April 24, 1945. C. A. BERNARD ET AL 2,374,578

BLOWER HEAD FOR THE SEPARATION OF CARD OR PAPER STOCK

Filed Nov. 9, 1943 2 Sheets-Sheet 1

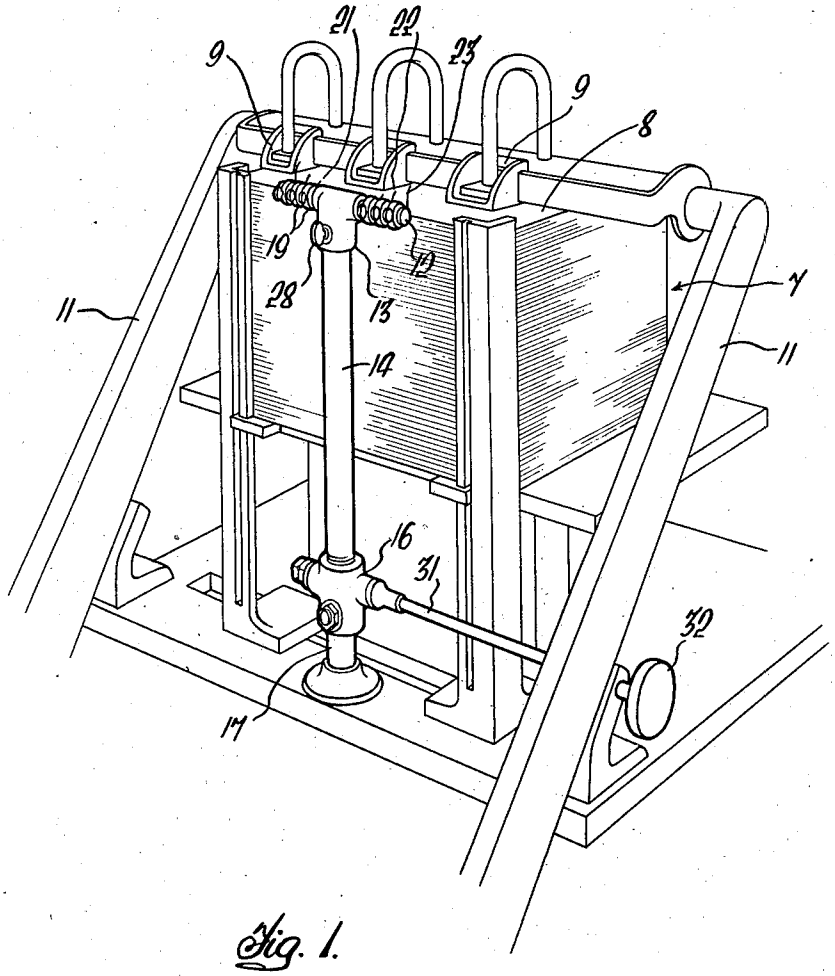


Fig. 1.

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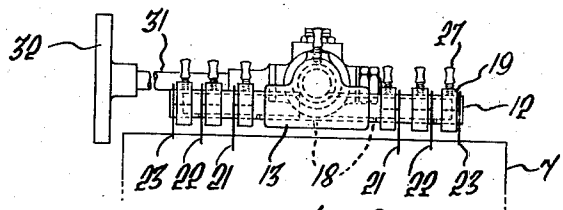


Fig. 4.

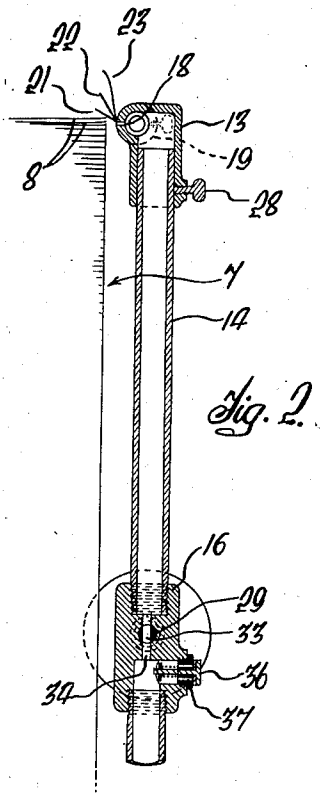


Fig. 2.

