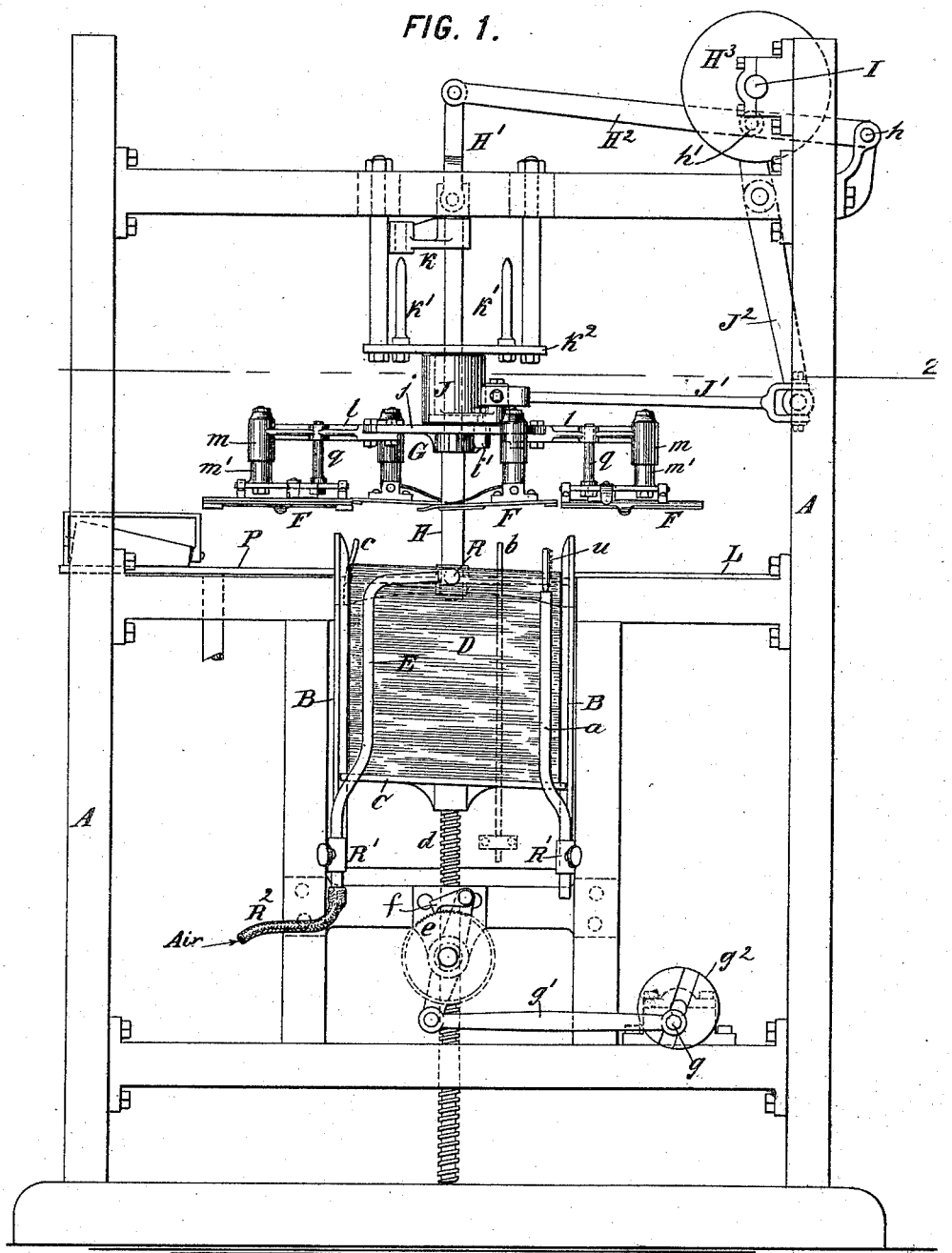
(No Model.) 4 Sheets—Sheet 1.

