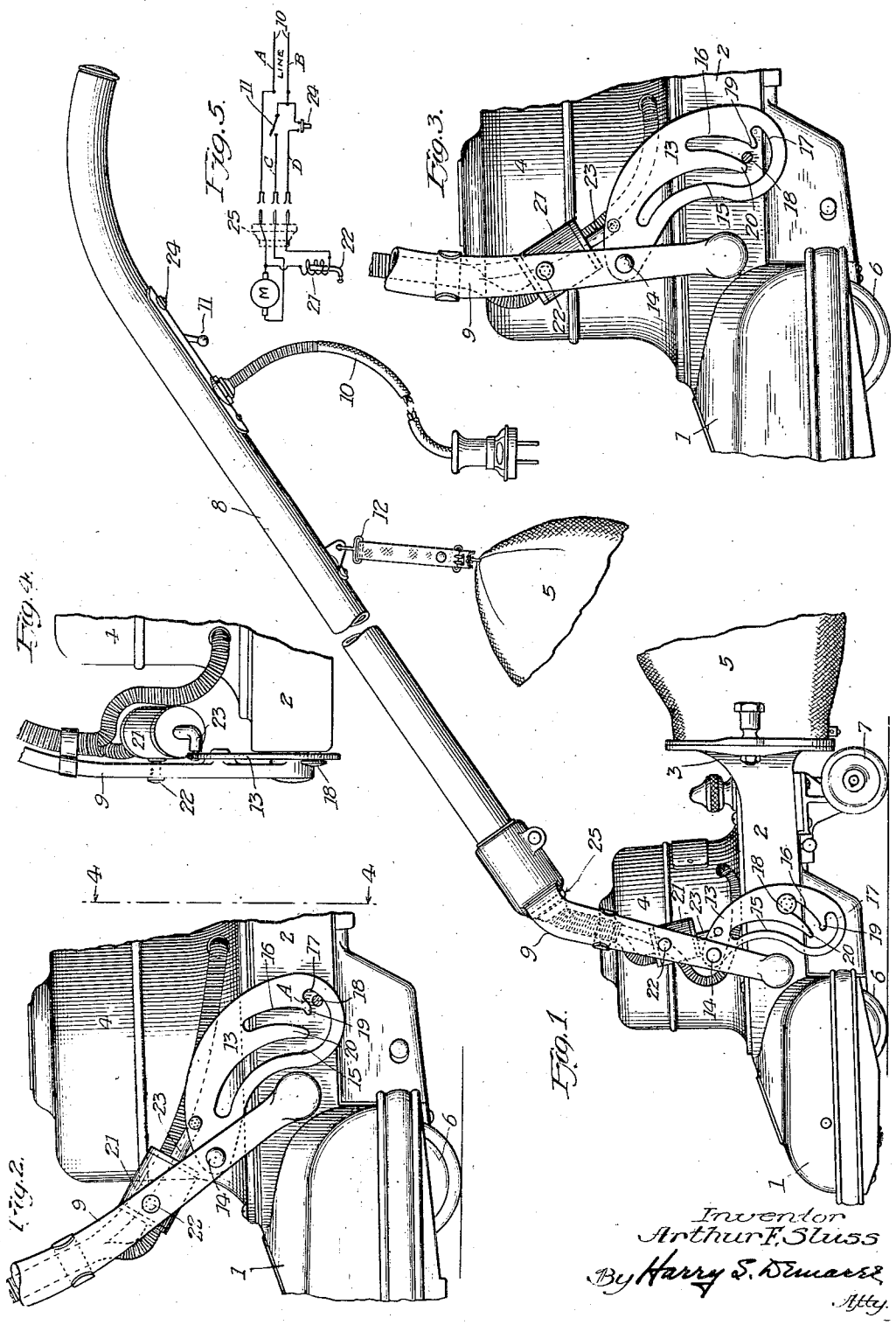
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SUCTION CLEANER

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SUCTION CLEANER

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The present invention relates to suction cleaners and particularly to new and improved handle-positioning means therefor. More specifically the present invention comprises the provision, in a suction cleaner, of handle-position-controlling means which permit the pivoted handle of the cleaner to have an excursion in a plurality of ranges and which is provided with electrical means, controlled by the operator, which function to release the handle from restraint of the controlling means.

