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(54) **Printing press blanket cleaner.**

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DE-A- 3 601 539
FR-A- 2 117 385
US-A- 1 378 278

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Description

This invention relates to an offset printing press with an improved dry mechanical cleaning system for cleaning a blanket cylinder in the press.

Offset printing, in comparison with the letterpress method of printing, has become the predominant printing method in the newspaper publishing industry. This is due in part to the increased sharpness of the printed images and the ability to print on less even surfaces than are required by the letterpress method. Also, another important factor in the popularity of offset printing is the lower cost of the printing plates used with offset presses.

Offset printing presses typically employ a blanket cylinder, e.g. a rubber cylinder or a rubber-covered cylinder, for the pruposes of receiving inked images from a printing plate. The inked images are then offset onto paper passed between the blanket cylinders or an impression cylinder. Continuous printing is made possible by wrapping a printing plate or a plurality of printing plates around the surface of a plate cylinder designed for rotation in contact with the blanket cylinder.

In operating blanket-to-blanket presses, a web of paper passes between two blanket cylinders mounted such that one blanket cylinder serves as an impression cylinder for the other, resulting in simultaneous printing on both sides of the web of paper.

Continuous offset printing is adversely affected by dust and lint from the web of paper which tend to accumulate on the blanket cylinder(s). This dust and lint reduces the quality of the printed product. The accumulation of dust, lint or ink on a blanket cylinder thus presents a serious annoyance and necessitates undesirable down-time for cleaning. The problem is especially acute in the newspaper industry, when, in response to the rising cost of newsprint stock, less expensive grades of paper having higher lint content often are substituted for more expensive grades.

A known dry mechanical cleaning system is disclosed in DE-A-3 601 539, which comprises brushing means, means for moving the brushing means between an inoperative position away from the cylinder and an operative position closely adjacent the cylinder for brushing dirt and lint from the surface of the cylinder, and lint removing means in the form of a lint catcher with an openable door for removing the brushed lint and dirt.

Also, it is known to use wet vacuum systems for removing debris from cylinders. In such wet system, segments of the blanket cylinder are continually immersed and cleaned with a solvent. The excess solvent is then removed by a wiper with a vacuum header adjacent the wiper blade. See, for example, US-A-3 835 779. Another wet system is disclosed in US-A-1 378 278.

The present invention avoids the need for solvents by employing a completely dry system for removing debris and, unlike previous dry systems, no conventional lint catcher is needed or used.

The present invention is characterised in that the removing means includes a housing in which the brushing means is mounted, the housing together with the cylinder defining in an operative position a partially evacuable chamber, and a source of vacuum for partially evacuating the chamber thereby to remove the dirt and lint from the blanket cylinder.

The blanket cylinder can be cleaned during the course of a press run without interrupting press operation or causing waste during the run. This permits a sharper reproduction for a printed product and incurs less down-time. It also permits the use of grades of paper stock having higher lint contents.

The cleaning system is suitable for integral construction with an offset press, or for manufacture as an add-on device capable of being retrofitted to an existing press.

The cleaning system is suited to automatic operation at a frequency of engagement adjustable by a press operator.

Thus, the frequency of the automatic engagement and operation of the blanket cleaning system may be adjusted by the press operator in response to various anticipated or observed operating parameters such as the length of the press run and the lint content of the paper stock.

Further features and advantages of the present invention will be apparent to those skilled in the art in light of the following description of preferred embodiments in connection with the accompanying drawings, wherein:

Figure 1, is a side perpsective view, in partial cross-section, of a vacuum blanket cleaner system constructed in accordance with one embodiment of the present invention;

Figure 2 is a side view of the vacuum blanket cleaner system in the engaged position;

Figure 3 is a side view of the vacuum blanket cleaner system in the disengaged position;

Figure 4 is an enlarged side view in cross-section of the brush assembly;

Figure 5 is a front view in cross-section of a brush assembly having segmented brushes; and

Figure 6 is a front view in cross-seciton of a brush assembly having laterally adjustable brushes.

Referring now to the drawings, and, in particular, to Figure 1, there is shown a dry blanket cleaner in accordance with on embodiment of the present invention. The blanket cleaner, shown generally at 20, includes a brush assembly 22 made up of at least one brush 24 and a vacuum means (not shown).