H. E. SMYSER.

PAPER FEEDER.

No. 492,374. Patented Feb. 21, 1893.

FIG. 1.



WITNESSES:
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Fred White

INVENTOR:
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Dittmar G. Fraser & Co.

(No Model.) 4 Sheets—Sheet 2.

H. E. SMYSER.

PAPER FEEDER.

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FIG. 3.

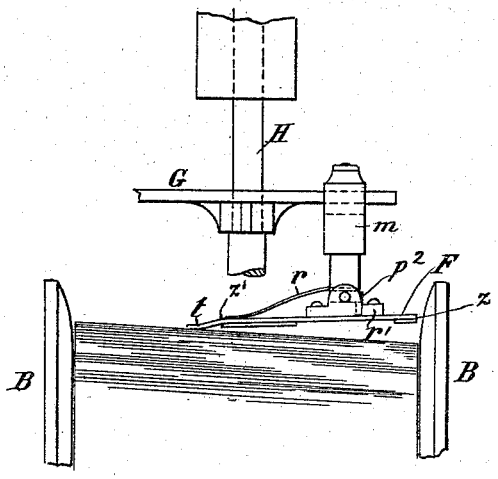


FIG. 4.

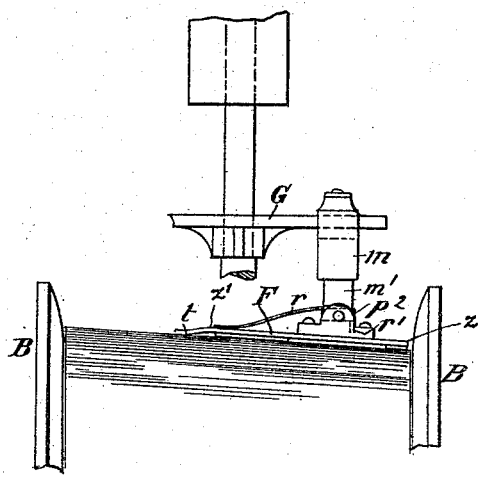
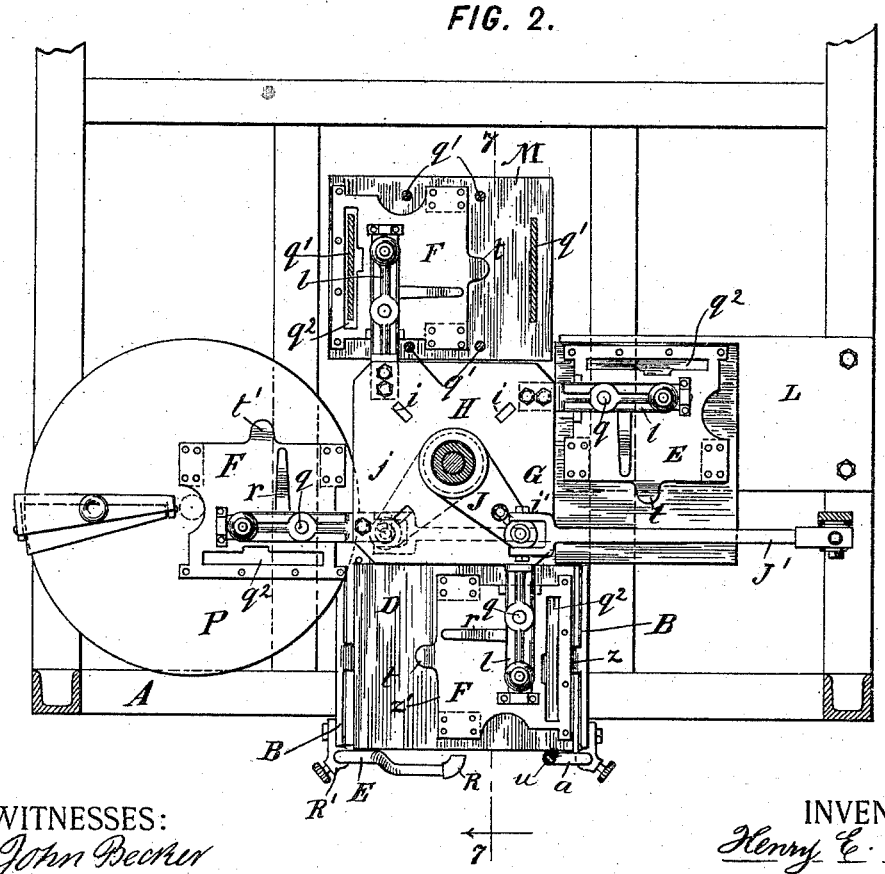