In the use of the suction cleaner by the operator as the machine is propelled back and forth across the surface covering undergoing cleaning the handle of the cleaner is pivoted relative to the cleaner proper by the movement of the operator's arm. It is, therefore, desirable that the handle be permitted to pivot freely within a certain range, the limits of which are defined by the positions between which it is naturally moved by the operator in the use of the cleaner. It is also desirable that the handle be retained in this range upon being released by the operator in order that it may be grasped readily upon the renewal of the cleaning operation. In the cleaning of certain parts of the covering, as for example those parts positioned under articles of furniture, it is desirable and necessary that the handle of the cleaner be lowered to a position considerably outside the usual working range in order that the machine may be moved under the article without interference from the handle. It is also desirable, upon the completion of the cleaning operation, to place the handle of the cleaner in a substantially vertical position in order that the space required for storage will be as small as possible. It is further desirable that means be provided to retain the handle in this vertical storage position and also that it be possible to disengage the handle from the working range in order to move it to that position. It has been common heretofore to provide handle-positioning means in which the handle was permitted limited excursion within certain ranges, it being permitted to pass from one range to the other, or from either range to the storage position, upon the reception of the necessary directing force from the operator. Inasmuch as the handle-position-controlling means are usually located upon the lower end of the handle, or upon the suction cleaner casing itself, this force is customarily provided by the foot of the operator, and aside from being awkward presents the danger of scuffing the shoe of the operator thru contact with the metallic parts. In the handle-position-controlling means constructed in accordance with the present invention the handle is enabled to pass from one excursion range to another without the assistance of a directing or releasing force from the operator applied to the controlling means, there being electrical actuating means associated with the controlling means which provide the necessary force. The electrical means are energized from the same current source which is used to drive the motor for the suction-creating fan, and the controlling switch therefor is conveniently positioned in the handle of the cleaner where it is readily available to the operator when its use is required.

It is an object of the present invention to provide a new and improved handle-position-controlling means. It is another object to provide handle-controlling means in a suction cleaner in which the handle is released from the controlling means without physical assistance from the operator. It is a still further object to provide, in a suction cleaner, handle-position-controlling means which selectively restrict the suction cleaner handle to a range of movement relative to the cleaner from which it can only be released with the assistance of electrical means which are controlled by the operator. These and other more specific objects will appear upon reading the following specification and claims and considering in connection therewith the annexed drawings:

In the drawings in which a preferred embodiment of the present invention is disclosed and in which the same reference character refers to the same parts thruout:

Fig. 1 is a side view of a suction cleaner embodying the present invention and show-

ing the cleaner handle retained in the working range by the position-controlling means;

Fig. 2 is a partial side view of the cleaner showing the handle pivoted forward to the vertical position and about to be locked in its storage position;

Fig. 3 is a view similar to Figure 2 showing the cleaner handle pivoted forward to the upper end of its working range having been disengaged therefrom by the assistance of the electrical disengaging means.

Fig. 4 is a partial view upon the line 4—4 of Fig. 2.

Fig. 5 is a schematic diagram disclosing the electrical connection of the releasing means in the electrical circuit of the suction cleaner.