The blanket cleaner in accordance with this embodiment of the present invention is mounted in operative association with a blanket cylinder 28, generally parallel to a longitudinal axis of the blanket cyli-

nder. Blanket cleaner mounting brackets 30 are attached to the press frame (not shown) generally outside either end of blanket cylinder 28. Pivoting arms 34 connect the blanket cleaner 20 with mounting brackets 30. These pivoting arms 34 serve to carry the blanket cleaner 20 and are pivotal about pin 36.

The blanket cleaner is generally pivotal between two operative positions. Pivoting of said arms 34 between these positions is affected by a plurality of actuators 38 attached to pivot arms 34. Preferably, the actuator employed is a pneumatic actuator, although electrical or hydraulic actuators can be used if desired. Conventionally, compressed air is used because it is commonly is available in the press rooms, while electrical or fluid sources are not. In the first operative position, blanket cleaner 20 is biased away from blanket cylinder 28 to facilitate, for example, replacement of the brushes, repair or maintenance of the machine and/or changing of the web.

In the second operative position, the blanket cleaner 20 is held in contact with the surface of the blanket cylinder 28. In this second position, the blanket cleaner can affect cleaning and removal of the lint and debris from the blanket cylinder.

The vacuum portion of one embodiment of blanket cleaner 20 is generally comprised of substantially U-shaped housing 40 extending along the length of the blanket cylinder and a brush assembly 22. The brush assembly 22 is mounted inside housing 40 which in turn is mounted to pivot arms 34. The housing 40 includes brushes 24 retained in brush holder 25, which brush holder is removably mounted to the housing 40 in any convenient manner and can be easily replaced as required. Brushes 24 can be mounted in pairs as shown and have a relatively long life. However, continual operation will require replacement and maintenance of the brushes.

Referring now to FIGS. 5 and 6 there is shown two alternate embodiments for the brush assembly. In FIG. 5, brush holder 62 is segmented to allow individual sections to be lifted so as not to contact the blanket cylinder during cleaning. Segmenting can be desirable since newspaper blanket cylinders are generally set up in quarters or pages; i.e, a web can be double width (full blanket) or single width (half blanket). If a single width is used, ink can get onto the cylinder that does not have the web covering it. when that occurs, ink can foul the continuous brushes in the non-web area. Segmenting the brushes, preferably into four sections, permits the brushes in the unused area to be lifted away.

In the embodiment shown in FIG. 5, lifting is accomplished by manually moving lever 64 of lifting assembly 65 into the down position. This acts to lift guide rod 66 attached to brush holder 62 and bias that section of the brush holder away from the blanket cylinder. The brush assembly may be segmented into as many sections as desired to provide for maximum versatility. Generally, segmenting the brush assembly into four sections covers most operations. Also, lifting may be accomplished by an effective means and can be done either manually, as shown, or by automatic or semi-automatic means.

In the case of commercial web presses, segmenting of the brushes may not be feasible. This is because the web being operated on may vary greatly in width. For such applications the brush assembly can be made laterally adjustable along the width of the blanket cylinder. (See FIG. 6) In the embodiment shown in FIG. 6, brush holder 68 is slideably mounted within housing 70 along slots 72. Locking means 74 serve to maintain the brushes in the desired lateral location. In the embodiment shown in FIG. 6, wing nuts are used to lock the brushes in the desired location. In this fashion the brushes may be aligned for the particular application to be performed.

A variety of materials can be used for the brushes 24, provided that they do not damage the surface of the blanket cylinder 28. These materials include both natural and synthetic fibers. Also the brushes 24 can be mounted at an angle of up to 90° from the tangent to the surface of the blanket cylinder improve their ability to loosen and remove lint and other debris from the surface.

Housing 40, in the form of an inverted U-shaped channel, has a top surface 44 and parallel sides, 46 and 48 respectively. Housing 40 is mounted between pivot arms 34 in a downward position with the open end facing the blanket cylinder 28. Alternatively, U-shaped channel 40 may be mounted forward or back relative to the centerline of the blanket cylinder 28 as desired. For example, Fig. 4 shows an embodiment wherein the brushes are mounted forward of the centerline of the blanket cylinder.