FIG. 2.



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(No Model.)

4 Sheets—Sheet 3.

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PAPER FEEDER.

No. 492,374. Patented Feb. 21, 1893.

FIG. 5.

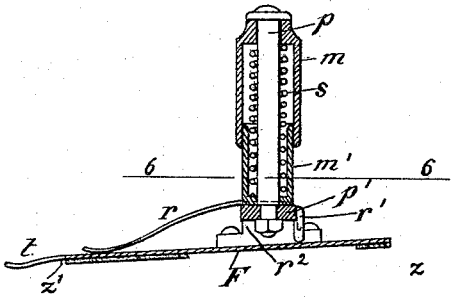


FIG. 6.

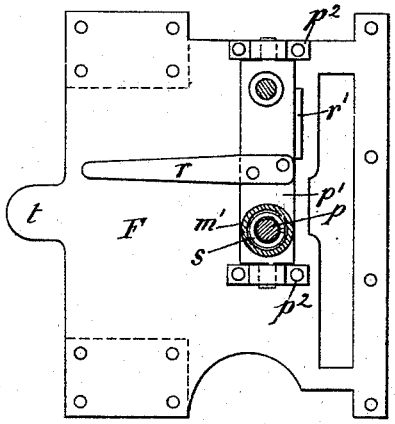


FIG. 7.

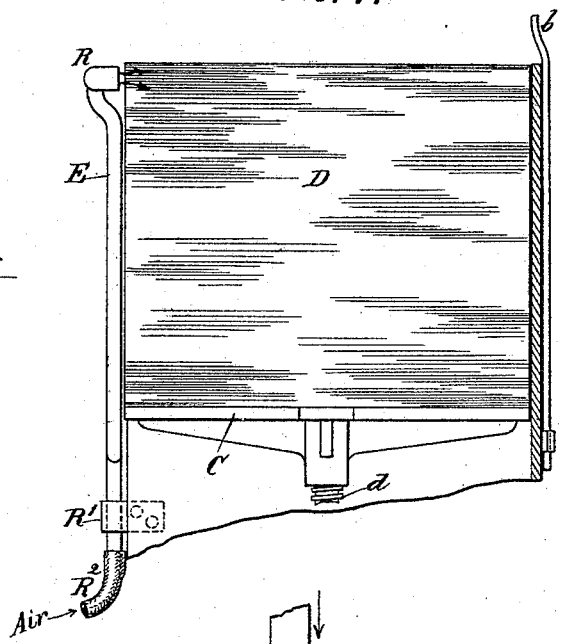
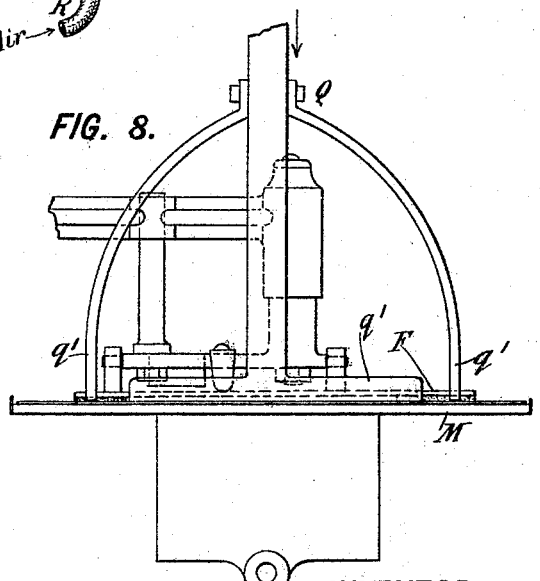


FIG. 8.