The present invention is embodied in a suction cleaner which comprises a casing which includes a nozzle 1, a fan chamber 2, an exhaust outlet 3, and a motor casing 4. Within the body of the cleaner are provided the usual parts necessary in such a machine to perform the function of drawing cleaning air thru the nozzle 1 and exhausting it through the exhaust outlet 3 into the dust bag 5; as well as the function of actuating the agitator positioned within the nozzle 1. The cleaner is movably supported by means of front and rear wheels 6, 6 and 7, 7 respectively, only one of each being shown. To enable the operator to propel the cleaner over the surface covering a handle 8 is provided which is connected to the casing of the cleaner, the lower end of the handle, comprising the forked bail 9, extending upon opposite sides of the motor housing 4 and being pivoted at the sides of the fan chamber 2. The handle 8 is hollow and the current-carrying leads to the cleaner motor, which are indicated by the reference character 10, enter the handle near the upper end thereof and extend downwardly therethru to the fork in the bail 9 from where they extend along one of the side arms of the bail and into the motor casing 4. Near the point at which the incoming current-carrying leads enter the handle a suitable switch 11 is provided which is connected in series with the motor of the cleaner and which controls the flow of electrical current thereto. As in the usual suction cleaner the upper end of the dust bag 5 is swingingly carried by the handle 8 as by a support 12.

By the present invention means are provided which function to restrict the free pivotal movement of the handle between certain angular positions relative to the cleaner, which may be called a range of movement, comprising a slotted stop plate 13 which is freely pivoted from the adjacent arm of the handle bail 9 by a pin 14 at a point spaced from the pivot point of the handle itself. Plate 13 is provided with a plurality of connected slots which are indicated by the reference characters 15, 16 and 17. A suitable pin 18 is carried by the casing of the cleaner at a point spaced from the pivot point of the handle and extends thru the stop plate 13, the possibility of disengagement being eliminated thru the pin being provided with an enlarged head. The slots 15, 16 and 17 are of a width slightly greater than the diameter of the pin 18 and permit, when the pin extends in any one of them, the angular movement of the handle thru allowing the pin to slide.

With the handle positioned as shown in Figure 1 pin 18 is within, and at the outer end of, the slot 16 and the handle is held as shown thru the plate being forced against the pin by the weight of the handle. The slot 16 is so positioned in the plate 13 that the pivotal movement of the handle between those positions in which it is ordinarily used in the cleaning operation serves merely to advance the pin from one end of the slot 16 to the other. It is impossible to pivot the handle 8 forward of a position in which the pin 18 has advanced to the inner or open end of slot 16 by a mere force exerted upon the handle as the hook 19, at the end of the slot on its lower side, engages and locks the pin in place. With the pin 18 at the open end of slot 16, however, a slight pivoting force upon the plate 13 in an upward direction serves to disengage the pin 18 from the hook and makes it possible for the pin to slide thru the open end of the slot. If the handle is then pivoted forward the pin 18 will round the rounded hook 19 and enter the slot 17, the freely pivoted weight of the plate 13 serving to pivot the plate downwardly so as to cause the pin to enter that slot.

With the handle positioned as shown in Figure 2, the pin has been disengaged from the slot 16 and has entered the slot 17. As shown the plate 13 has yet to pivot downwardly under the force of gravity to force the pin to the end of the slot and so definitely lock the handle in position. To disengage the handle from that position it is necessary to pivot the plate upwardly, against the action of gravity, and to hold it up a sufficient period of time to enable the pin to round either the hook 19 or both the hook 19 and the point 20, depending upon whether it is desired to have it enter the slot 16 or the slot 15.

It is also possible to cause the handle 8 to be pivoted rearwardly from the position shown in Figure 1 instead of forwardly, if the pin 18, upon being disengaged from the slot 16, is caused to enter the slot 15. This operation requires only that the plate 13 be held upwardly against the force of gravity while the pin 18 leaves the slot 16 and rounds the projecting point 20, which defines the boundary between the adjacent sides of the slots 15 and 16. With the pin 18 once in the slot 15 it is possible to pivot the handle

rearwardly to a position in which it extends substantially horizontally during which movement the pin 18 would advance upwardly or outwardly in the slot 15 of the plate.

