

L. E. LA BOMBARD AND M. H. SIDEBOTHAM.
STACKER.

APPLICATION FILED APR. 6, 1921.

1,434,014.

Patented Oct. 31, 1922.

2 SHEETS—SHEET 1.

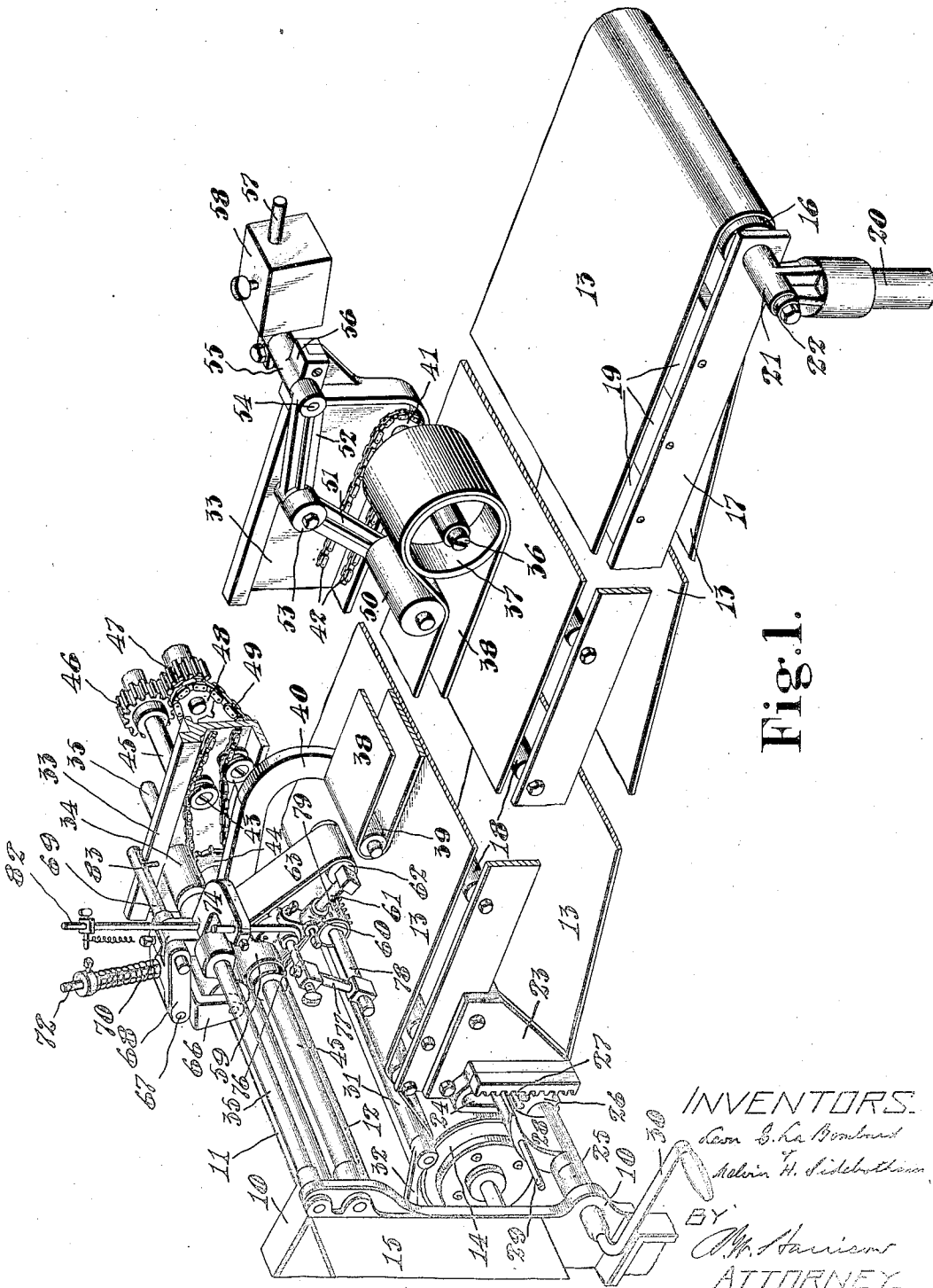


Fig. 1.

