

Nov. 4, 1952

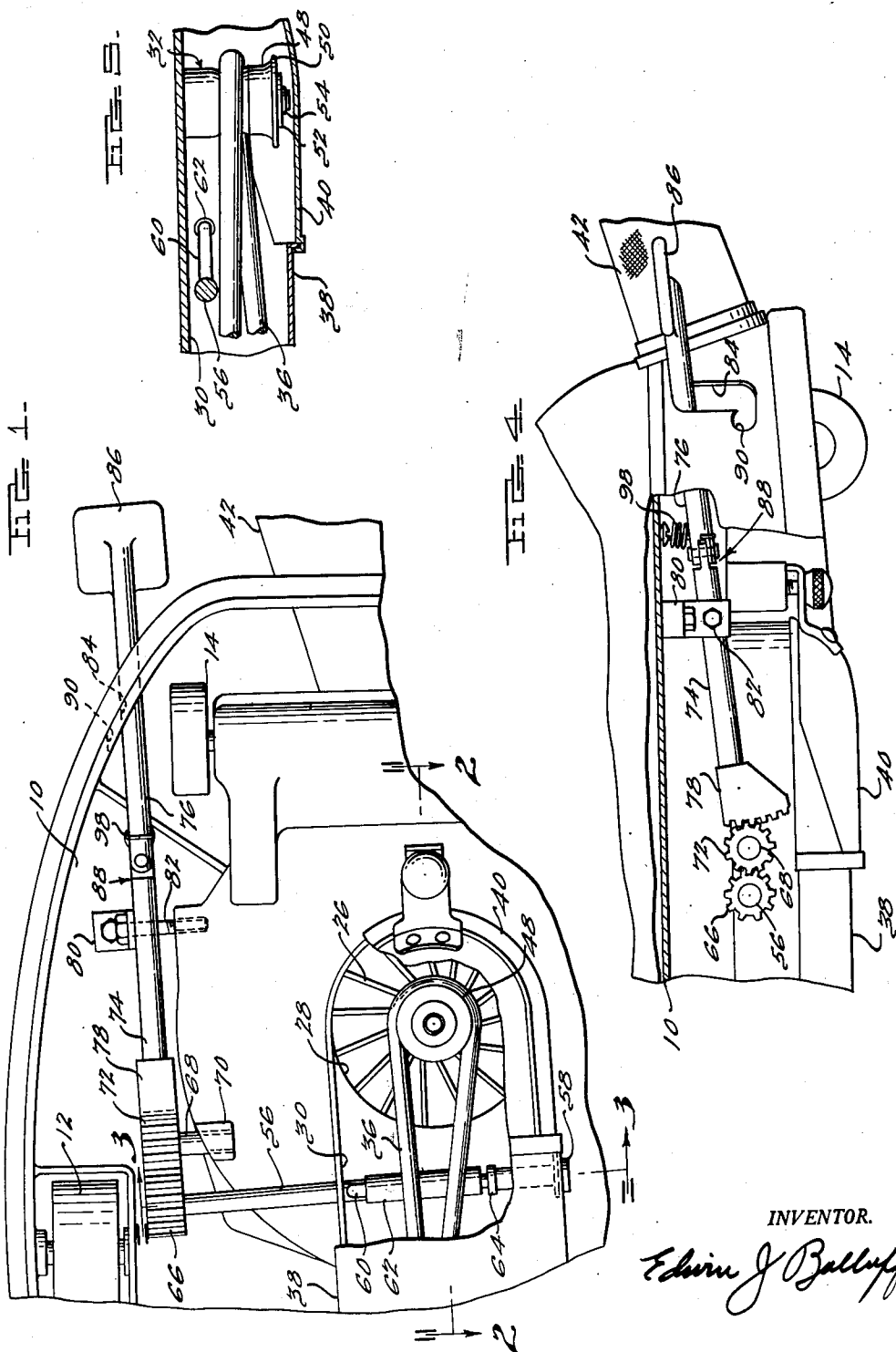
E. J. BALLUFF

2,616,119

DRIVE INTERRUPTING MEANS FOR SUCTION CLEANERS

Filed Nov. 19, 1948

2 SHEETS—SHEET 1



INVENTOR.