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(No Model.)

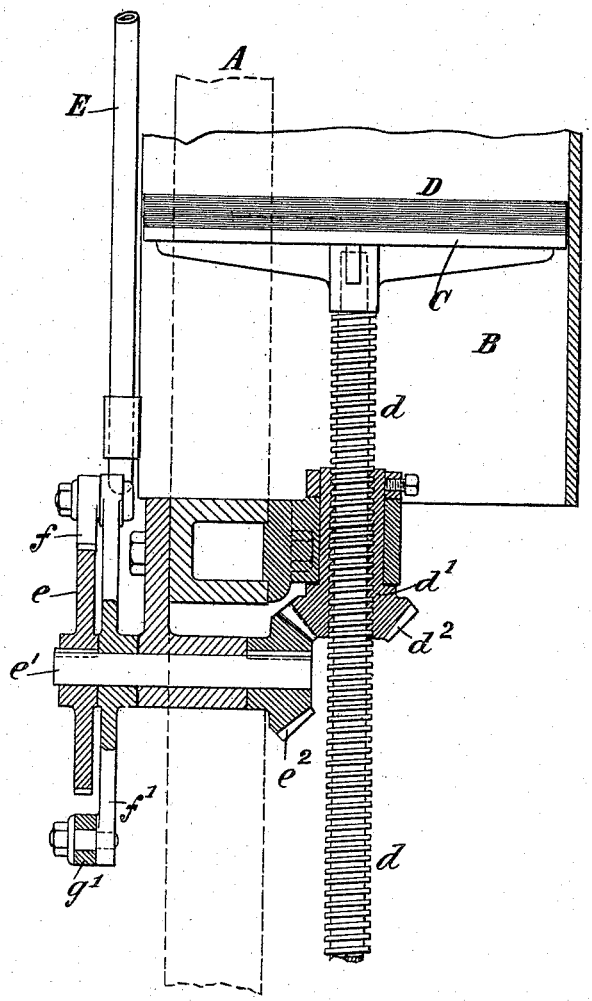
4 Sheets—Sheet 4.

H. E. SMYSER.

PAPER FEEDER.

No. 492,374. Patented Feb. 21, 1893.

FIG. 9.



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UNITED STATES PATENT OFFICE.

HENRY E. SMYSER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ARBUCKLE BROTHERS, OF NEW YORK, N. Y.

PAPER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 492,374, dated February 21, 1893.

Application filed April 4, 1892. Serial No. 427,639. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. SMYSER, a citizen of the United States, residing at Germantown, in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Feeders, of which the following is a specification.

This invention relates to apparatus for picking up the top sheet of paper from a pile and feeding it into any suitable machine which is to act on the paper.

My present invention has been designed especially for application to machines for pasting sheets of paper and folding them into boxes or bags, but it is also applicable to other purposes.

Figure 1 of the accompanying drawings is a front elevation of a machine to which my present invention is applied. Fig. 2 is a plan of as much thereof as is necessary to illustrate my present invention, the view being partly in section on the line 2—2 in Fig. 1. Figs. 3 and 4 are fragmentary front elevations on a larger scale showing the lifter in operation. Fig. 5 is a sectional elevation on a larger scale showing the lifter and its mounting. Fig. 6 is a plan of the lifter in section on the line 6—6 in Fig. 5. Fig. 7 is a fragmentary section in the plane of the line 7—7 in Fig. 2. Fig. 8 is a fragmentary section of the pile of paper in the same plane. Fig. 9 is a fragmentary vertical transverse section cut through the center of Fig. 1.