Heretofore it has been the practice to provide an outstanding lug or arm upon the lower portion of the plate 13 by which the operator could exert the necessary lifting force upon the plate and to hold it against the pull of gravity in order that the pin 18 should become disengaged from one slot to enter another. The performance of this function by the operator, however, usually requires that he stand upon one foot and use the other to lift the plate. Such an operation is awkward and is accompanied by the undesirable possibility that the upper surface of the shoe will become scuffed through coming into contact with a metal surface on the cleaner. According to the present invention electrical means are provided by which, whenever it becomes necessary to pivot the plate 13 in order to accomplish an adjustment of the handle, it is only necessary for the operator to press a push button, or switch, which will send an electrical current thru a solenoid and result in the moving element thereof exerting a lifting force upon the stop plate 13. The solenoid is indicated in the drawings by the reference 21 and is pivotally connected to the same arm of the handle bail 9, by means of pin 22, as is the stop plate 13; the pivotal pin 22 being spaced above the pivot pin 14 of the plate 13. The moving element of the solenoid is indicated by the reference character 23 and is connected to the plate 13 at a point spaced from its pivot point, being pivotally connected thereto. The electrical circuit thru which the solenoid 21 derives its energizing current is connected to the same source as the cleaner motor, as is clearly illustrated in Figure 5. In Figure 5 the incoming leads 10 are shown as comprising the lines A and B, the line B being divided at the source side of the switch 11 into two lines C and D, the line C passing directly to one side of the motor and thereby forming a complete motor circuit with the line A when the switch 11 is closed, while the other line D, after passing thru a normally opened push button switch 24, passes thru the winding of the solenoid 21 and connects to the line A, thereby making a complete solenoid circuit when the switch 24 is closed. As is clearly shown in Figure 1 the switch 24 is preferably positioned closely adjacent the power-controlling switch 11 and in a position which is easily accessible to the operator. The line D, which passes thru the solenoid, extends with the lines A and C thru the handle 8 to the connection with the bail 9, where a three point switch 25 is preferably provided, the lead D extending beside the leads A and C down the arm of the bail 9 as far as the solenoid.

In the operation of the handle-position-controlling means constructed in accordance with the present invention, to remove the handle from the operating range, or that in which it is restricted by the pin 18 in the slot 16, it is only necessary for the operator to pivot the handle forwardly as far as possible, or that position in which pin 18 is caught by the hook 19. The operator then need only press the push button 24 which will energize the solenoid 21 which in turn will pull the moving element 23 inwardly thereby exerting a lifting force upon the plate 13.

This lifting force tends to pivot the plate 13 around its pivot point 14 thereby moving the plate 13 so that the pin 18 contacts the upper side of the slot 16, as is clearly shown in Figure 3, in which position the handle may be pivoted further forward resulting in the pin 18 leaving the slot 16 and entering the slot 15. With the pin 18 in the slot 15 the operator is free to pivot the handle forwardly and rearwardly into a substantially horizontal position, the range of movement being the length of the slot 15 between the point 20 and the upper end thereof. If, however, it is desired to place the handle in the storage position, that is that position in which the handle is substantially vertical, after being used in the working range, the pin 18 is disengaged from the hook 19 in a manner similar to that described and, upon reaching the position shown in Figure 3, the lifting force exerted upon the plate 13 by the moving element of the electrically energized solenoid 21 functions to lift the plate 13 until the pin 18 is contacted by the common lower wall of the slots 15 and 17 at their junction. The operator is then free to pivot the handle forwardly to a position shown in Figure 2, in which position the release of the energizing switch 24 will allow the plate 13 to drop downwardly under the action of gravity resulting in the seating of the pin 18 in the upper end of slot 17 and the retention of the handle in the storage position. Similarly it is possible to move the pin 18 from the slot 17 directly to the slot 15 simply by pressing on the switch 24 thereby lifting the plate 13 so that as the handle is pivoted rearwardly the pin 18 will slide along the extended lower edge of the slots 15 and 17, that lower edge being common to both of those slots, and will enter the slot 15 as the handle is pivoted a sufficient distance rearwardly. It is also possible to pass the pin from the slot 15 to the slot 17 without entering the working slot 16 in a similar manner.