At least one brush 24 is mounted to the top surface 44 of housing 40 through the brush holder 25 and substantially parallel to sides 46 and 48 so that, when the cleaner is engaged, the brushes contact the surface of the blanket cylinder and loosen dirt and lint contained within the housing. Alternatively, a plurality of brushes may be positioned in rows on columns within the housing 40 for use in loosening lint and debris from the surface of the blanket cylinder 28.

Flexible wipers 50 are positioned at the ends of sides 46 and 48 of housing 40 and serve to contact the surface of blanket cylinder 28 to provide sealing surfaces in contact with the blanket roller when the blanket cleaner is engaged. These wipers 50 also serve a secondary purpose of loosening and dislodging lint and debris 52 from the surface of the blanket cylinder 28.

Loosened lint and debris 52 are removed from the interior of housing 40 by means of an appropriate vacuum system. A vacuum generating machine (not shown) is connected to vacuum port 58 in housing 40 by hose 56. Lint and debris 52 are conveyed through

hose 56 by means of the vacuum to be deposited in an appropriate disposal unit (not shown).

Referring now to Figures 2-4, there is shown the general operation of the blanket cleaner in accordance with a blanket to blanket press embodiment of the present invention. A web of imprinting material 60 passes between counterrotating blanket cylinders 28 and is imprinted on both front and rear sides of the web. In the course of this imprinting operation, lint and debris 52 from the web 60 accumulate on the surface of the blanket cylinders 28 and, if allowed to remain thereon, tend to reduce to overall quality of the printed product.

In order to remove this lint and debris from the surface of the blanket cylinders 28, blanket cleaners 20, generally located atop the blanket cylinders 28, are biased against the cylinders by biasing means in the form of actuators 38. Generally, it is not necessary that the blanket cleaners 20 be continuously in contact with blanket cylinders 28 throughout the imprinting operation, however, where an excessive amount of lint and debris accumulate rather quickly, it may be desirable to leave them engaged during operation of the press. Under normal operating conditions the blanket cleaners 20 are periodically actuated against the blanket cylinders for a predetermined time to effect cleaning of the surface.

Periodic operation of the blanket cleaner of this invention may be controlled by conventional timing mechanisms related either to rotation of the presses or on command of the operator. In any case, the operation of the actuator is controlled so that when blanket cleaning is desired, the actuator 38 is operated so that the cleaner is moved from the disengaged position (Figure 3) to the engaged position (Figure 2). In the engaged position the brushes 24 of the brush assembly 22 are brought into contact with the surface of blanket cylinder 28. The brushes 24 are utilized to wipe the blanket cylinder 28, and after a predetermined number of rotations, the actuator 38 is operated to cause the brush assembly 22 to disengage as shown in Figure 3.

While engaged, lint and debris that is loosened and dislodged by the brushes 24, and to some degree, by the wipers is drawn off and disposed of by the vacuum system. This effectively removes the lint and debris from the blanket cylinder during the imprinting operation.

The particular embodiment just described is preferred because of the ease of installation and adjustment provided by the construction described. For example, the various working parts are located physically above the blanket cylinder 28, and thus are readily accessible both for installation and maintenance. Other locations are compatible with the broader aspect of our invention. However, it is clear that by utilizing the brush assembly 22 in conjunction with the vacuum means 56, the need for the lint catcher assembly used in the prior art is obviated.

Numerous variations, within the scope of the appended claims, will be apparent to those skilled in the art in light of the foregoing description and accompanying drawings. As indicated, other fluid operating sources or other timing mechanisms may be employed to alter the operation of the actuators disclosed. The sequence of the operating mechanism may be changed, if desired.

Claims

1. An offset printing press for including a blanket cylinder (28), and a dry mechanical cleaning system for the cylinder, the cleaning systems including a brushing means (24); means (38) for moving the brushing means between an inoperative position away from the blanket cylinder (28) and an operative position closely adjacent the cylinder for brushing dirt and lint from the surface of the blanket cylinder; and means (40, 56) for removing the brushed dirt and lint, **characterised in that** the removing means includes a housing (40) in which the brushing means is mounted, the housing together with the cylinder defining in said operative position a partially evacuable chamber; and a source of vacuum (56) for partially evacuating said chamber thereby to remove the dirt and lint from the blanket cylinder.