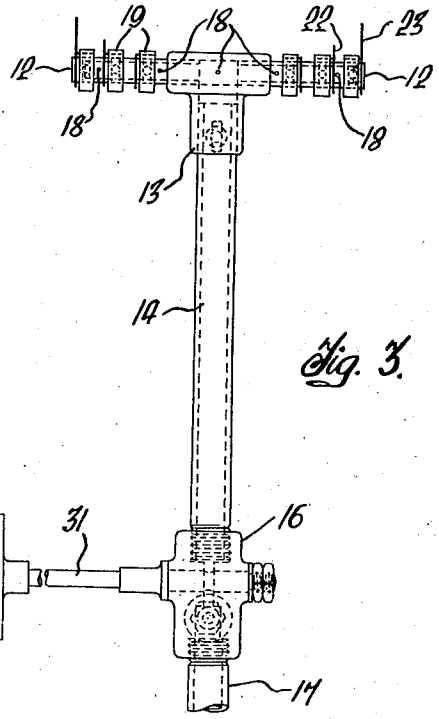


Fig. 3.

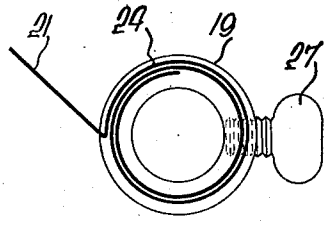


Fig. 5.

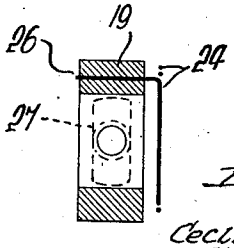


Fig. 6.

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UNITED STATES PATENT OFFICE

2,374,578

BLOWER HEAD FOR THE SEPARATION OF CARD OR PAPER STOCK

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Application November 9, 1943, Serial No. 509,614
In Australia November 26, 1942

7 Claims. (Cl. 271—26)

This invention relates to blower heads for the separation of sheets of paper, card or such like stock from a feed pile so that each sheet may be individually delivered to a printing machine by suction pads or like devices mounted upon a swinging frame.

Separation of the sheets is usually achieved by a simple compact blower head located in the front of the feed pile so that a constant blast of air is directed against the front edges of the uppermost sheets causing a fluttering movement which is intended to separate the topmost sheet from the other sheets.

It has been found, however, especially when the paper or like sheets are of a relatively porous nature that such fluttering movement is insufficient for positive and individual sheet separation, and often allows of the suction pads picking up more than one sheet at a time. If that happens, two or more superposed sheets are simultaneously delivered to the printing cylinder and while clinging together are sometimes taken completely through the printing machine to the delivery pile, but with only the top sheet being printed. This necessitates careful sorting and checking which increases the cost of production. In some cases, the sheet or sheets clinging underneath the top most sheet cause the machine to foul, or are taken to the inking rollers thereby entailing extra work and lost time for removal.

The present invention aims to provide simple and efficient means whereby such disabilities and defects in operation are eliminated.

A more specific object is to provide improvements in blower heads of the general kind indicated by which the air blast is distributed over a relatively large area or expanse in such manner as to more definitely and positively separate the individual sheets near the top of the feed pile, so that each sheet may in turn be picked up and carried away by the suction pads to the printing machine. Another object is to provide mechanical devices preferably in the form of a series of springy fingers so arranged as to contact the edges or edge portions of any underlying sheet which may tend to be drawn upwardly with the topmost sheet and to return such underlying sheet to proper position upon the feed pile ready to be removed by the suction pads at the proper time and in proper order.

The invention also provides for controlling the pressure of the air blast so that it may be readily varied to suit the particular class or kind of stock being dealt with at any particular time.

