment of the present invention is disclosed, comprising a modern type suction cleaner which includes a main casing or casting 1 which includes a nozzle 2, a fan chamber 3, provided with an inlet 4, and an exhaust outlet 5, which is provided with means 6 for the attachment of a dirt separator or a dust bag. A motor, generally indicated by the reference character 7, is mounted upon the main casing 1 immediately above the fan chamber 3 with its shaft 9 extending downwardly through the fan chamber 3, where the fan 8 is mounted upon it, into the air passageway immediately outside the fan chamber, which is called the eye of the fan chamber, where the pulley 10 is mounted. The entire construction is movably supported by means of spaced front supporting wheels 11, 11 and by the rear vertically-adjustable supporting wheels 12, 12 which are provided with means 13 by which the cleaner may be pivoted about the axis of the front supporting wheels in order to vary the position of the nozzle relative to the covering undergoing cleaning.

The main casing 1 is provided with spaced vertical walls 14, 14 within the nozzle 2, Fig. 2, which converge toward the inlet of the chamber 3. These walls define wheel pockets 15, 15 at the rearward corners of the nozzle 2 within which are positioned the front supporting wheels 11, 11 and also serve to define the sides of the air passage which leads from the mouth of the nozzle 2, which is defined by the nozzle lips 16 and 17, to the fan chamber. The bottom of the air passage comprises the bottom plate 18 upon which the rear nozzle lip 17 is integrally formed. At the rear of the air passage formed by the walls 14, 14 and the bottom plate 18 together with the top of the casing 2, is positioned a removable housing 19 which forms a continuation of the air passage and serves to direct the air into the fan chamber 3.

Housing 19 is removably attached to the casing 1 by means of forwardly protruding pins 20, 20 which seat in the rear wall of casing 1, and also by the rearwardly extending portion 21 which is removably held in place by a transversely slidable member 22, the construction being a well-known and much used one completely shown and described in the patent to Hettelsater, 1,575,363.

In the usual suction cleaner of this type the housing 19 is formed with a bottom surface which is a continuation of the bottom plate 18 of the air passage and its bottom surface is rounded into upwardly diverting side walls forming a chamber within which a driving pulley for the belt is positioned. The air which enters between the nozzle lips 16 and 17 passes rearwardly, into the air passage aforedescribed, and enters the housing, of the usual type, across its entire width and is deflected upwardly therein upon contacting the rear wall thereof passing, before it does so, the driving pulley and thereby bringing all foreign matter which it carries into contact with said pulley. In the housing, formed according to the present invention, however, the housing 19 is formed with a bottom surface 23 which is positioned above the bottom plate 18 of the air passage and is somewhat above the top of the driving pulley 10 which is positioned within the housing. The channel indicated by the reference character 24 is provided which extends the length of the housing and provides a seat within which the pulley is seated. The surface 23, the channel 24 and the diverging wall 25 of the housing 19 ends in a plate 26 at their forward end, the lower extremity of which is substantially in line with the bottom of the channel 24 and which serves to close the air passage formed in the casing 1 which lies outside the housing described by walls 25, the seat 23 and the channel 24.

In the usual suction cleaner the driving belt is positioned within the air passage of the casing 1 and extends from the pulley 27 which is formed upon the rotatably mounted agitator 28 in the nozzle 2, to the driving pulley which is positioned within the housing forming the eye of the fan chamber. In a cleaner, constructed in accordance with the present invention, a baffle plate, indicated by the reference character 29, is positioned within the air passage casing being secured therein by suitable means such as screws 30, 30. Baffle 29 comprises a plate, the sides of which fit comfortably and snugly adjacent the walls 14, 14 of the air passage and the front portion 31 of which is flattened and lies upon the bottom plate 18 of the air passage. An intermediate section 32 slopes upwardly and rearwardly and ends in a flattened portion 33 which is substantially upon a level with the surface 23 of the chamber 19. Baffle 29 is provided with a cutaway portion in its approximate center, as indicated at 34, through which the driving belt, indicated by the reference character 35, may pass. The flattened portion 33 at the rear of the baffle is slightly raised near its center immediately in the rear of the cutaway section 34 as is indicated at 36 so as not to interfere with the driving belt 35.