2. Apparatus according to claim 1 wherein the offset printing press includes a press frame with a blanket cylinder (28) mounted thereon, a blanket cleaner mounting frame (30) attached to the press frame adjacent the blanket cylinder, and arm means (34) movably connecting the mounting frame to the press frame, said housing (40) being attached to the movable arm means (34).

3. Apparatus according to claim 2, wherein the brush housing (40) is substantially U-shaped in transverse cross section and extends longitudinally along the length of the blanket cylinder so as to enclose a portion of the surface of the blanket cylinder when in said operative position.

4. Apparatus according to any preceding claim including means (50) extending from said housing (40) for contacting said blanket cylinder (28) to provide a sealing surface between said blanket cylinder and said housing when in said operative position.

5. Apparatus according to any preceding claim, wherein said brushing means comprises brushes (62) segmented into sections, which sections are separably moveable between positions for being engaged and disengaged with the cylinder blanket.

6. Apparatus according to claim 5 wherein said brushes are shorter in length than said housing (40) and are adjustable in position in the housing.

7. Apparatus acording to claim 5 or 6 wherein the brushing means includes a pair of linear brushes (62)

removably mounted within said housing.

8. Apparatus according to any preceding claim including pneumatically operated moving means (38) for moving the brushing means (24) between said operative and inoperative positions.

Patentansprüche

1. Offset-Druckpresse mit einem Drucktuch-Zylinder (28) und einem trockenen, mechanischen Reinigungssystem für den Zylinder, das eine Bürsteinrichtung (24) umfaßt, und mit einer Einrichtung (38), die dazu dient, die Bürsteinrichtung zwischen einer Ruhestellung, in der sie vom Drucktuch-Zylinder (28) entfernt ist, und einer Arbeitsstellung hin- und herzubewegen, in der sie sich in unmittelbarer Nähe des Zylinders befindet, um Schmutz und Fussel von der Oberfläche des Drucktuch-Zylinders abzubürsten, sowie Einrichtungen (40, 56) zum Entfernen von abgebürstetem Schmutz und Fusseln, **dadurch gekennzeichnet**, daß die zum Entfernen dienende Einrichtungen ein Gehäuse (40) umfaßt, in welchem die Bürsteinrichtung montiert ist, wobei das Gehäuse zusammen mit dem Zylinder in der Arbeitsstellung eine teilweise evakuierbare Kammer angrenzt, sowie eine Unterdruckquelle (56), die dazu dient, die Kammer teilweise zu evakuieren und auf diese Weise den Schmutz und die Fussel vom Drucktuch-Zylinder zu entfernen.

2. Vorrichtung nach Anspruch 1, bei der die Offset-Druckpresse einen Preßrahmen umfaßt, an dem ein Drucktuch-Zylinder (28) montiert ist, sowie einen Drucktuch-Reiniger-Montagerahmen (30), der am Druckrahmen in der Nähe des Drucktuch-Zylinders befestigt ist, sowie Arm-Einrichtungen (34), die in beweglicher Weise den Montagerahmen mit dem Druckrahmen verbinden, wobei das Gehäuse (40) an den beweglichen Arm-Einrichtungen (34) befestigt ist.

3. Vorrichtung nach Anspruch 2, bei der das Bürstengehäuse (40) im wesentlichen im querverlaufenden Querschnitt U-förmig ist und sich in Längsrichtung entlang der Länge des Drucktuch-Zylinders so erstreckt, daß es einen Teil der Oberfläche des Drucktuch-Zylinders umschließt, wenn es sich in der Arbeitsstellung befindet.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, die Einrichtungen (50) umfaßt, die sich vom Gehäuse (40) weg erstrecken, um den Drucktuch-Zylinder (28) zu berühren und so eine Abdicht-Oberfläche zwischen dem Drucktuch-Zylinder und dem Gehäuse zu bilden, wenn dieses sich in der Arbeitsstellung befindet.

5. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der die Bürsteinrichtung Bürsten (62) anfaßt, die in Abschnitte aufgeteilt sind, wobei die Abschnitte trennbar zwischen Stellungen bewegbar sind, in denen sie mit dem Zylinder-Drucktuch in Eingriff stehen bzw. außer Eingriff sind.

6. Vorrichtung nach Anspruch 5, bei der die Bürsten eine geringere Länge als das Gehäuse (40) aufweisen und in dem Gehäuse in ihrer Lage einstellbar sind.

7. Vorrichtung nach Anspruch 5 oder 6, bei der die Bürsteinrichtung zwei lineare Bürsten (62) umfaßt, die in entfernbarer Weise in dem Gehäuse montiert sind.

8. Vorrichtung nach einem der vorhergehenden Ansprüche, die pneumatisch betriebene Bewegungseinrichtungen (38) anfaßt, um die Bürsteinrichtung (24) zwischen der Arbeitsstellung und der Ruhestellung hin- und herzubewegen.

Revendications

1. Presse offset destinée à comprendre un cylindre porte-blanchet (28), et un système de nettoyage mécanique à sec pour le cylindre, le système de nettoyage comprenant un moyen de brossage (24) ; des moyens (38) destinés à déplacer le moyen de brossage entre une position de repos éloignée du cylindre porte-blanchet (28) et une position de travail étroitement rapprochée du cylindre pour brosser les saletés et les peluches de la surface du cylindre porte-blanchet ; et des moyens (40, 56) destinés à enlever les saletés et peluches brossées, **caractérisée en ce que** les moyens d'enlèvement comprennent un carter (40) dans lequel est monté le moyen de brossage, le carter définissant avec le cylindre dans ladite position de travail une chambre pouvant être soumise à un vide partiel ; et une source de vide (56) pour établir un vide partiel dans ladite chambre afin d'enlever ainsi les saletés et les peluches du cylindre porte-blanchet.

2. Appareil selon la revendication 1, dans lequel la presse offset comprend un bâti de presse sur lequel le cylindre porte-blanchet (28) est montage, un bâti (30) de montage du dispositif de nettoyage du blanchet relié au bâti de la presse à proximité immédiate du cylindre porte-blanchet, et des moyens à bras (34) reliant de façon mobile le bâti de montage au bâti de la presse, ledit carter (40) étant reliant aux moyens à bras mobiles (34).

3. Appareil selon la revendication 2, dans lequel le carter (40) de brosse est de forme sensiblement en U en section transversale et s'étend longitudinalement sur la longueur du cylindre porte-blanchet afin de renfermer une partie de la surface du cylindre porte-blanchet lorsqu'il est dans ladite position de travail.

4. Appareil selon l'une quelconque des revendications précédentes, comprenant un moyen (50) faisant saillie dudit carter (40) pour être en contact avec ledit cylindre porte-blanchet (28) afin d'établir une surface d'étanchéité entre ledit cylindre porte-blanchet et ledit carter dans ladite position de travail.

5. Appareil selon l'une quelconque des revendi-

cations précédentes, dans lequel ledit moyen de brossage comprend des brosses (62) divisées en sections, lesquelles sections sont mobiles séparément entre des positions pour être engagées avec le cylindre porte-blanchet et dégagées de celui-ci.

6. Appareil selon la revendication 5, dans lequel lesdites brosses ont une longueur inférieure à celle dudit carter (40) et sont réglables en position dans le carter.

7. Appareil selon la revendication 5 ou 6, dans lequel le moyen de brossage comprend deux brosses linéaires (62) montées de façon amovible à l'intérieur dudit carter.

8. Appareil selon l'une quelconque des revendications précédentes, comprenant des moyens (38) de déplacement à commande pneumatique destinés à déplacer le moyen de brossage (24) entre lesdites positions de travail et de repos.

