Feb. 10, 1931. A. NOVICK 1,791,569

DELIVERY MECHANISM

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Fig. 1.

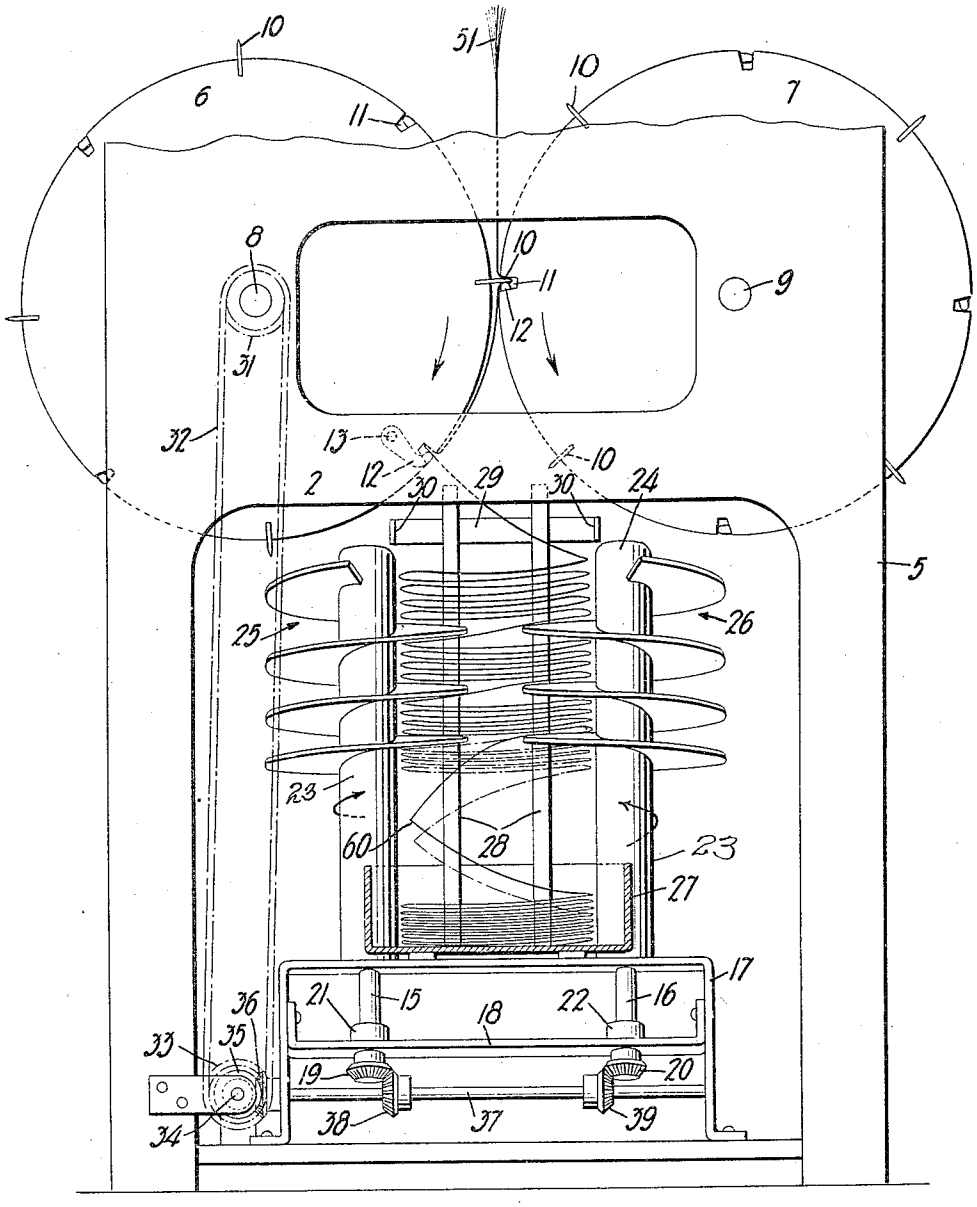

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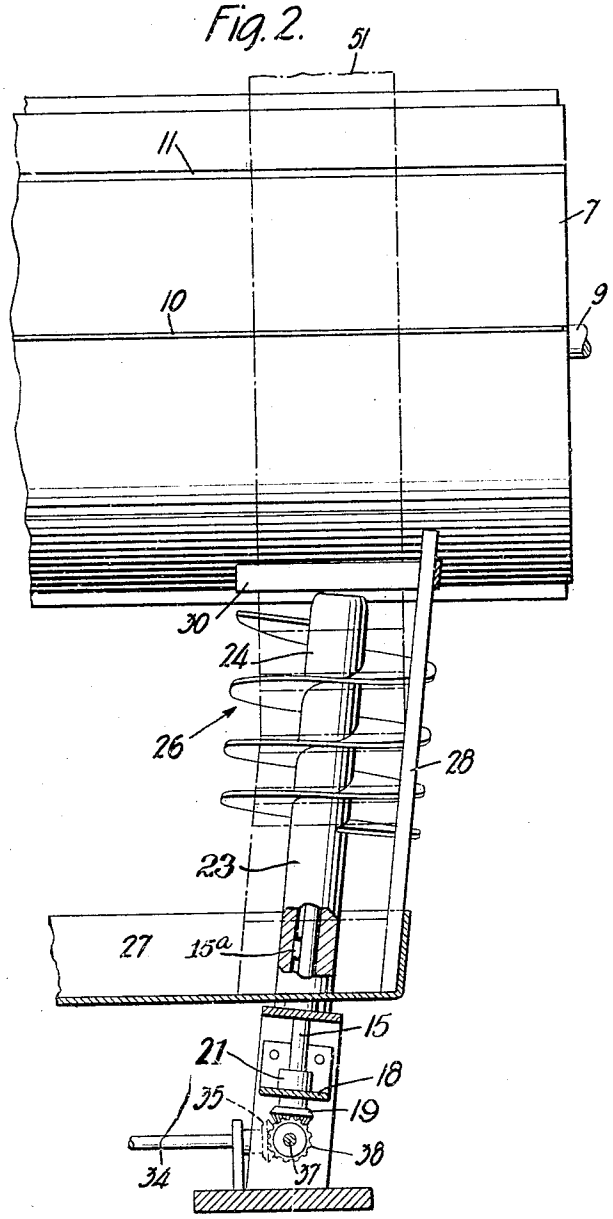
Fig. 2.



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DELIVERY MECHANISM

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Fig. 3.

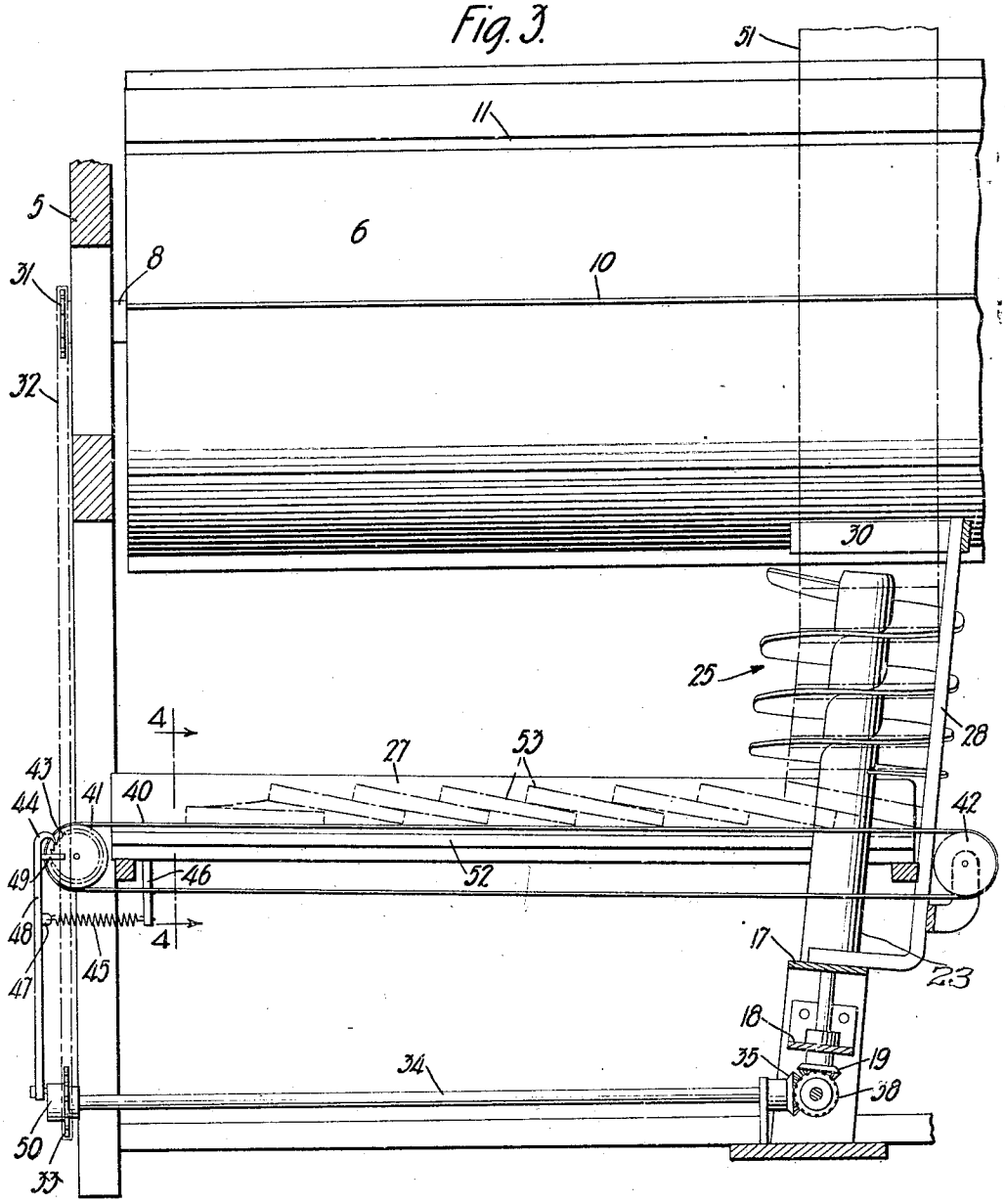
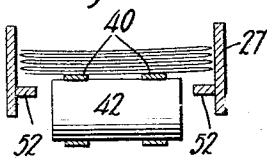


Fig. 4.



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Patented Feb. 10, 1931

1,791,569

UNITED STATES PATENT OFFICE

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DELIVERY MECHANISM

Application filed July 15, 1926. Serial No. 122,555.

This invention relates to machines for carrying to and delivering folded strips of paper at a desired station, and particularly to means for packing the same in pads of a predetermined number of folds and guiding the same to a delivery trough in which the same are automatically carried to the station where they may be manually or automatically taken from the machine.

A principal object of my invention is to guide the folded strips to a trough, compressing each pad thereof into a compact form in its travel to said trough.

Another object of my invention is to carry the folded pads in said trough to a position where they may be discharged from the machine.

Another object of my invention is to maintain the pads in proper alignment while being passed through the guiding mechanism.

Other objects will be apparent from reading this specification taken in connection with the accompanying drawings, in which:

Fig. 1 is an end view of my machine showing the trough in cross section;

Fig. 2 is a vertical, central, longitudinal section, looking toward the left of Fig. 1;

Fig. 3 is a side view of a slightly modified form of my machine embodying the transmission mechanism; and

Fig. 4 is a transverse cross section of the trough and carrier belts.

Referring now in detail to the drawings, in which similar characters refer to similar parts throughout, 5 represents the frame of the machine in which the drums 6 and 7 are mounted to rotate with the shafts 8 and 9 respectively, journaled in the frame 5 of the machine. These drums are provided with alternate tucker blades 10 and slots 11, the drums being geared so that the blades of one drum will register with the slots of the other drum and the blades of the latter drum will register with the slots of the former drum, in the rotation of said drums. Associated with each slot 11 is a spring pressed gripper 12 adapted to be rocked on the rod 13.

Beneath the drum assembly just described is a lowering assembly in which is shown a pair of coacting revolvable supports 15 and 16 mounted in parallel in the frame 17 and the cross bar 18, and provided with bevelled gears 19 and 20 at their lower ends. Adjustment collars 21 and 22 are provided for the vertical adjustment of these supports 15 and 16. Splined on these supports and adapted to revolve therewith are platform supports 23 and 24 on which are mounted the helical platforms 25 and 26. The pitch of such platforms is gradually lessened as they descend. These platforms are positively mounted on their respective supports so that the corresponding parts thereof will always be in alignment with each other.

A guide frame is mounted in the trough 27, having the upright rails 28, the cross piece 29 and the side pieces 30. This frame is sufficiently inclined to cause the pads, as they pass through the lowering mechanism, to rest against the rails 28 of the back of the frame and be confined sidewise by the supports 23 and 24, thus maintaining proper alignment of the pads on their way to the trough 27. The platform supports are also slightly inclined to compensate for the inclination of the platforms 25 and 26 due to their pitch, which inclination is sufficient to cause the pads falling thereon to naturally assume a position against the back rails 28.

On the shaft 8 is a sprocket wheel 31 rotatable with said shaft. Adapted to be driven by said sprocket wheel is the chain 32 which passes over the sprocket wheel 33 keyed to the shaft 34 at the other end of which is mounted the bevelled gear 35 to rotate therewith. This gear 35 is in mesh with the bevelled gear 36 on the shaft 37 which is adapted to rotate the same. Keyed to the shaft 37 are the bevelled gears 38 and 39 which are in mesh with the respective gears 19 and 20 adapted to rotate the helical platforms 25 and 26.

In the trough 27 are carrier belts 40 supported by the rolls 41 and 42 which are rotatably mounted. The roll 41 is provided with the ratchet wheel 43 integral therewith which is adapted to be operated in one direction only by the pawl 44 which is held against the teeth of the said ratchet wheel by the spring 45 anchored in the stud 46 at one

end and the lug 47 of the ratchet arm 48 at the other end. A pair of fingers 49, only one of which is shown, form a fork on the pawl arm 48, between which the sprocket wheel 43 travels, thereby maintaining the pawl 44 in vertical alignment with the said sprocket wheel. The pawl arm 48 is eccentrically mounted in the hub 50 associated with the sprocket wheel 33, and is given a reciprocating motion upon the rotation of said hub, imparting the same to the pawl 44, which is in permanent cooperation with the ratchet wheel 43, the result being that the carrier belts mounted on said rolls 41 and 42 are subjected to intermittent motion when the machine is in operation.

In operation a plurality of paper strips 51 is fed between the drums 6 and 7, and in passing between the same, one of the tucker blades 10 of the drum 6 engages the strips and forces them into one of the slots 11 of the drum 7, where the same are held by the spring pressed gripper 12 until released. Releasing mechanism is provided for positively moving back the gripper 12 at the proper position in its rotation with the drum, but the said release mechanism is not shown, as it does not form any part of the present invention, and such release mechanisms are well known in the art. In the further travel of said strips 51 between said drums the successive tucker blade 10 of the drum 6 engages the strips and presses the fold made thereby into the successive slot 11 of the drum 7 where the same are engaged by the spring pressed gripper 12 of the drum 7. In further travel between the said drums the paper strips are successively folded first in one direction then in the opposite direction, resulting in a fan-form fold thereof below the drums.

Upon the grippers 12 in the slots 11 releasing their hold upon the strips 51, the same fall by gravity upon the platforms 25 and 26 which revolve toward each other so as to give their contents a downward movement maintaining the same in a substantially horizontal position. During each complete revolution of these platforms, several folds of paper are superimposed on each other on said platforms, the number depending upon the relative speed of the drums and platforms, which is adapted by selection of suitable gearing to the stiffness and weight of the paper, and the number of strips which are fed into the machine at one time. Other conditions such as change of pitch of the platforms, may prevail which will also affect the number of folds to be fed to the platforms during each complete revolution thereof. In the present showing, four return or double folds are illustrated which constitutes the pad just fed to the lowering mechanism (Fig. 1). Upon the further rotation of the platforms the first fold of the next pad will fall directly onto the platforms and the subsequent folds will be superimposed thereon until that pad is complete, when the next pad will be started on the further rotation of said platforms. As the pads are lowered in this mechanism they are pressed closer together by reason of the decreasing pitch of the respective platforms as the same descend. Between the lowest planes of these platforms the pad is just being subjected to the third revolutionary treatment of the platforms, and below the lowest plane of the platform screws is shown in dotted lines a pad in compressed condition, the said pad having been dropped into the trough 27, where it is shown in full lines.

The strips of paper now having been fed to and folded between the drums and lowered and compressed into pads through the lowering mechanism, have found their way by gravity from the lowering mechanism into the trough 27. This trough is provided with carrier belts 40 running longitudinally of the trough adjacent its floor 52 which latter acts as a support for the belts to limit the sagging thereof when loaded with pads. These belts are adapted to intermittent movement, and carry with them the pads 53 which have fallen thereon from the lowering mechanism. At the end of their journey on the belts the pads may be manually or automatically taken from the machine.

For the purpose of operating the machine, the shaft 8 is rotated from a suitable source of power, not shown, and when it is rotated, the sprocket wheel 31 is rotated therewith carrying the chain 32 and passing over and rotating the sprocket wheel 33, keyed to the shaft 34, which revolves the bevelled gear 35 which is in mesh with and revolves the bevelled gear 36.

This latter gear, in turn, revolves the shaft 37 to which it is keyed. On the shaft 37 and adapted to rotate therewith are bevelled gears 38 and 39 which are respectively in mesh with the bevelled gears 19 and 20 on the respective supports 15 and 16, which they rotate. On these latter supports the platform supports 23 and 24 are splined and are adapted to rotate with the supports 15 and 16, and the helical platforms 25 and 26 are revolved with the said platform supports 23 and 24. It is apparent that the platform supports on the supports 15 and 16 may be readily removed therefrom and replaced by supports having different pitches of helical platform when desired.

The pawl arm 48 being eccentrically mounted on the hub 50 is given a reciprocating movement and the pawl 44 of said pawl arm being pressed against the teeth of the ratchet wheel 43 by the spring 45, engages and rotates said ratchet wheel only on the downward movement of said pawl arm, thus imparting to the roll 41 which is controlled by the ratchet wheel 43 an intermittent move-

ment, which in turn is imparted to the carrier belts 40.

It will be understood that the pad lowering helices 25 and 26 may be used as illustrated in Figures 1 and 2, without the conveyor belts 40. In this case the operator may reach into the machine, after the deposit of a predetermined number of pads in the trough 27, and sever the deposited pads by a pair of scissors from the strips at the fold 60. When, however, the superposed strips 51 are some distance from the end of the machine it is inconvenient to reach into the machine to the deposited pads and accordingly the conveyor mechanism including the belts 40 may be used to carry the pads to a more convenient position for removal.

It will also be understood that another or second set of strips 51 may be fed into the machine adjacent to the set shown and that the second set may be lowered after folding by another set of helices which may be slanted in the opposite direction to those shown in Figure 3. They may be geared to the shaft 34 in a similar manner. The gears 38 and 39 of the second set of helices may engage the gears 19 and 20 on the opposite sides to those shown in Figure 1 so as to rotate the helices in opposite directions to the ones indicated. With this arrangement the pads delivered by the second set of helices may be fed out at the opposite end of the machine. To bring this about there may be located close to the roller 42 similar guide rollers and the belts 40 may be crossed between said guide rollers and extend to the other end of the machine. Thus the lower reach of each belt 40 of one set becomes the upper reach of the other set and consequently the upper reaches of the belts feed in opposite directions in the two sets to deliver the pads at the opposite end of the machine.

It will further be understood that each pad lowering device consists of an inclined platform which for convenience extends around a spindle to form a helix, which platforms cooperate with suitable guides to deposit the pads in a suitable trough or receptacle.

I have described what I believe to be the best embodiment of my invention. I do not wish to be confined, however, to the embodiment so described and illustrated, but what I desire to cover by Letters Patent is set forth in the appended claims.

What I claim as new is:

1. In a crease pressing mechanism, a pair of aligned platforms each comprising a hub portion and a helical portion, the convolutions of said helical portion being flat and continuous and extending outwardly from said hub portion and being of progressively diminishing pitch.

2. In a crease pressing mechanism, a pair of helical platforms, each comprising a hub portion and a continuous helical portion attached throughout its length to said hub portion and of progressively diminishing pitch, and parallel rotatable supports for said platforms.

3. In a crease pressing mechanism, a pair of unbroken platforms comprising helices of progressively varying pitch, means for rotating said platforms, and means for opposing lateral thrust thereof.

4. In a crease pressing mechanism, a platform comprising a hub portion and an unbroken, substantially unyielding helical portion of progressively diminishing pitch, each convolution of said helical portion contacting with said hub portion.

5. In sheet delivery mechanism, a platform comprising a hub portion and a helical portion of progressively varying pitch and integral throughout its length with said hub portion.

6. In a crease pressing mechanism, a pair of helical platforms in alignment with each other, a pair of rotatable supports for said platforms, each of said platforms comprising a hub portion and an unbroken helical portion of progressively diminishing pitch, said helical portion contacting throughout its length with said hub portion.

7. In a crease pressing and delivery mechanism, pressing and lowering means including a pair of continuous, helical, aligned platforms of progressively diminishing pitch, rotatable supports for said platforms, said platforms being adapted to rotate with said supports, guiding means for maintaining material in said pressing and lowering means in substantial alignment and conveying means for discharging such material.

8. In a crease pressing and delivery mechanism, a pair of helical aligned platforms of progressively diminishing pitch, a pair of rotatable supports for said platforms, said platforms having unbroken crease pressing surfaces and being adapted to rotate with said supports, guiding means for maintaining material between said supports in substantial alignment and conveying means for discharging such material.

9. In a crease pressing mechanism, a pair of continuous, substantially rigid, helical pressing platforms in alignment with each other and of progressively diminishing pitch, supports individual to the platforms, rotary supports for the platform supports, and means forming driving connections between the platform supports and the rotary supports, but leaving the platform supports free to be moved axially relative to the rotary supports, and to be thereby separated from the rotary supports at will.

10. In sheet delivery mechanism, means for preliminarily creasing a sheet and means comprising a pair of helical platforms of progressively diminishing pitch, the adjacent threads of which form opposed, continuous

pressing surfaces, for conveying said sheet and for wiping the same throughout its width in order to effect a fold along the line of such crease.

11. In a fan-folding mechanism, a pair of coacting rolls, means for rotating the rolls in opposite directions, means carried by the rolls for forming alternate right-hand and left-hand creases in a sheet, an ironing device for said right-hand creases and an ironing device for said left-hand creases, and means for causing said rolls in their rotation to act alternately to deliver such creased portions alternately to said ironing devices.

12. In a fan-folding mechanism, a pair of coacting rolls, means for rotating the rolls in opposite directions, means carried by the rolls for forming oppositely disposed creases in a sheet, a pair of rotatable right-hand and left-hand helical platforms for respectively receiving and pressing such oppositely creased portions, and means for causing said rolls to deliver such oppositely creased portions alternately to each of said platforms.

13. In delivery mechanism, a continuously rotating lowering device, comprising a pair of platforms each provided with a hub portion and a helical portion of progressively varying pitch integral throughout its length with said hub portion, a receiving trough therefor, a carrier belt adapted to pass through said trough, rolls over which said carrier belt is adapted to travel, one of said rolls being a driving roll, and means for intermittently energizing said driving roll, and thereby transmitting intermittent motion to said belt, comprising a ratchet wheel integral with said driving roll, a reciprocably moving pawl adapted to engage said ratchet wheel when moved in one direction, means for holding said pawl on said ratchet wheel, and a fork carried by said pawl adapted to straddle said ratchet wheel and maintain the pawl in vertical position.

In testimony whereof I have affixed my signature to this specification.

ABRAHAM NOVICK.