In the drawings, I have shown my invention as applied to a machine for making sheets of paper into boxes or bags and automatically filling the bags with material to be packed. Such a machine is shown in my patent No. 449,275, dated March 31, 1891, and in subsequent applications for patents which I have filed covering improvements on the machine illustrated in that patent namely, Serial Nos. 380,470, filed February 6, 1891, and 423,140, filed February 29, 1892. I have in this application illustrated and described only so much of that machine as is necessary to an understanding of my present invention, leaving those who desire further information concerning the portions of that machine which are not here illustrated, to refer for information thereof to my said patent and applications.

Referring to the drawings, let A designate any suitable fixed frame adapted to support and provide bearings for the working parts. This frame is constructed with upright guides B B, between which is held a table C adapted to move up and down and supporting the pile D of paper in sheets or blanks. The sheets of this pile are guided and held in position by the uprights B B, and by guiding bars E, *a*, *b* and *c*, these bars being of any suitable number, and placed in any proper positions adapted to enable them to efficiently guide the pile of sheets and hold the same in the proper position.

The table C is designed to move upward as the pile diminishes by the feeding off of sheets from the top, in order that the top sheet of the pile may always be at the same height. Many different means are known for thus feeding the pile upwardly. The means shown in the drawings, consists of a screw d projecting downwardly from the bottom of the table and engaged by a nut, d' which is turned through bevel-gears d^2 e^2 from a ratchet-gear e fixed on a shaft e' and propelled by a pawl f mounted on a rocking-arm, f' which is driven from a crank-stud g through a connecting-rod g' all as shown in Figs. 1 and 9. The crank-stud g is mounted adjustably in a diametrical slot in a disk g^2 on a rotary shaft, so that the throw of the crank may be adjusted, and the sweep of the pawl, and consequently the rapidity of the upward feed thereby determined.

The sheets are picked off from the pile by lifters F F, which are mounted to move in succession and intermittently. Each lifter has first a forward movement over the pile, then a downward movement into contact with the pile, then an upward movement to lift off the top sheet, and again a forward movement to carry the sheet off from the pile. This latter movement brings another lifter over the pile. In the course of their forward movements, the lifters successively deliver the sheets carried by them to the part of the machine by which they are to be folded up or otherwise operated upon.

In the drawings, I have shown four lifters

F F, but their number may be greater or less as circumstances demand. These lifters are mounted on a carrier G, which is fixed on a vertical shaft H. To this shaft are imparted intermittent forward rotative movements, and in the intervals between the forward movements it is caused to plunge downwardly and reascend. These movements may be imparted in many different ways, the mechanism for this purpose forming no part of my present invention and not being essential thereto. I will, however, briefly describe the mechanism shown. To the upper end of the shaft H is swiveled a link H′ connected to the end of a lever H^2, pivoted at h and carrying a roller h', which is acted on by a cam-groove formed in a cam-disk H^3 fixed on a rotary shaft I. The cam-groove is of such shape as to impart downward and upward movements at intervals to the lever H^2, and hence through the link H′ to the shaft H. The forward rotative movements of the shaft H are to the extent of one quarter revolution of each movement, and are performed while the shaft is in its uppermost position. As the carrier G, which is fixed to the shaft, moves up with it in its ascending movement, one of four holes or sockets i i in the plate j of this carrier is entered by a downwardly projecting tooth i' on an arm J, which is standing stationary in the position shown in dotted lines in Fig. 2. This arm is pivoted on a sleeve concentric with the shaft H, and has a swinging motion through an arc of ninety degrees imparted to it through a link J′, from a lever J^2, which is vibrated at intervals by a suitable cam. The engagement between this tooth i' and one of the holes i, locks the carrier to this arm, and the arm is then swung from the position shown in dotted lines in Fig. 2 to the position shown in full lines, thereby rotating the carrier, and with it the shaft H a quarter revolution. The next downward movement of the shaft releases the carrier from the pin i', and while the parts are disengaged the arm J swings back to the position shown in dotted lines, and remains there until re-engaged by the carrier at the next upward movement of the shaft. The displacement of the shaft and carrier in rotative direction during the downward and return movements are prevented by a guiding arm k fixed on the shaft, and having a tubular eye on its end which as the shaft moves downward slides down over one of four vertical pins k' k' mounted fixedly on a plate k^2 forming part of the framework. This mechanism is more fully shown and described in my previous patent and applications before referred to.