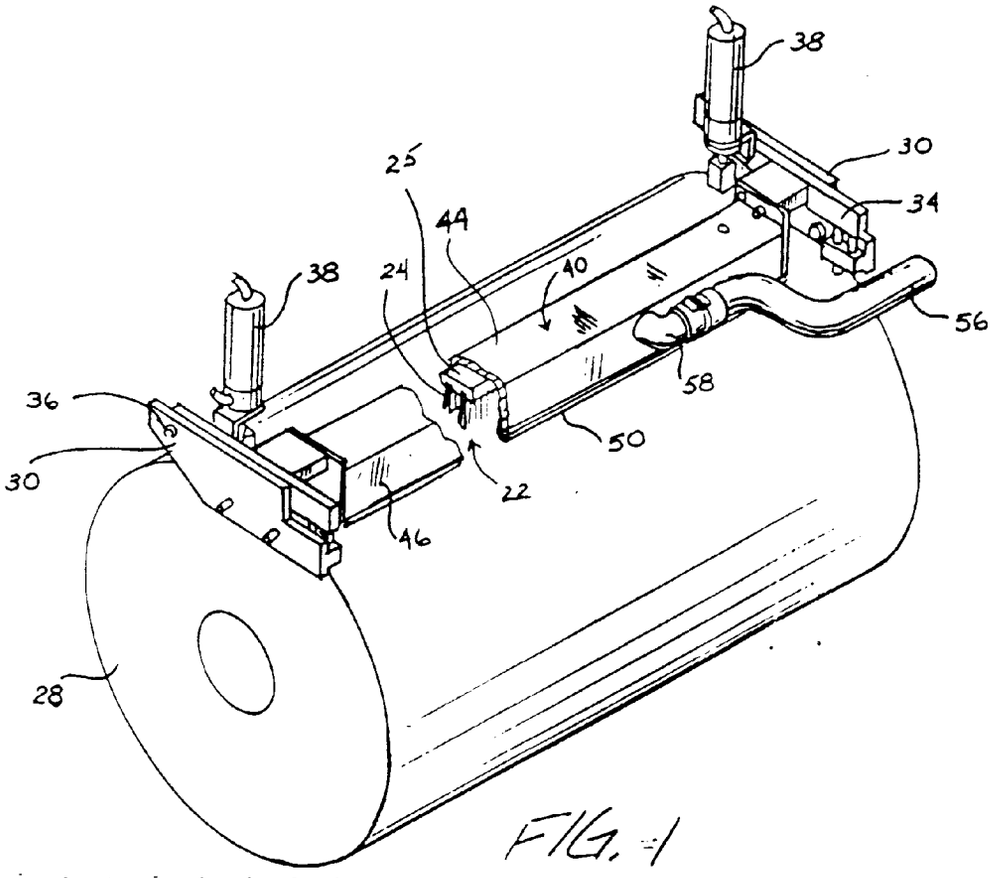


FIG. 1

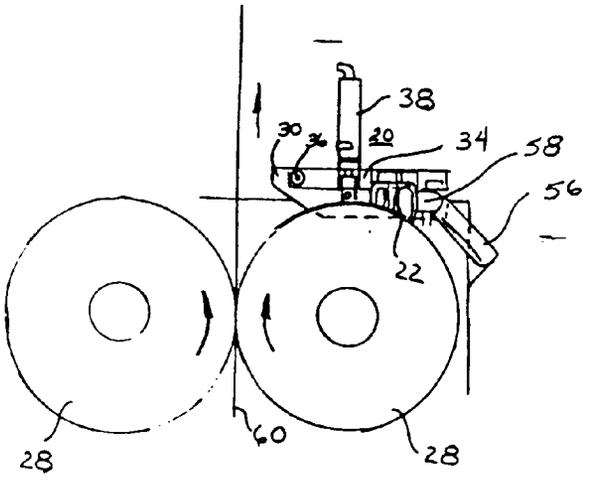


FIG. 2