INVENTORS.

Leon E. La Bombard
M. H. Sidebotham

BY

W. H. Harris
ATTORNEY

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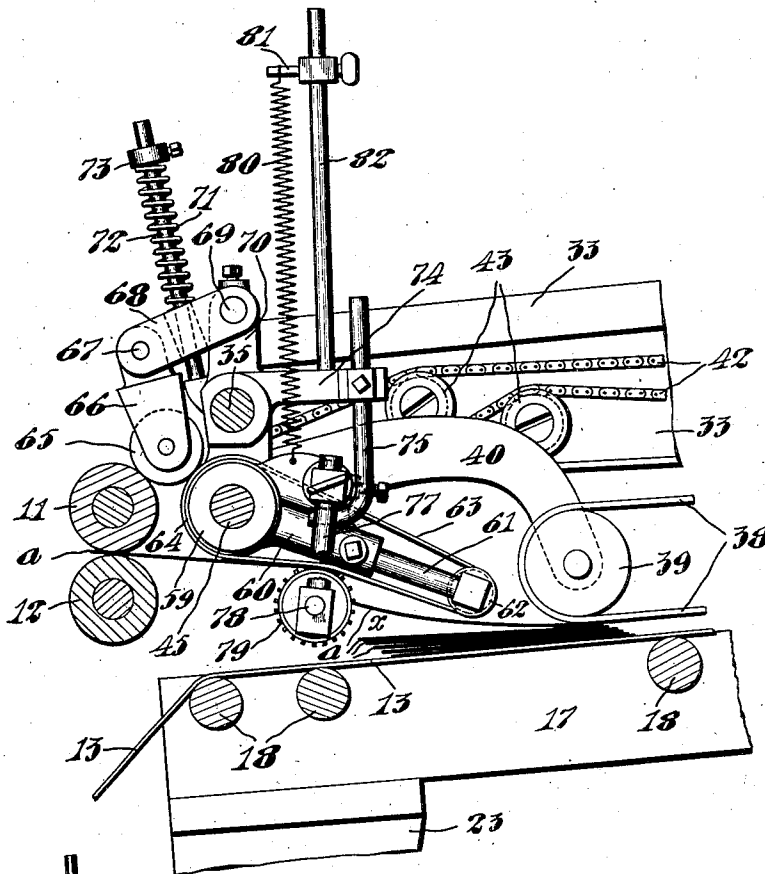


Fig. 2.