The carrier G is constructed with the plate j, and with four tangential arms l l, as shown in Fig. 2, projecting rigidly from it. These arms carry downwardly projecting bosses m m, to which the lifters F F are connected. Preferably the lifters are mounted yieldingly on the arms, so that as the carrier is moved down its motion may be continued after the lifter encounters the top of the pile of sheets, during which time the lifter is pressed against the pile by yielding elastic pressure. To this end, it is preferable to construct the lifter with a vertical stud p having sliding connection with the boss m on the carrier arm, as shown in Fig. 5, and with an interposed spiral spring s exerting a downward pressure against the lifter and pressing the latter downward until the head of the stud p strikes the top of the boss m. The spring is concealed within the boss m, and within the tubular sleeve m', which slides telescopically within it. These details of the construction of the elastic mounting for the lifters are not however essential. To prevent the rotative displacement of the lifters, each is provided with a fixed vertically projecting pin q sliding freely through a hole in the arm l, by which it is guided.

In the particular construction shown, where four lifters are employed, the pile of paper D is placed in position to be encountered by one of the lifters in its downward or plunging movement, and beneath the other lifters are arranged a fixed table L, a receiving table M, and a paste table or disk P, as shown in Fig. 2. The paste-disk is designed to apply a coating of paste or gum to those portions of the under surface of the lifter which project downwardly beyond the general under surface thereof, and which are designed to apply paste to the paper. It will be understood that this paster is employed only when the paper to be operated upon requires to have a coating of paste or gum applied to it, as is the case in machines for making boxes or bags. The coating of paste applied to the lifter by the paste-disk imparts sufficient adhesiveness to the under surface of the lifter to enable it, after having descended into contact with the top sheet of the pile, to lift the latter with it upon its reascending movement. In case, however, the paper is not to be pasted, some other means will be provided for causing the paper to adhere to the lifter. For this purpose, any one of the well known pneumatic attachments for paper lifters in paper feeding devices may be employed. The paste disk P is provided with the usual paste reservoir and distributer, and with means for rotating it intermittently, such as are well known as applied to paste-disks.

The operation is as follows:—Each lifter arrives in turn over the paste-disk P, and with a descending movement of its carrier is pressed against this disk so that its paster surfaces receive a coating of paste therefrom. On ascending, the lifter is moved forward a quarter of a revolution and brought over the pile of paper D, and upon its descending movement it is pressed down against the paper, and its pasted surfaces adhere to the top sheet thereof, so that upon the reascending movement it lifts the top sheet. It then moves forward a quarter revolution and descends again against the table L, and in so doing presses the

sheet flat against this table and makes a more intimate contact between its paster surfaces and the paper, so that the paste is thoroughly applied to the latter. It then reascends and swings forward another quarter revolution and descends in contact with the receiving table M, pressing the sheet against the latter. During the instant that it dwells in contact with this table, a stripper comes down and presses the sheet against the table, so that upon the reascending movement of the lifter the sheet is stripped therefrom and left lying upon the receiving table, from which it is fed onward to the successive operative parts by mechanism which it is not necessary here to explain, but which is found in my said former patent and applications. The stripper consists simply of a vertically movable frame Q, Fig. 8, having fingers or presser bars q' q' which come down and rest upon the sheet of paper in the position shown in cross-section at q' in Fig. 2, thus clamping the paper against the table M for an instant after the lifter has begun to ascend. One of these presser bars acts through a slot q^2 formed in the lifter plate. When the lifter has ascended sufficiently to disengage itself from the paper, the stripper Q quickly moves upward out of the way. The lifter is then swung the remaining quarter of a revolution to the position over the paste-disk again.