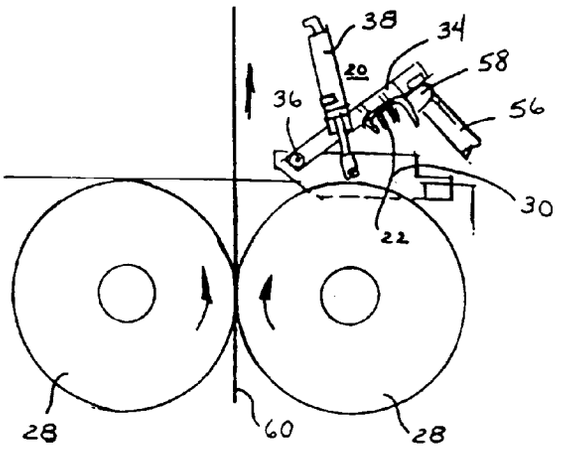


FIG. 3

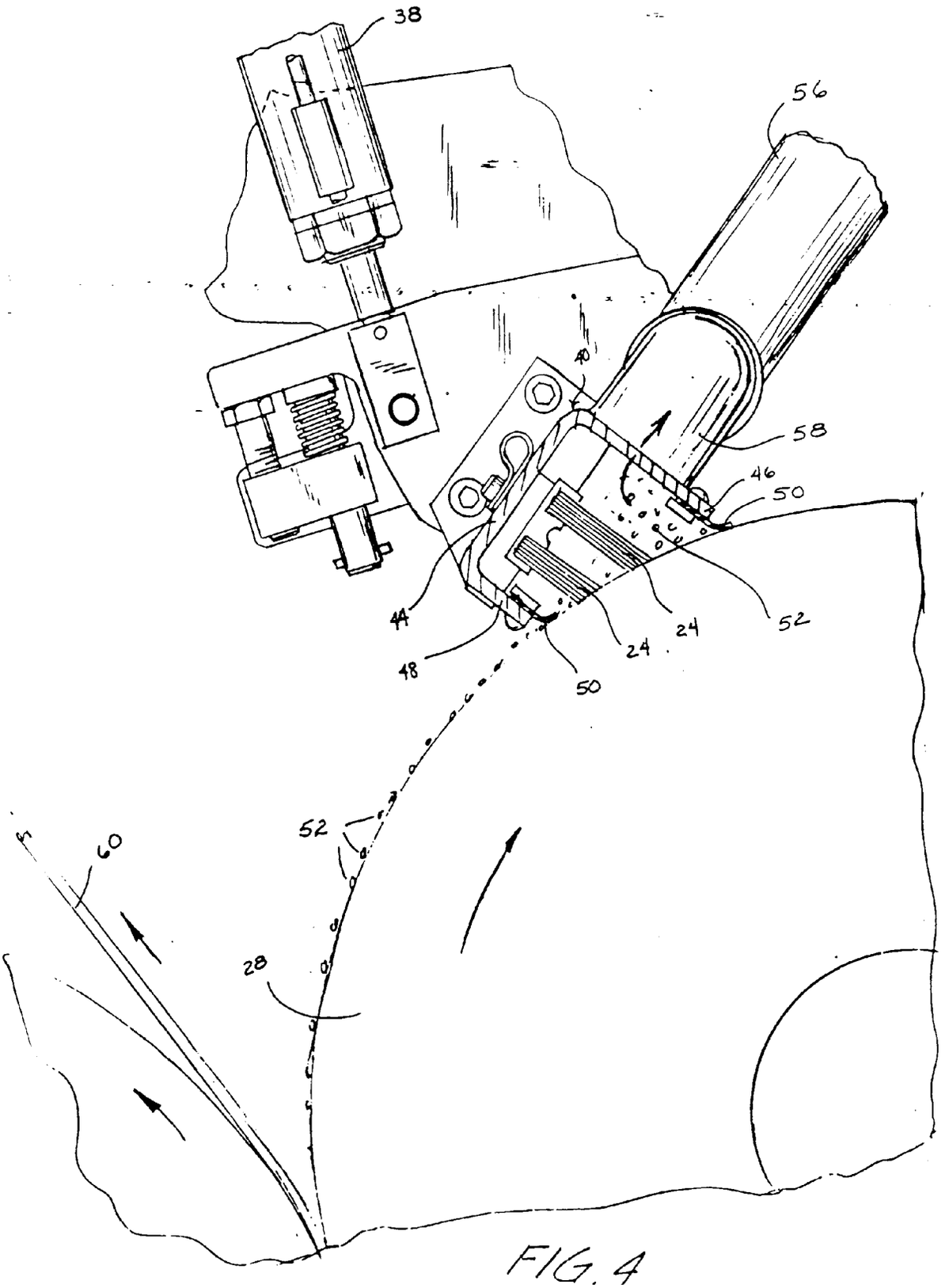


FIG. 4