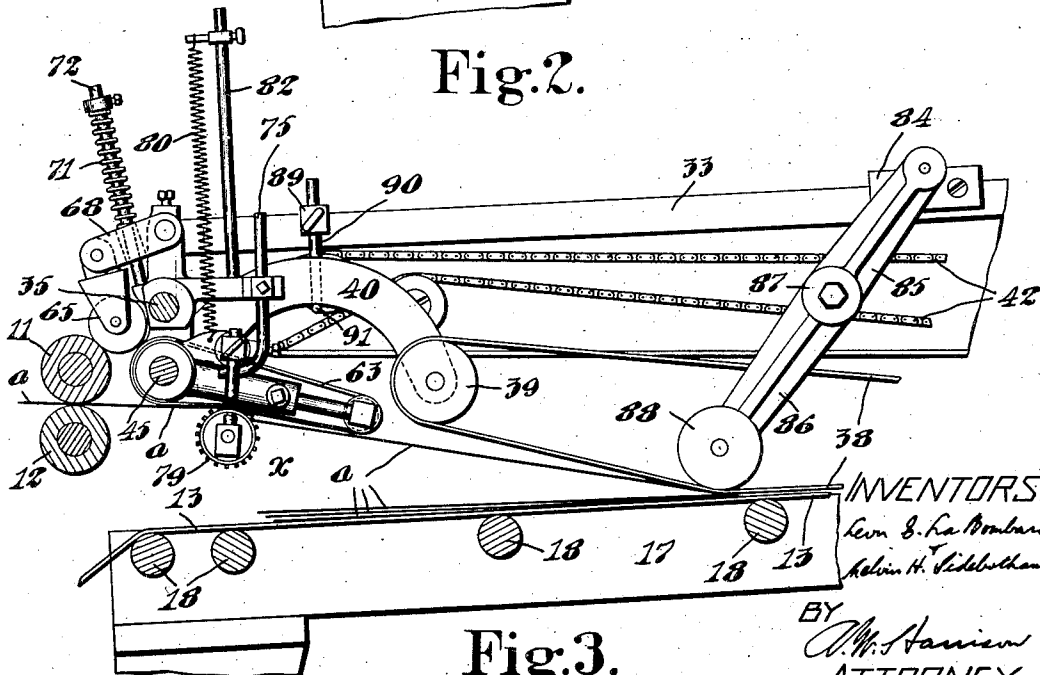


Fig. 3.

INVENTORS:
Lew E. La Bombard
M. H. Sidebotham

BY
W. H. Harrison
ATTORNEY.

UNITED STATES PATENT OFFICE.

LEON E. LA BOMBARD AND MELVIN H. SIDEBOTHAM, OF CHELSEA, MASSACHUSETTS,
ASSIGNORS TO SPECIALTY AUTOMATIC MACHINE COMPANY, OF CHELSEA, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

STACKER.

Application filed April 3, 1921. Serial No. 459,124.

To all whom it may concern:

Be it known that we, LEON E. LA BOMBARD and MELVIN H. SIDEBOTHAM, citizens of the United States, and residents of Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Stackers, of which the following is a specification.

This invention relates to machines or devices for assembling articles in a row and has particular reference to mechanism known as stackers, employed for grouping and holding flat paper or pasteboard boxes issuing from a machine which converts flat blanks into folded boxes. Such a machine is illustrated in Letters Patent No. 1,346,899, granted July 20, 1920 to Leon E. La Bombard, and another type of folding machine is illustrated in our application filed July 2, 1921, Serial No. 482,034.

In stacker mechanism of the general type illustrated in the patent referred to, the folded blanks issue from the machine which folds them, onto a slowly moving receiving belt, the folded blanks passing through a throat between said receiving belt and an upper relatively inclined belt and accumulating in overlapped condition and then passing under a pressing belt which holds the row of overlapping blanks under pressure long enough for the glue to set.

One of the objects of the present invention is to provide means which will effect quick and positive movement of each folded blank to the nip of the pressing and receiving belts so as to keep the throat clear by ensuring the movement of each blank out of the way of the next following blank.

Another object is to provide means for so varying the shape and size of the throat as to enable the machine to operate properly upon blanks of widely different sizes and grades or qualities of material.

Incidental to the last stated object is the further one of providing for varying adjustments of the throat without necessitating longitudinal adjustment of the parts, thereby enabling a shorter stacker than usual to be employed, resulting in a saving of space. This is because all stackers of this general type require a certain amount of longitudinal exposed surface for attendants to gather up the articles after they leave the

presser belt. Obviously any structure which requires longitudinal adjustment of the parts above the receiving belt to provide for large sizes of blanks necessitate a long lower belt in order to furnish the exposed surface mentioned.

With the above and other minor objects in view, the present invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings:

Figure 1 is a broken out perspective view of so much of our improved stacker as is necessary to an understanding of the same, it being understood that parts at the rear which would merely duplicate parts illustrated are omitted.

Figure 2 is a detail sectional elevation.

Figure 3 is a similar view illustrating an adjustment when larger blanks are being operated upon.

In Figure 1 a portion of the frame of a box folding machine is indicated at 10. In each of Figures 1, 2 and 3 the rolls which deliver the folded blanks *a* to the stacker are shown at 11, 12.