It will be observed that each lifter F is jointed or hinged to its carrying stud, the stud p being fixedly attached to a cross-bar p', the ends of which are pivotally entered in bearing blocks p^2 fixed to the plate of the lifter F. A leaf-spring r is fixed on this plate p', and its end presses downwardly on the lifter plate F at the rear or following side thereof, thus pressing this side down until the limit of pivotal movement is reached, as determined by a stop r' applied to the lifter plate and striking the plate p'. The lifter F thus stands normally at a slight inclination, its rear or following edge z' being lower than its forward or advancing edge z. The pile of paper is also preferably tilted, and in the position or direction so as to increase the want of parallelism between the lifter and the top sheet of the pile. This tilting of the pile is best effected by mounting the table C obliquely, as shown in Fig. 1. By reason of this obliquity of the paster relatively to the top of the pile, the paster in descending strikes with its rear or following edge first as shown in Fig. 3, and in completing its descent from this position to that shown in Fig. 4, it tilts on its pivotal connection at p^2, and its following edge or tail thereby exerts a rubbing action against the top sheet, pressing it toward the left and tending by the movement thus imparted to it to separate it from the sheet next beneath, so that on the lifting motion, the liability of two sheets being lifted together by their mutual adherence, is reduced. During the lifting movement, the forward or advancing edge of the lifter first ascends, while the tail of the lifter continues to press downwardly upon the pile of sheets, so that the forward edge of the upper sheet is the portion first lifted, and by the downward pressure of the tail of the lifter upon the pile, the sheets beneath are slightly crimped, and thereby the disengagement of the upper sheet from those beneath it is further facilitated. To increase this indenting action, the lifter plate is constructed with a prolongation or tail t at its rearward or following side, whereby the crimping action is concentrated at one portion of the pile of sheets and toward the middle of the pile, so that by exerting a downward pressure at this point, the edges of the pile tend to separate. As the lifter ascends and lifts first the advancing edge of the upper sheet, there is abundant opportunity for air to enter between it and the next sheet beneath and thereby prevent the lifting of two sheets together by suction, and the sheet is also given a slight lateral or sliding movement toward the right as it is lifted, being the opposite movement to that imparted to it during the descent of the lifter, and this movement further facilitates its separation from the sheet beneath.

For further insuring the separation of the sheets, I provide a small brush u with its bristles arranged to project against the edge of the pile of sheets at and above the top of the pile, so that as the sheet is lifted its edge is drawn across the bristles of this brush, which bristles exert a retarding action against the sheet, which action is insufficient to detach it from the adhesive surface of the lifter, but sufficient to detach from it a second sheet in case the latter should chance to be lifted with the upper sheet.

For further insuring the separation of the sheets, I provide a nozzle R directed against the side of the pile close beneath the top thereof, and I provide means for directing a blast of air through this nozzle against this pile of sheets, so that the air shall blow in between the individual sheets causing them to flutter slightly, and introducing a film of air between the adjacent sheets which will prevent their adhering together and being lifted by suction. This nozzle might direct the jet at almost any point around the pile, but I find it preferable to direct it against one side of the pile at or near the top thereof and at about the middle in the position shown. In the construction shown, the upright guide E is made tubular, being an iron pipe the upper end of which is bent over and the nozzle R is applied to it, while its lower portion is held in a clamp R′ and connected by a flexible or other tube R^2 to any source of compressed air, such as a blower, air-pump or compressed air reservoir. The air may enter in a continuous blast, or be made intermittent, entering only during the time that the lifter is in contact with the pile.

It is not essential that both the lifter and the pile of sheets shall be inclined, it being only essential that they shall be inclined rela-

tively to one another. Either of them might be horizontal if the other be given a sufficient inclination. It is, however, preferable to incline the lifter in one direction and the pile of sheets in the other, as shown.

My invention may be applied in connection with any machine by which it is desired to feed paper from a pile sheet by sheet. To adapt it to any particular purpose, the mounting of the lifter may be greatly varied, and it may be caused to execute movements widely different from those hereinbefore described. It should be understood that all that is essential to my invention is the combination and construction of the devices that act directly upon the paper.

My present application relates to the same subject matter of invention as my application for patent for package making machinery, filed February 6, 1891, Serial No. 380,470, and which is still pending. My present invention being an improvement upon the construction disclosed in said application, I make no claim herein to anything claimed in that application.

I claim as my invention the following defined novel features substantially as hereinbefore specified, namely:

1. In a paper feeder, the combination with a table for holding a pile of paper, of a lifter movable downward against the pile and upward to deliver the lifted sheet, consisting of a plate standing normally in a plane inclined relatively to the top of the pile, so that in descending it strikes the pile of paper first at one edge, and mounted to oscillate to bring it into parallel contact with the paper, whereby in ascending it lifts one edge of the sheet in advance.

2. In a paper feeder, the combination with a table for holding a pile of paper, of a lifter and its carrier movable downward against the pile and upward to deliver the lifted sheet, the lifter consisting of a plate jointed relatively to its carrier and standing normally in a plane inclined relatively to the top of the pile, whereby on descending it strikes the paper obliquely exerting a rubbing action against it, and in ascending it lifts one edge of the sheet in advance.

3. In a paper feeder, the combination with a table for holding a pile of paper, of a lifter and its carrier movable downward against the pile and upward to deliver the lifted sheet, the lifter consisting of a plate jointed relatively to its carrier and having a spring acting to press downward its following edge, and a stop for limiting its depression arranged to cause the plate to stand normally in a plane inclined relatively to the top of the pile, whereby on descending it strikes the paper obliquely, its following edge first encountering it and the plate rocking against the yielding tension of said spring until its advancing edge encounters the paper, thereby exerting a backwardly rubbing action against the top sheet of the pile tending to disengage it from the sheets beneath.

4. In a paper feeder, the combination with a table for holding a pile of paper, of a lifter and its carrier movable downward against the pile and upward to deliver the lifted sheet, the lifter consisting of a plate jointed relatively to its carrier and standing normally in a plane inclined relatively to the top of the pile, so that in descending its following edge shall first encounter the paper, and formed at this edge with a tail projection t adapted to indent the pile and thereby facilitate the separation of the top sheet from those beneath.

5. In a paper feeder, the combination of a traveling lifter and its carrier, means for applying paste to said lifter, and the lifter constructed to oscillate relatively to its carrier and normally inclined relatively to the top of the pile, whereby on descending it strikes the paper obliquely and exerts a rubbing action against it, whereby the adhesion of the top sheet of paper to its pasted surface is facilitated.

6. In a paper feeder, the combination with a table for holding a pile of paper, mounted on an incline so that the top sheet of the pile shall be presented at an inclination, of a lifter and its carrier movable downward against the pile, the lifter consisting of a plate jointed to its carrier standing normally in a plane out of parallel with the top of the pile, with its advancing edge adapted to encounter the lowermost side of the inclined top of the pile, whereby in advancing its following edge first encounters the pile and the plate executes a tilting movement to bring it into parallel contact with the top sheet.

7. In a paper feeder, the combination with a carrier G, of a lifter F consisting of a tilting plate pivoted to a cross-bar p', a spring reacting against this cross-bar and pressing downward against one side of the plate, and a vertically yielding connection between the cross-bar and the carrier.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY E. SMYSER.

Witnesses:
GEORGE H. FRASER,
CHARLES K. FRASER.