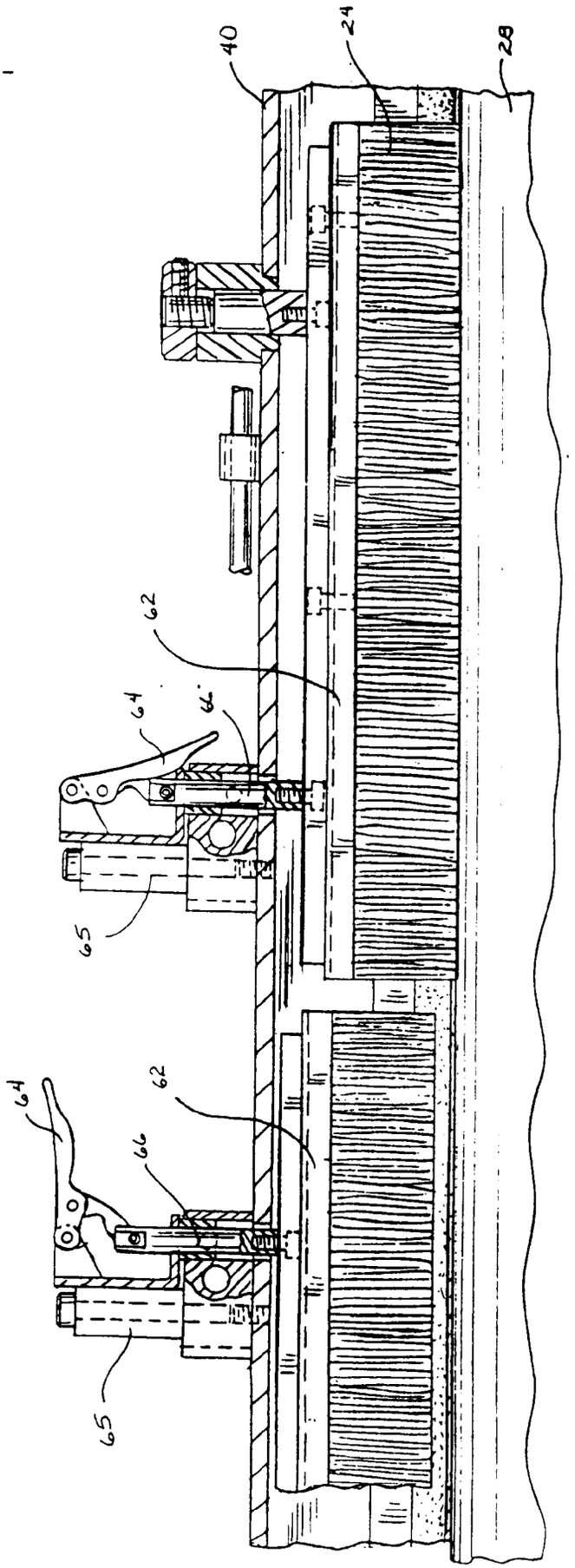


FIG. 5

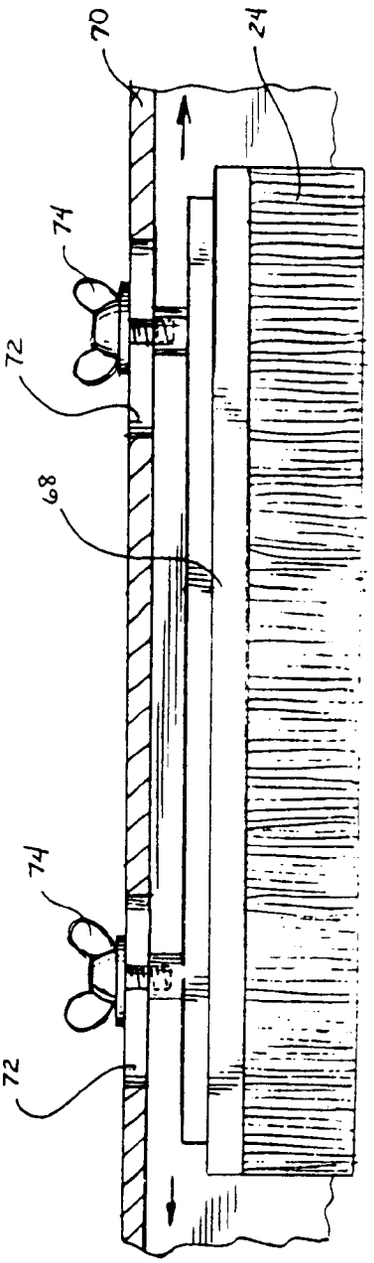


FIG. 6