Sept. 30, 1958 J. R. SHEA, JR 2,854,150

MEANS FOR REMOVING A LIFT OF SHEET MATERIAL FROM A STACK OF SUCH MATERIAL

Filed May 1, 1957

FIG. 1

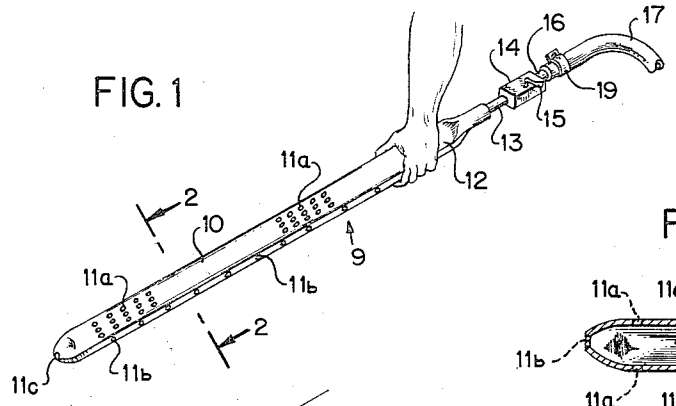


FIG. 2

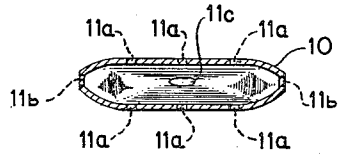


FIG. 3

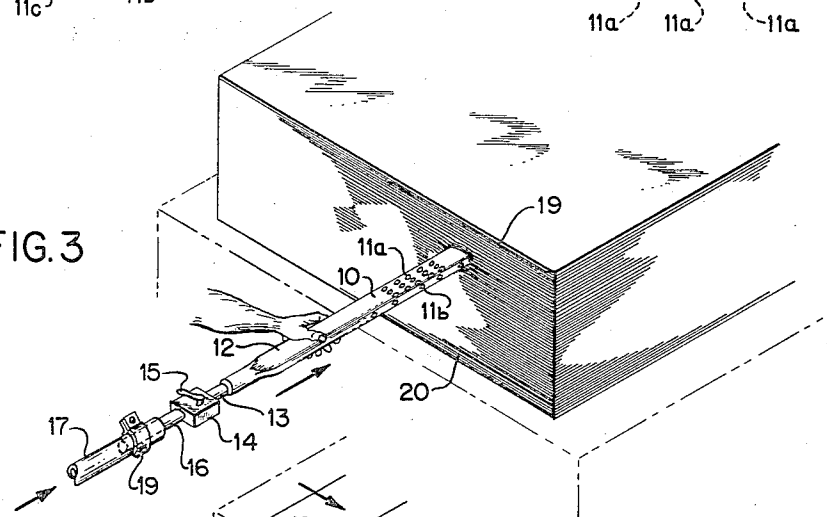
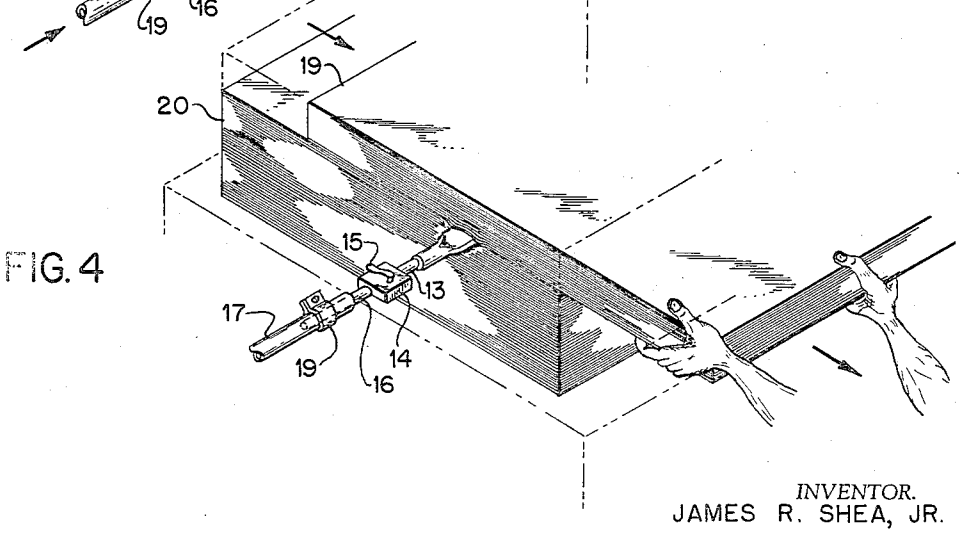