The above and various other objects and features of the invention and the advantages arising therefrom will, however, be more readily appreciated from the following description aided by reference to the accompanying drawings which relate to one practical embodiment.

Referring to the drawings which form part of this specification:

Figure 1 is a perspective view showing a device according to the invention, in relatively thick lines, operatively applied to a conventional paper or stock feed section of a printing machine.

Figure 2 is a side section elevation illustrating the operation of the invention.

Figure 3 is a front elevation.

Figure 4 is a plan view.

Figure 5 is a detail showing in side view one of the springy fingers.

Figure 6 is a detail showing in edge view one of the springy fingers and a mounting member therefor in section.

Referring more particularly to Figure 1, 7 indicates the feed pile, the superposed sheets 8 of which are to be fed singly to the printing section of a machine by suction pads 9 carried by the hinged or pivoted feeder arms 11. Lying in the same horizontal plane as the upper sheets of the pile and extending close to and parallel with the front edges thereof are two hollow arms 12 which are closed at their outer ends and connected at their inner ends, as by a T piece 13, to the upper end of a pipe 14 connected by way of a valve casing 15 and pipe 17 to a source of air under pressure.

The T piece and the hollow arms of the blower head are provided at longitudinally spaced intervals and at that side facing the feed pile with air outlet or distributing apertures 18 (Figures 2 and 3) which may be in the form of horizontally elongated slots but are preferably in the form of relatively small diameter drilled holes. Compressed air issuing from these apertures 18 has sufficient velocity to force apart the uppermost sheet or two in the feed pile, not only at the front edge as is usual with conventional blower heads, but right through to the back and side edges, thus effecting a preliminary separation of the sheets.

Five of such air outlet orifices are seen in Figure 3 but it will be understood that a greater or lesser number may be provided, the primary requirement being that they should be spaced so as to distribute the air blast over a substantial part of the area of the stock sheets.

Encircling the hollow arms 12 at suitable intervals are adjustable collars 19 forming mount-

ing member for springy fingers 21, 22 and 23. Each springy finger may consist of the outer end portion of a helically coiled wire spring 24, as best seen in Figures 5 and 6, an inner coil of which terminates in an offset portion 26 which is inserted into a transverse hole in the respective mounting collar 19. These collars may be secured in any appropriate longitudinally and circumferentially adjusted positions to the hollow arms 12 by thumb screws 27.

The springy fingers are shown in two groups, located at opposite sides of the T piece, and each comprising three fingers of different lengths and angular inclinations relative to the stock pile. As the sheets from the pile commence to be lifted by the suction pads 9, the leading or front edges raise the free ends of the first fingers 21 which have been lightly touching it. As the sheet continues to rise, the ends of these springs brush lightly across its edge in such a way as to intercept or dislodge any sheet that may be adhering to the underside of the topmost sheet. The springs 21 then return to their original positions. Rising still further the topmost sheet comes into contact with the second fingers 22 which are longer than the first fingers and more steeply inclined. The action of the fingers 22 is similar to that of fingers 21 and will generally dislodge any adhering sheets which have passed the fingers 21. As a further precaution, we may provide a third set of fingers 23 which are longer and more steeply inclined than the first and second sets. Their function is much the same as the first and second fingers. The three sets of fingers are almost certain to prevent more than one sheet being carried away by the suction pads at any one time. In some cases only two sets of fingers will be found sufficient.

As seen in Figure 2, the normal overhang of the free ends of the fingers in relation to the stock pile decreases upwardly, while the free end of the third finger is slightly curved inwardly. This is the preferred construction and arrangement as it seems to assure most efficient operation but variations are possible without loss of efficiency.

The sheets intercepted and separated by the fingers will be maintained in correct registry in relation to the stock pile and will thus be accurately delivered by subsequent actions of the suction pads to the printing machine.

The entire blower head can be vertically adjusted by sliding it up or down the pipe 14 and may be locked in the most desirable position by the thumb screw 28.