Edwin J. Balluff

UNITED STATES PATENT OFFICE

2,616,119

DRIVE INTERRUPTING MEANS FOR
SUCTION CLEANERS

Edwin J. Balluff, Livonia Township, Wayne County, Mich., assignor to Eureka Williams Corporation, Bloomington, Ill., a corporation of Michigan

Application November 19, 1948, Serial No. 61,017

8 Claims. (Cl. 15-390)

1

This invention relates to suction cleaners in general and has particular reference to a suction cleaner whereby the driving relation between a motor driven fan and an agitator may be readily disconnected or connected so as to provide for straight suction cleaning operation, or for carpet agitation coupled with suction cleaning. Thus a cleaner of this type may be used on long napped and other types of rugs which cannot stand the beating and sweeping of an agitator.

A principal object of the invention is to provide a new and useful improvement in a suction cleaner whereby the driving connection between the motor driven fan and the agitator may readily be broken and reestablished.

Another object of the invention is to provide a suction cleaner which may be converted to straight suction cleaning.

Another object of the invention is to provide a new and improved arrangement for converting a cleaner from a straight suction cleaner to one which beats in conjunction with suction cleaning.

Other and further objects of the invention will be apparent from the following description and claims and will be understood by reference to the accompanying drawings, of which there are two sheets, which by way of illustration show a preferred embodiment and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a fragmentary bottom plan view of a cleaner embodying the invention;

Fig. 2 is a partial sectional view of the cleaner taken along lines 2-2 of Fig. 1;

Fig. 3 is a sectional view taken along lines 3-3 of Fig. 1;

Fig. 4 is a fragmentary side elevational view of a cleaner, partially broken away and with the cleaner in normal cleaning operation; and

Fig. 5 is a sectional view generally along line 5-5 of Fig. 3 but with the cleaner arranged for normal cleaning operation.

A cleaner of this type may have a casing 10, wheels 12 and 14, and a handle 16. The casing 10 is provided with a nozzle indicated generally at 18. The nozzle 18 has a downwardly presented mouth 20 and a rotary agitator 22 operably associated with said nozzle mouth 20, and

2

journalled in the nozzle 18. The casing 10 also contains a fan chamber 24, a motor driven suction fan 26, and a fan air inlet 28. An air passageway 30 is provided between nozzle mouth 20 and fan air inlet 28. Pulley means indicated generally at 32 extend into the air passageway 30 and are formed on an extension of the shaft of the motor and fan. Pulley means 32 are provided with a groove 34 adapted to receive an endless elastic belt 36. The belt 36 extends through the passageway 30 between the pulley member 34 and the agitator 22 so that when the motor drives the fan 26, the agitator 22 also will be rotated, if belt 36 is in running engagement with groove 34.

The air passageway 30 is covered by removable bottom plates 38 and 40. A reduced extension of the pulley member 34 is journalled through a sleeve bearing 46. An idler 48 is journalled on the sleeve 46 and has a radially extending flange 50 limiting the downward displacement of the belt 36. A washer 52 on the reduced extension 44 holds the bearing 46 and idler 48 on the pulley member 34, and a snap ring 54 secures the washer 52 on the reduced extension 44.

A shaft 56 extends horizontally across and is journalled in the side walls of the air passageway 30 and has a head 58 on one end thereof. An L-shaped belt shifting arm 60 is secured to shaft 56. A loosely fitting roller sleeve 62 surrounds a portion of the arm 60 which is parallel to the shaft 56. A screw 64 retains the sleeve 62 on the arm 60. A pinion 66 is rigidly secured to the other end of the shaft 56. A stub shaft 68 is secured to a portion 70 of the fan air chamber 24 and a second pinion 72 is rotatably secured to shaft 68. An operating lever arm is made up of two shafts 74 and 76. The part 74 of the lever arm has a sector member 78 on one end thereof provided with gear teeth. The teeth on the rotating pinion 72 are adapted to mesh with the teeth of pinion 66 and with the teeth of the sector member 78.