I claim:

1. In a suction cleaner, a casing, a handle pivotally connected to said casing, means for limiting the motion of the handle at its upper and its lower positions and for limiting

its excursion to a definite arc of movement intermediate such positions, and electrically operated means for releasing the handle from the control of said first mentioned means to permit its movement beyond its intermediate excursion, and manually operable controlling means for said electrical means positioned on said handle.

2. In a suction cleaner, a casing, a handle pivotally connected to said casing, means for limiting the motion of the handle at its upper and its lower positions and for limiting its excursion to a definite arc of movement intermediate such positions, and electrically operated means for releasing the handle from the control of said first mentioned means to permit its movement beyond its intermediate excursion, comprising a solenoid connected to a source of electrical power and a switch in the circuit of said solenoid carried by said handle.

3. In a suction cleaner, a casing, a handle pivotally connected to said casing, means for limiting the motion of the handle at its upper and its lower positions and for limiting its excursion to a definite arc of movement intermediate such positions, and electrically operated means for releasing the handle from the control of said first mentioned means to permit its movement beyond its intermediate excursion, comprising a normally unenergized solenoid connected to a source of electrical power and a normally open switch in the circuit of said solenoid carried by said handle.

4. In a suction cleaner, a casing, a handle pivotally connected to said casing, current-carrying leads carried by said handle and entering said casing, means for limiting the arcuate motion of said handle to a definite range, and electrically operated means for releasing the handle from the control of the first mentioned means to permit the movement of the handle to a position outside said range comprising a solenoid connected across the current-carrying leads and a switch in the circuit of said solenoid carried by said handle.

5. The combination with a tool and a pivoted handle therefor, of means for limiting the motion of the handle at its upper and at its lower positions and for limiting its excursion to a relatively narrow arc of movement intermediate such positions, said means comprising two co-operating members, one mounted on the tool, the other mounted on the handle, and one being pivotally mounted, one of said members being provided with an inter-connected slot system in one of the slots of which said other member is slidably positioned and retained against displacement with the handle in the intermediate arc of movement, and electrically operated means connected to one of said members to effect the release of one of said members from said slot and to permit its selective engagement with said other slots upon the pivoting of said handle, and manually controlled switch means in the circuit of said electrically operated means.

6. The combination with a tool and a pivoted handle therefor, of means for limiting the motion of the handle at its upper and at its lower positions and for limiting its excursion to a relatively narrow arc of movement intermediate such positions, said means comprising two co-operating members, one mounted in the tool, the other mounted on the handle, and one being pivotally mounted, one of said members being provided with an interconnected slot system in one of the slots of which said other member is slidably positioned and retained against displacement with the handle in the intermediate arc of movement, an electric solenoid connected to said slotted members to effect the release of one of said members from said slot, and switch means carried on the handle to control the flow of current thru said solenoid.

7. In combination with a movable tool comprising a body, a handle pivoted to said body, a plate provided with a plurality of connected slots pivoted to said handle, a pin carried by said body and extended through a slot in said plate, said plate and said pin cooperating to limit the pivotal movement of said handle, electrically operated means to move said plate relative to said pin to permit said pin to slide from one slot to another, and manually controlled switch means for said last mentioned means mounted on said handle.

8. In combination with a movable tool comprising a body, a handle pivoted to said body, a plate provided with a slot system pivoted to said handle, a pin carried by said body extended into a slot of said plate, said slot being so constructed that said pin cannot slide therefrom unless said plate is lifted, an electrical solenoid mounted on said handle and connected to said plate and adapted when energized to lift said plate, and a manually operable switch in the circuit of said solenoid positioned on said handle.

Signed at North Canton, in the county of Stark, and State of Ohio, this 5th day of January A. D., 1931.

ARTHUR F. SLUSS.