The valve 29 (Figure 2) for controlling the air pressure to the blower head may be of the rotary plug type and be carried by a spindle 31 fitted with an operating handwheel 32, the plug having a port 33 which registers with an air passage 34 in the valve casing when in the full-on position. By turning the handwheel 32 the port in the plug may be brought into a position at a right angle to the air passage 34, thus cutting off the passage of the air to the blower head. Intermediate positions of the valve plug can therefore give a full range of air volumes to the blower head from full-on to zero.

When the supply of air is cut off or reduced by the valve 29, a spring loaded safety valve 36 is forced open allowing excess air to escape through the by-pass holes 37 thus relieving the compression valves of any back pressure.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a blower head installation for separating paper or like sheets from a stock pile for individual delivery to a printing machine, a member extending in the same horizontal plane as the upper sheets of the pile adjacent the front edges of said sheets, said member being provided at longitudinally spaced positions with supports, and coiled wire springs retained at their inner ends to the respective supports, the outer end portions of said springs being bent to constitute springy fingers having free end portions which project rearwardly and upwardly over the front edge of the stock pile at longitudinally spaced intervals to yieldingly contact with the front edges of the sheets as they are raised from the stock pile and thereby to intercept and dislodge any underlying sheet that may tend to rise in clinging relationship with an overlying sheet and to return the intercepted sheet towards the stock pile in correct pile registry for ultimate removal, said springy fingers being of different lengths and of different inclinations relative to the stock pile, the shorter finger or fingers being inclined less steeply than the longer finger or fingers.

2. In a blower head installation, the combination claimed in claim 1, wherein said first named member comprises a hollow head for connection to a source of compressed air and hollow arms communicating with and outstanding from opposite sides of said head, said arms being provided with longitudinally spaced air outlet apertures facing said upper sheets of the stock pile, and wherein said supports consist of at least two series of collars adapted for adjustable retention to said hollow arms, the springy fingers connected to each series of collars being of different lengths and of different inclinations relatively to the stock pile, the shorter finger or fingers being inclined less steeply than the longer finger or fingers.

3. A blower head for separating paper or like sheets from a stock pile to permit their individual delivery to a printing machine or the like, comprising a hollow head, means for delivering air under pressure to said head, arms extending from opposite sides of the head and positioned in substantially the same horizontal plane as the upper sheets of the pile, said arms being formed with apertures to deliver an air blast to the upper part of the feed pile to separate the upper sheet thereof, supports adjustably mounted on said arms and a coiled wire spring anchored at one end in each support, the opposite end of the spring being extended beyond the support in the direction of the air blast as spring fingers to project over the front edge of the stock pile to yieldingly contact with the front edges of the sheets as they are raised from the stock pile for feeding, the spring fingers having relatively different lengths and relatively different angles to the plane of the top sheet of the pile in the normal positions of the parts.

4. A blower head to separate the upper sheets of a pile of sheets to facilitate independent delivery of the sheets for feeding purposes, comprising a hollow body to direct jets of air under pressure to the edges of the upper sheets of the pile, spacing members longitudinally adjustable on the hollow body and a spring secured at one end to each member and projected beyond the member above the plane of the jets and inclined with respect to the plane of the upper sheet of the pile to provide spring fingers to overlie the upper sheet of the pile and at an upward inclination to the plane of such upper sheet, the relative lengths of

the spring fingers and their upward inclination relative to the pile sheet varying relatively.

5. A construction as defined in claim 4 wherein the spring fingers are arranged in at least two series on the hollow member with the fingers of each series being of relatively different lengths and different angular relations with the plane of the top sheet of the pile.

6. A construction as defined in claim 4 wherein the springs between the anchoring means and the spring fingers thereof are coiled about the hollow member.

7. A construction as defined in claim 4 wherein the spring fingers are arranged in at least two series on the hollow member with the fingers of each series being of relatively different lengths and different angular relations with the plane of the top sheet of the pile, the inclination of each spring finger of a series relative to the plane of the pile sheet increasing relatively as the lengths of the fingers increase.

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