FIG. 4



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MEANS FOR REMOVING A LIFT OF SHEET MATERIAL FROM A STACK OF SUCH MATERIAL

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4 Claims. (Cl. 214—1)

This invention relates to a device for removing a lift or pile of sheet material from a stack of such material, and more particularly to an air sword utilizing air pressure to facilitate separation and removal of a ream or other substantial quantity of paper from a quantity of stacked paper sheets.

In a typical finishing room operation at a paper mill producing flat or sheeted papers, the sheets of paper cut from rolls of paper by rotary cutters or sheeters are filed substantially evenly in large stacks on skids alongside the sheeters, removed by lift trucks for counting and marking with tags placed between sheets in the stacks to indicate reams, half reams, quires, or other quantities, and delivered to the mill trimmers to be accurately trimmed and squared to the size desired for each ream or other quantity. Mill trimmers can accurately trim lifts or piles of paper only up to a limited height, 6 inches in many cases, and, accordingly, it is necessary to divide and separate from each stack for trimming, successive lifts that can be handled by the trimmers. The removal of the lifts from the stacks is commonly performed by a crew of two men who do all of such work by hand without the aid of any lifting devices or tools. Their usual method of operation is for each to grasp a lift of the desired quantity on top of the stack and, by jointly pushing or pulling, slide the lift across and off the remaining stack and onto the adjacent bed of the trimmer. The lifts of paper are heavy, often weighing in the neighborhood of 200 pounds each. The work of sliding the lifts is more laborious when the sheets are "sticky" as is the case with certain coated papers.

My invention greatly facilitates the removal of a heavy lift of paper from the top of a stack of paper by providing a positive air pressure beneath the lift which tends to reduce the friction between the piles in the sliding operation. My invention also provides for the making of the initial and partial separation of the lift from the stack without the necessity of the trimmer crew using their fingers for the purpose. My invention can be further used to good advantage to blow powder between a lift and the stack section beneath it for additional reduction of the friction between them in the sliding operation and to remove the undesired powder from the lift and the stack section while the lift is being removed.

These and other objects and advantages of my invention will more fully appear, and my invention will be easily understood, when the following description and claims are considered in connection with the accompanying drawings which form part of this specification, and in which—

Fig. 1 is a perspective view showing an illustrative air sword device constructed in accordance with my invention;

Fig. 2 is a sectional view on a larger scale than Fig. 1, the section being taken on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a perspective view showing the air sword device partially inserted into a stack of paper; and

Fig. 4 is a perspective view showing the air sword device fully inserted into a stack of paper, and showing a lift being removed from the stack.

Referring to the drawings, which illustrate a preferred embodiment of my invention, an illustrative sword 9 comprises a smooth surfaced hollow blade portion 10 which is provided with air ports 11*a* in the top and bottom faces, air ports 11*b* in the side edges, and air port 11*c* in the tip. Integral with blade portion 10 is a hollow handle portion 12 which is rigidly connected through pipe 13 to a valve body 14. Pipe 13 is unitary with valve body 14. A valve handle 15 is provided for regulating the flow of air into the air sword device. Pipe 16, also unitary with valve 15, is received by the end of air hose 17 and is fastened thereto by hose clamp 18. Air under positive pressure is supplied from a source not shown to air hose 17.

Preferably the sword blade portion 10 has a pointed tip for easy insertion into a stack of sheeted paper and is formed of flat sides joined by rounded edges as illustrated in Fig. 2 in order that the lift of sheeted paper to be removed can be slid over said blade more easily during the removal operation.