A bracket 80 is secured to casing 10 and has a pivot pin 82 which passes through shaft 74. An elongated L-shaped slot 84 is provided in the exterior wall of the casing 10 toward the rear of the cleaner. Shaft 76 is slidable through the elongated slot 84 and has a foot pedal 86 on its outer end. Shafts 74 and 76 are jointed at 88 in the manner shown to provide lateral movement of shaft 76 with respect to shaft 74. When the foot pedal 86 is depressed, the member 78 will rotate about the pivot 82 in a clockwise direction, and therefore rotate the pinion 72 in a

3

counterclockwise direction. Pinion 66 and its shaft 56 will thereby be rotated in a clockwise direction. The rotation of shaft 56 is arranged to move the belt shifting arm 60 into engagement with the belt 36 until arm 60 is in the vertical position shown in Figs. 2 and 3. The rotation of the arm 60 will cause the displacement of belt 36 downwardly along pulley member 34 and on to idler 48. The sleeve 62 will roll on the belt 36 and around the arm 60 so as to prevent any undue friction or binding between the belt 36 and sleeve 62. The pulley member 34 freely turns through sleeve bearing 46 and thereby the driving relation between pulley member 34 and agitator 22 is broken and the cleaner is now adapted to be used for straight suction cleaning without operation of the agitator.

When the foot pedal 96 is depressed the joint 88 permits lateral movement of shaft 76 into the portion 90 of the L-shaped slot 84, thereby locking the lever arm and therefore the belt engaging means into this lower position. When it is desired to reestablish the driving relation between the pulley 34 and the agitator 22, the shaft 76 may be disengaged from opening 90 and allowed to return to the position shown in Figs. 4 and 5 under the influence of spring 98.

The belt is made of elastic material and is stretched by the belt engaging means when the foot pedal is operated. When the foot pedal is returned to its normal position the belt 36 will return to its original position on pulley member 34.

While I have illustrated and described a preferred embodiment of my invention, it is understood that this is capable of modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, a pulley within said air passageway driven by said fan, an endless elastic belt in driving relation with said pulley and said agitator for driving said agitator during operation of said fan, an idler aligned with and adjacent said pulley, a belt shifting arm movable between two positions, said belt shifting arm being arranged in said air passageway transversely of said belt and said pulley, said belt shifting arm being engageable with the strands of said belt during movement from one of said positions to the other of said positions to shift said belt from said pulley on to said idler thereby breaking the driving relation between said agitator and said fan, a lever arm pivotally mounted on said casing, means connecting said lever arm and said belt shifting arm whereby said lever arm is operable for moving said belt shifting arm from one of said positions to the other of said positions, said lever arm extending through an elongated slot in said casing and having a foot pedal thereon, and means for locking said belt shifting arm in the other of said positions when said driving relation is broken.

2. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, a pulley within said air passageway driven by said fan,

4

an endless elastic belt in driving relation with said pulley and said agitator for driving said agitator during operation of said fan, an idler aligned with and adjacent said pulley, a rotatable shaft journaled in said casing and having a belt engaging and shifting arm secured thereto, said arm extending across said air passageway and being movable with said shaft between two positions, said arm being operative upon said belt during movement from one of said positions to the other of said positions for shifting said belt from said pulley on to said idler so as to break the driving relation between said agitator and said fan, a pinion on one end of said rotatable shaft, a lever arm provided with gear teeth at one end thereof operably connected with said pinion for rotating said shaft so as to move said belt engaging arm from one of said positions to the other of said positions, and a foot pedal on the other end of said lever arm.

3. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, belt driving means within said air passageway driven by said fan, an endless elastic belt in driving relation with said belt driving means and said agitator for driving said agitator during operation of said fan, a belt shifter movable between two positions and arranged in said passageway, said shifter being engageable with the strands of said belt during movement from one of said positions to the other of said positions for shifting said belt axially of said belt driving means and out of driven relation with respect thereto so as to break the driving relation between said agitator and said fan, a lever arm having a foot pedal thereon, and gearing connecting said lever arm to said belt shifter for operating said belt shifter through said lever arm.

4. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, a pulley within said air passageway driven by said fan, an endless elastic belt between said pulley and said agitator for driving said agitator during operation of said fan, an idler aligned with and adjacent said pulley, a rotatable shaft extending laterally across said air passageway, a belt engaging arm secured to said shaft and having a portion thereof arranged parallel to said shaft, said belt engaging arm being movable between two positions and engageable with said belt during movement from one of said positions to the other of said positions to shift said belt from said pulley to said idler so as to break the driving relation between said agitator and said fan, a pinion on one end of said shaft, means for rotating said shaft comprising a lever arm arranged substantially perpendicular to said shaft, a member having gear teeth secured on one end of said lever arm, a second pinion between said first pinion and said gear member and arranged to mesh with the teeth of each, a pivot for said lever arm, an L-shaped slot in said casing through which said lever arm passes, and a joint in said lever arm allowing movement of one end of said lever arm through said slot in a direction perpendicular to the pinion-turning movement of said lever arm.

5. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway

5

between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, pulley means within said air passageway driven by said fan, an endless elastic belt between said pulley and said agitator for driving said agitator during operation of said fan, a horizontal rotatable shaft extending laterally across said air passageway, a belt engaging arm operative between an upper position and a lower position secured to said shaft and including a belt engaging portion parallel to said shaft, said belt engaging means being operative upon said belt during movement from one of said positions to the other of said positions to shift said belt axially of said pulley and out of driven relation with respect thereto so as to break the driving relation between said agitator and said fan, a pinion on one end of said shaft, means for rotating said shaft comprising a lever arm arranged substantially perpendicular to said shaft, a member having gear teeth secured on one end of said lever arm, a second pinion between said first pinion and said gear member and arranged to mesh with the teeth of each, a pivot for said lever arm, an L-shaped slot in said casing through which said lever arm passes, a foot pedal on said lever arm on the other end thereof, and a joint in said lever arm between said pivot and said foot pedal allowing movement of one end of said lever arm through said slot in a direction perpendicular to the pinion-turning movement of said lever arm for locking said belt engaging means when said driving connection is broken.

6. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, pulley means within said air passageway driven by said fan, an endless elastic belt between said pulley and said agitator for driving said agitator during operation of said fan, an idler aligned with and adjacent said pulley, a rotatable shaft extending laterally across said air passageway, a belt engaging arm operative between an upper position and a lower position secured to said shaft, said belt engaging arm including a belt engaging portion spaced from and parallel to said shaft, a roller sleeve surrounding said belt engaging portion of said belt engaging arm, said belt engaging means being operative upon said belt during movement from said upper position to said lower position to shift said belt from said pulley to said idler so as to break the driving relation between said agitator and said fan, a pinion on one end of said shaft, means for rotating said shaft comprising a lever arm arranged substantially perpendicular to said shaft, a member having gear teeth secured on one end of said lever arm, a second pinion between said first pinion and said gear member and arranged to mesh with the teeth of each, a pivot for said lever arm, an elongated L-shaped slot in said casing through which said lever arm passes, a foot pedal on said lever arm on the other end thereof, and a joint in said lever arm between said pivot and said foot pedal allowing movement of one end of said lever arm through said slot in a direction perpendicular to the pinion-turning movement of said lever arm.

6

7. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, pulley means within said air passageway driven by said fan, an endless elastic belt between said pulley and said agitator for driving said agitator during operation of said fan, a rotatable shaft extending across said air passageway, a belt engaging arm operative between two positions secured thereon, said belt engaging arm being operative upon said belt during movement from one of said positions to the other of said positions for shifting said belt axially of said pulley and out of driven relation with respect thereto so as to break the driving relation between said agitator and said fan, a pinion on one end of said rotatable shaft, a lever arm provided with gear teeth at one end thereof operably connected with said pinion for rotating said shaft, an L-shaped slot in said casing through which said lever arm passes, a foot pedal on the other end of said lever arm, a pivot for said lever arm, and a joint in said lever arm between said pivot and said foot pedal for permitting movement of said lever into a locked position thereof in which position said belt is out of driven relation with respect to said pulley.

8. In a suction cleaner, a casing having a floor nozzle, a motor, a suction fan driven by said motor, an air inlet to said fan, an air passageway between said nozzle and said fan air inlet, a surface cleaning agitator in said nozzle, a pulley within said air passageway driven by said fan, an endless elastic belt between said pulley and said agitator for driving said agitator during operation of said fan, an idler aligned with and adjacent said pulley, belt shifting means within said air passageway, said belt shifting means comprising an arm extending transversely of said air passageway and engageable with said belt during movement thereof for shifting said belt from said pulley to said idler so as to break the driving relation between said agitator and said fan, and a foot pedal exterior of said casing operably connected to said belt shifting means for moving said arm.

EDWIN J. BALLUFF.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,332,235	Staples	Mar. 2, 1920
1,460,245	Hoover	June 26, 1923
1,641,063	Blanch	Aug. 30, 1927
2,054,692	Charron	Sept. 15, 1936
2,084,234	Anderson	June 15, 1937
2,094,138	White	Sept. 28, 1937
2,287,922	White	June 30, 1942

OTHER REFERENCES

Ser. No. 344,417, Eisenlohr (A. P. C.), published April 27, 1943.