The travelling platform or receiving belt 13, toward which the blanks are delivered by the rolls 11, 12, is mounted at one end on, and is driven by, a drum 14 (Fig. 1) which is operated at a slow speed by power through suitable gearing in a gear case 15. As such gearing is illustrated and described in the Patent 1,346,899, no detailed reference thereto is necessary herein.

The shaft of the outer roll 16 for the belt 13 is mounted in bearings provided therefor in the outer end of a frame 17 having belt supporting rolls 18 and a flat support such as a series of boards 19. The outer end of the frame 17 is pivotally supported at a fixed height, as by a pair of legs a portion of which is shown at 20, said leg having a sleeve 21 enclosing a pivot pin or stud 22 projecting from the frame. The inner end of the frame, the end nearest the drum 14, is vertically adjustable as by mechanism shown in Fig. 1, 23 being a bracket secured to the frame. The bracket has a vertical slot 24 through which a shaft 25 extends, said shaft carrying a pinion 26 engaging a rack 27 carried by the bracket. A detent

pawl 28 loosely mounted on the shaft 25 and having a handle pin 29 is adapted to engage the rack 27. It is to be understood that, in practice, there is a duplicate of the 5 slotted bracket, rack, and pinion at the other side of the frame. Then, when the shaft 25 is rotated, as by means of a wrench or crank handle 30, the inner end of the frame 17 is adjusted to a higher or lower position and 10 held in such position by the pawls one of which is shown at 28. Such adjustment varies the height or vertical width of the throat x as indicated by comparing Figures 2 and 3. To maintain the belt 13 at proper 15 tension under all adjustments of the frame 17, suitable tensioning means are employed such as a gravity roll 31 (Fig. 1) carried by pivoted arms one of which is shown at 32.

The upper or pressing belt 38, under some 20 adjustments, presents a part of the upper wall of the throat x , as indicated in Figure 3. To facilitate the attaining of this result, a hinged frame bar 33 is employed, said bar having a hub 34 mounted on a 25 pivot rod or shaft 35. In practice the rod 35 is screw-threaded and the hub 34 is internally threaded so that by rotating the rod the lateral position of the frame bar 33 may be adjusted. For present purposes it 30 may be assumed that the bar 33 is laterally positioned by sliding the hub 34 along the rod 35.

Mounted on a stud or axle 36 projecting from one side of the frame bar 33 near its 35 outer end is a pulley or driving drum 37 on which the outer end of the belt 38 is mounted, the inner end of the belt being mounted on a roll or wide pulley 39 idly mounted on a pin projecting from an arm 40 40 which is free to rise and fall as presently explained. A sprocket 41 operatively connected with the pulley or driving drum 37 is driven by a chain 42 passing over idle guide rolls 43 carried by the frame bar 33. The 45 chain is driven by a sprocket 44 carried by a shaft 45 on which the arm 40 is pivotally supported so that said arm is free to gravitate toward the lower belt 13. The shaft 45 has a gear 46 meshing with a gear 47 50 the latter having a sprocket 48 driven by a chain 49 from any suitable part of the machine such as a small sprocket connected with the shaft of drum 14. For present purposes it is sufficient to state that the belt 55 38 is driven, through the gearing referred to, at the same slow speed as the belt 13.

Owing to the fact that the pressing belt 38 is driven in the manner described, the lower or acting stretch of said belt is kept 60 taut and therefore ensures even and uniform pressure on the blanks.

To keep the belt 38 under proper tension we employ a tightener roll 50 carried by an adjustable arm consisting of two sections 65 51, 52, having a clamp joint 53, the section

52 being carried by a rock shaft or pivot 54 mounted in a bearing 55 provided in a slide 56 adjustably secured at the proper distance along the frame bar 33 by any suitable means such as a screw. Adjustably 70 mounted on an arm 57 of the rock shaft 54 is a counterbalancing weight 58. The distance of the tightener roll 50 from the belt pulley 37 is varied by changing the angular relationship of the sections 51, 52, and the 75 degree of pressure of said roll on the belt is varied by shifting the weight 58 along the arm 57.