In the operation of the cleaner construction in accordance with the present invention, as the machine is operated upon the surface covering, air and dirt are drawn through the nozzle 2 between the lips 16 and 17 and into the air passage within the nozzle in response to the suction created by the suction-creating fan 18. As the air with foreign matter enters the air passage it is deflected upwardly upon making contact with the baffle 29 positioned therein, and continues its rearward passage between that baffle and the bottom of the fan chamber. The air is deflected by the baffle

above the level of the driving pulley 10 and the belt 35 connected therewith and enters the housing 19 thereabove and passes between the surface 23 of the housing and the eye 4 of the fan chamber being drawn through said eye into the fan chamber by the action of the fan 8 therein. The cutout section 34 in the baffle plate 29 permits a small amount of air which carries foreign matter to gain entrance into the air passage below the baffle and so enters through the housing 19 in the vicinity of the driving pulley shaft at its point of contact with the belt 35 but the greater part of the air together with the matter carried thereby is deflected from the pulley by the construction aforedescribed and contact therewith is prevented.

Having clearly and completely described the present invention, I claim:—

1. In a suction cleaner a nozzle, an agitator in said nozzle, a fan chamber, a conduit connecting said nozzle and said fan chamber, an unprotected drive shaft extending through said fan chamber into said conduit, a fan carried by said shaft in said fan chamber, power-transmission means in said conduit extending from said agitator to said shaft, and stationary means to deflect the dirt-laden air in said conduit from the point of contact of said power-transmission means and said shaft.

2. In a suction cleaner a nozzle, an agitator in said nozzle, a fan chamber, an air passageway or conduit connecting said nozzle and said fan chamber, a drive shaft extending through said fan chamber into said conduit, a fan carried by said shaft in said fan chamber, power-transmission means in said conduit extending from said agitator to said shaft, and stationary means to deflect the dirt-laden air in said conduit from the point of contact of said power-transmission means and said shaft, said means comprising a baffle positioned in said conduit which contacts the bottom wall of said conduit adjacent its forward end and which extends rearwardly and upwardly to a level above said point of contact of said power-transmission means and said shaft at its rearmost end.

3. In a suction cleaner a nozzle including a mouth, a rotary agitator positioned in said nozzle, a fan chamber, a conduit connecting said nozzle and said fan chamber, a drive shaft extending through said fan chamber into said conduit, a fan on said shaft in said fan chamber, a pulley on said shaft in said conduit, a power-transmitting belt in said conduit connecting said agitator to said pulley, and an air deflecting baffle in said conduit having an opening through which said belt can pass, said baffle making line contact with the side of said conduit adjacent said pulley at its forward end and extending transversely in said conduit to deflect the dirt-laden air therein from said pulley.

4. In a suction cleaner a nozzle including a mouth, a rotary agitator positioned in said nozzle, a fan chamber, a conduit connecting said nozzle and said fan chamber, a drive shaft extending through said fan chamber into said conduit, a fan on said shaft in said fan chamber, a pulley on said shaft in said conduit, a power-transmitting belt in said conduit connecting said agitator to said pulley, and an air deflecting baffle in said conduit, said baffle comprising a plate extending partially across said conduit, a portion of said plate extending parallel to and in contact with a side of said conduit, an intermediate portion of said plate sloping rearwardly and upwardly and having a slot for said belt, and a rear portion of said plate extending substantially parallel to said first-mentioned portion and ending substantially adjacent the inlet of said fan chamber and above said pulley.

5. In a suction cleaner comprising a nozzle, a fan chamber and an air passageway therebetween, an agitator within said nozzle, a driving shaft extending from said fan chamber into said air passageway, power transmission means connecting said agitator to said driving shaft, a removable housing forming the end of said passageway adjacent said fan chamber having a bottom surface on a plane between the fan chamber and the point of contact of said power transmission means and said driving shaft, and a channel depending from said bottom surface closely enclosing said transmission means and shaft.

6. In a suction cleaner comprising a nozzle, a fan chamber and an air passageway therebetween, a rotatable agitator within said nozzle, a driving shaft extending from said fan chamber into said air passageway, a belt connecting said agitator to said shaft, a removable housing forming the end of said passageway adjacent said fan chamber having a bottom surface between the fan chamber and the point of contact of said belt and said shaft, and a channel depending from said bottom surface closely enclosing said belt and said shaft.

Signed at Basel, in the canton of Basel-City, and State of Switzerland, this 28th day of August, A. D. 1930.

EUGENE BUTZER. [L. S.]