The number of air ports in the sword blade portion is not particularly critical in the operation of the device. It is desirable, however, that there be some air ports in each of the side edges and at least one in the tip end for reasons to be pointed out in the hereinafter described operation of the device.

In operating my air sword, the tip end of the device, with a perforated flat side of the blade in up position, is first inserted into the stack of paper in the desired place as illustrated in Fig. 3. This step can be carried out whether the air pressure into the air sword device is on or off. This causes a partial separation of the stack into a lift 19 above the blade and a stack section 20 below the blade. After insertion of the blade substantially through the stack, the air pressure, if not previously turned on and flowing through the blade, is turned on by means of handle 15. The jets of air from air ports 11*a* in the top of the flat blade are directed against the bottom of lift 19 and tend to lift that pile on a cushion of air. The jets of air from air ports 11*b* in the side edges of the blade are directed laterally in both directions between lift 19 and stack section 20 and tend to separate these piles toward their outer edges. While air under pressure is being so expelled, lift 19 is removed as shown in Fig. 4 by sliding it manually in a lateral direction over, across and beyond the blade between the piles and over, across and beyond remaining stack section 20 to the adjacent bed of the trimmer, not shown. The cushion of air between the piles tends to lighten the weight of the lift and reduce the friction between it and the remaining stack section which greatly facilitates the sliding operation.

The amount of air pressure to be used can be easily determined by simple experimentation. I have operated the air sword successfully upon a variety of grades of paper at pressures from 20 p. s. i. to 50 p. s. i. depending upon the weight of the lift to be removed and the degree of friction to be overcome in the sliding operation.

The valve for regulating the flow of air through the air sword need not be incorporated as part of the device but can be located at or near the source of air supply.

The air sword device of my invention can be used advantageously with talcum powder or other powdery material for more easily removing lifts of certain coated papers from stacks of such papers. Sheets of some coated papers have a tendency to stick together. Also, coated papers, being generally smoother than uncoated papers, present more extensive and intimate surface contact between sheets, and this increases the friction to be overcome in the sliding operation. This friction can be re-

duced by using the jet of air issuing from air port **11***c* in the tip of the blade of my air sword device to blow talcum powder from the hand of the operator or from a container into the place of partial separation of the piles where it is further dispersed laterally between the piles by jets of air from air ports **11***b* in the side edges of the blade. These same lateral jets of air serve to blow away and remove the powder from the lift and the remaining stack section as the lift is being removed.

While a certain preferred embodiment of my invention has been illustrated and described in detail, it is to be understood that changes may be made therein and the invention embodied in other structures. It is not therefore my invention to limit the patent to the specific construction illustrated, but to cover the invention broadly in whatever form its principles may be utilized.

I claim:

1. A tool for removing a heavy lift of sheet material from a stack of such material comprising a handle, a hollow, smooth-surfaced, flat-sided blade extending from the handle to a pointed end, said blade being provided with a multiplicity of air ports, and air supply means connected to the hollow blade for delivering air under pressure through the hollow blade towards its pointed end and to and through the air ports.

2. A tool for removing a heavy lift of sheeted paper from a stack of sheeted paper comprising a hollow handle, a hollow, smooth-surfaced, flat-sided blade extending from the handle to a pointed end, said blade being provided with a multiplicity of air ports, and air supply means connected to the handle for delivering air under pressure through the handle and through the blade towards its pointed end and to and through the air ports.

3. The tool of claim 2 in which the flat sides of the blade are joined by rounded edges, air ports are provided in said rounded edges, and at least one air port is provided in the pointed end of the blade.

4. The tool of claim 3 in which a regulating valve is provided at the handle for controlling the flow of air to and through the air ports in the blade.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,854,150 September 30, 1958

James R. Shea, Jr.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 23, for "filed" read -- piled --; column 3, line 14, for "invention" read -- intention --.

Signed and sealed this 3rd day of February 1959.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents