

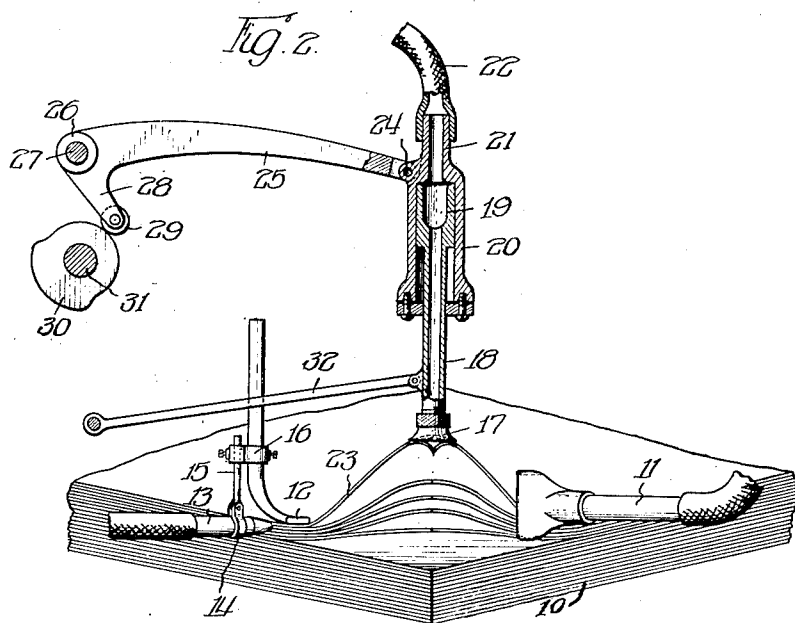
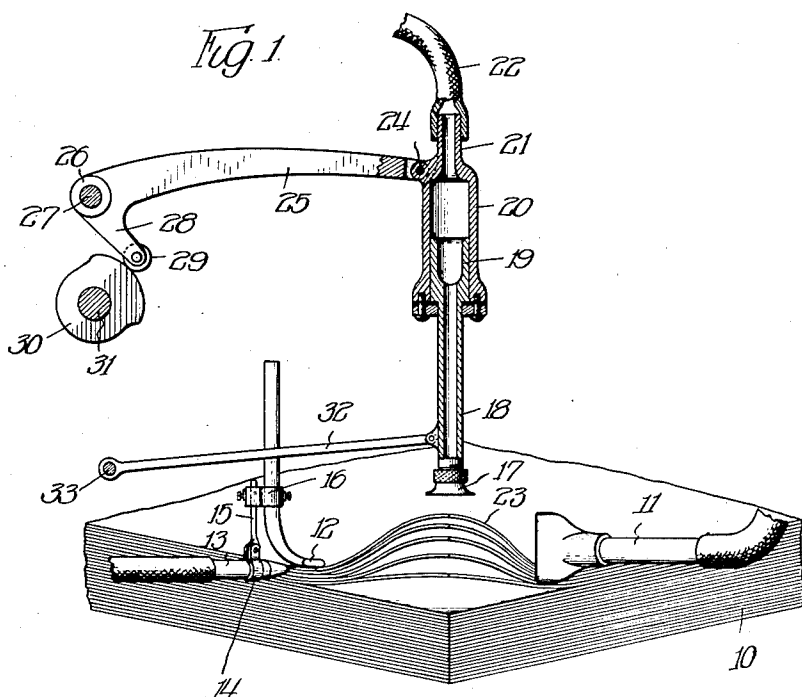
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A. G. JACOBSON

SHEET SEPARATING MECHANISM

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Witness:
A. Burkhardt.

Inventor:
Arthur G. Jacobson,
By *Thompson, Husley, Bygones & Knight*
Attys.

UNITED STATES PATENT OFFICE.

ARTHUR G. JACOBSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO MIEHLE PRINTING PRESS
& MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLI-
NOIS.

SHEET-SEPARATING MECHANISM.

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To all whom it may concern:

Be it known that I, ARTHUR G. JACOBSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Separating Mechanism, of which the following is a specification.

This invention relates to sheet separating mechanism.

One object of the invention is to provide simple, reliable and efficient means for separating the top sheet in a pile from a second sheet therein and gripping said top sheet for withdrawing same from the pile without causing the first sheet again to engage the second sheet at the point where they are first separated.

Another object of the invention is to separate sheet material in a pile in a simple and improved manner whereby when a film of air once separates the top sheet from a second sheet such film of air will not be pressed from between said sheets.

Another object is to provide sheet separating mechanism which is simple in operation and adapted to meet the various requirements for the particular use.

These and other objects are accomplished by means of the arrangement disclosed on the accompanying sheet of drawings, in which—

Figure 1 is a fragmentary sectional view of sheet separating mechanism embodying my invention and also showing a pile of sheet material undergoing separation, the top sheets of paper being fluffed up at one corner just prior to the top sheet of paper being gripped; and

Figure 2 is a similar sectional view showing the top sheet of material in the pile gripped by the suction gripper.

The various novel features of the invention will be apparent from the following description and drawings, and will be particularly pointed out in the appended claims.

Referring to the figures of the drawings, it will be noted that a pile 10 of sheet material is shown from which sheets are to be taken one at a time preparatory to being fed progressively, for example, in a printing press.

As is well known, the question of sheet

separation is a vital one in connection with printing and one which has been given considerable thought. Various sheet separating mechanisms are in use with varying degrees of success. In certain types of sheet separators a portion of the top sheet in a pile is separated from the next sheet preliminarily by jets of air, whereupon a gripper, which may be one of various types, passes downwardly into engagement with said top sheet and continues in its movement until the separated portion of said top sheet backs down into engagement with the second sheet and thereby forces the separating medium or air from between the first and second sheets. The result of such action is to nullify the preliminary separation.

In my arrangement I propose not only to take advantage of the preliminary separation caused by jets of air, but to grip the top sheet after it is separated from the second sheet at one portion and to prevent said top sheet from again pressing down on said second sheet at such separated portion.

In connection with the preliminary separation of the sheet material there is provided a fluffing tube 11 through which air is forced for fluffing one corner of the pile, as shown in the figures of the drawings. At the same time the top sheets are held down at another portion by a foot 12 to prevent accidental displacement of the top sheets. Cooperating with the hold-down foot 12 is another tube 13 through which a jet of air is directed upwardly between the top sheets of material. Preferably the hold-down foot 12 and jet tube 13 are coupled together to cooperate in their actions. In this particular instance a band 14 surrounds the front portion of the jet tube 13 and has connected thereto a rod 15 which is adjustably connected to a collar 16 secured to the hold-down foot 12 at an intermediate portion.

As mentioned above, after the top sheets of paper are preliminarily separated, the top sheet is gripped by a gripper preparatory to being progressively advanced. In the embodiment of my invention there is provided a suction gripper foot 17, preferably of flexible material, mounted at the end of an air tube 18 having preferably integrally formed at its upper end a hollow

piston 19, which is slidably mounted within a cylinder 20, having at its upper end a tube 21 to which may be connected a hose or other flexible tube 22 connected to any
 5 suitable source of suction, not shown, whereby suction is extended through the tubes 22 and 21, cylinder 20, hollow piston 19, tube 18 and suction foot 17 for drawing and gripping the top sheet of material 23.
 10 Pivottally connected to the upper end of the cylinder at 24 is one arm 25 of a bell crank lever 26 pivottally mounted at 27 and having another arm 28 in the end of which is a roller 29 operatively connected to a cam
 15 30 which is rotated by any suitable means, such as a shaft 31 upon which the cam is mounted. Accordingly, as the cam 30 is rotated the suction gripper mechanism is caused to rise and fall and is guided in its
 20 rising and falling movement by a link 32, one end of which is pivottally connected to the suction tube 18, and the other end of which is pivottally connected to any suitable support 33.
 25 As shown in Figure 1 of the drawings, the roller 29 is on the high part of the cam 30 and, accordingly, the suction mechanism is in its elevated position. As the roller passes from the high to the low part of the
 30 cam, the suction mechanism is lowered so that the suction foot 17 is passed down into engagement with the top sheet of material 23. As soon as the top sheet 23 of material is gripped by the suction foot 17 no more
 35 air can be drawn upwardly through the sealed tube 18. However, the suction force acts upon the piston 19 in a manner to draw the piston 19 and accordingly the tube 18, foot 17 and paper 23 upwardly even as the
 40 cylinder 20 continues its downward movement. By virtue of the fact that the piston 19, tube 18 and suction foot 17 are drawn upwardly by the suction after the suction foot 17 is sealed, such suction foot 17 is not
 45 permitted to be pressed down to the solid pile of sheets as the cylinder 20 is lowered, since it is higher by the length of the stroke of the piston and, accordingly, the separated portion of the top sheet 23 of material
 50 is prevented from being driven down into engagement with the next sheet. As a result thereof the separating body of air between the top sheet and the second sheet is not disturbed and the separation of the top sheet
 55 from the second sheet is successfully maintained. As mentioned above, this result is accomplished by the upward movement of the piston 19 within the cylinder 20 as the latter moves downwardly, so that even
 60 though the cylinder 20 continues its downward movement during the gripping operation the suction foot 17, tube 18 and piston 19 move upwardly immediately upon the sealing of the suction foot 17 by the
 65 top sheet of paper.

It is my intention to cover all modifications of the invention falling within the spirit and scope of the following claims.

I claim:

1. In mechanism for separating sheet material in a pile, the combination of means for fluffing sheet material in a pile, and suction gripper means comprising a plurality of relatively movable parts whereby when one of said parts grips the top sheet of material it recedes with said sheet regardless of the movement of the other relatively movable part, whereby separation of the top sheet from the second sheet is maintained. 70
2. In mechanism for separating sheet material in a pile, the combination of means for fluffing sheet material in the pile, and suction gripper means which is given a downward movement for gripping the top sheet of material and comprising a plurality of relatively movable parts whereby when one of said parts grips the top sheet of material it recedes with said sheet regardless of the continued downward movement of the other relatively movable part, whereby separation of the top sheet from the second sheet is maintained. 80
3. In mechanism for separating sheet material in a pile, the combination of means for fluffing sheet material in a pile, and vertically movable suction gripper means having a downward movement for gripping the top sheet of material and comprising a plurality of relatively movable parts whereby when one of said parts grips the top sheet of material it moves vertically upward taking the top sheet of material with it as the other relatively movable part continues its downward movement whereby separation of the top sheet from the second sheet is maintained. 85
4. In mechanism for separating sheet material in a pile, the combination of means for fluffing sheet material in the pile, and gripper mechanism including an actuated cylinder connected with a source of suction, a piston slidably mounted in said cylinder, and a suction gripper foot operatively connected to said piston whereby as said cylinder, piston and suction foot move in a given direction and the top sheet is gripped by said suction foot, said piston immediately moves in said cylinder in an opposite direction for withdrawing the top sheet of material regardless of the continued movement of said cylinder. 90
5. In mechanism for separating sheet material in a pile, the combination of means for fluffing sheet material in the pile, and gripper means including a movably mounted cylinder, a hollow piston movably mounted in said cylinder, a suction foot operatively connected to said piston whereby said cylinder, piston and suction foot all 95

move in the same direction until the suction foot is sealed by the top sheet of material and without passing solidly into engagement with the pile, whereupon said piston moves in an opposite direction in said cylinder carrying with it the suction foot and top sheet of material independently of the movement of said cylinder, whereby separation of the top sheet from the second sheet is maintained.

6. In mechanism for separating sheet material in a pile, the combination of means for fluffing sheet material in the pile, means for preventing accidental displacement of the

top sheet of material as it is being fluffed, 15 and gripper means comprising a plurality of relatively movable parts whereby when one of said parts grips the top sheet of material and without passing solidly into engagement with the pile it recedes with said 20 sheet regardless of the movement of the other relatively movable part whereby separation of the top sheet from the second sheet is maintained.

Signed at Chicago, Illinois, this 18th day 25 of August, 1922.

ARTHUR G. JACOBSON.