We will now describe the mechanism for locating the folded blanks a successively 80 in the throat x . The hub 59 of an arm 60 is freely mounted on the shaft 45 and has a longitudinally adjustable extension 61 carrying a roll 62. A belt 63 is mounted 85 on said roll 62 and on a roll 64 which is freely mounted on the shaft 45 between the hubs or arms 60 and 40. Therefore the belt 63 is not positively driven by any toothed gearing. It is frictionally driven by a roll 90 65 which bears on a portion of the belt running on the roll 64, and also bears on the upper delivery roll 11. The belt 63 is therefore frictionally driven at approximately the same relatively high speed as that of the 95 travel of the blanks while being delivered from the folding machine.

The friction roll 65 is carried by a yoke 66 pivotally connected at 67 to a link 68 which, in turn, is pivotally supported on a rod 69 100 mounted in a casting 70. The casting 70 is slidably mounted on both of the members 35, 45 so as to be laterally adjustable thereon. A spring 71 coiled around a guide pin 72 rising from the casting through a hole in the link 70 is confined between an adjustable 105 collar 73 and the top of the link and serves to cause the roll 65 to bear with sufficient pressure on the roll 11 and belt 63 to effect proper frictional drive of the belt.

Since the arm 60, 61, is mounted freely on 110 the shaft 45 it is desirable to adjustably limit its downward movement. This, in the machine illustrated, is provided for by a hook stop 75 the vertical portion of which is adjustable in an arm 74 of the casting 115 70. The lower end of said stop hooks under a pin 76 (Fig. 1) projecting from the side of the arm 60.

Adjustably mounted on the pin 76 is a short rod 77 to the lower end of which is 120 secured a stud shaft 78 on which is freely mounted a roll 79 having a multiplicity of rows of small pins. The roll 79, being freely mounted, is rotated by the blanks carried over it by the belt 63. This roll forms an 125 important feature of our invention as will presently be explained. Preferably the roll, or at least its pins, is of non-metallic material such as rubber, to avoid indenting the rear edges of the folded blanks. The roll 130

is so mounted as to contact with the under side of the lower stretch of the belt 63 the pressure of which on the roll is yieldingly counterbalanced by a spring 80 connected at its lower end to the arm 60 and at its upper end to a pin 81 projecting from a collar vertically adjustable on a rod 82 rising from the arm 74 of the casting 70.

In order that all of the parts just described may be laterally adjusted with the bar 33, the rod 69 (Fig. 1) has a connection at 83 with said bar.

When the parts so far described are adjusted as illustrated in Figures 1 and 2, and the machine is in operation, the folded blanks *a* follow each other in rapid succession between the rolls 11, 12 and pass between the belt 63 and the pin roll 79. As stated, said belt and roll will move at practically the same speed as the blanks. The front edge of each blank is deflected down by the belt 63 onto the belt 13 or onto the preceding blank. The adjustable support for the pin roll consisting of the members 76, 77, 78 (Fig. 1) enables said roll to be set at the proper distance from the belt roll 39 to act properly upon the blanks so that, when the front edge of each blank reaches the nip of belt 38 the blank will be quickly pushed to overlapping position. In other words, when the front edge of a folded blank or box *a* reaches the belt 38 which is moving slowly, the rear edge of that blank is engaged by some of the pins of the roll 79 and the front edge of the blank is tucked snugly under the belt 38 and the rear edge is so acted upon that the blank is slightly bent and "snapped" down onto the belt 13 or onto a preceding blank. In this manner the rear edge of each blank is quickly shifted out of the way of the one rapidly approaching behind it. The described adjustable mounting of the pin roll enables the latter to be set to properly act on supplies of blanks differing in length. Sometimes however it is desirable to adjust for blanks of considerably greater length, in which case the size of the throat *x* should be considerably increased. For this purpose the machine is equipped with two other elements which may be either on the machine in displaced position or entirely removed when not needed for use. These elements are shown in Figure 3 and omitted from Figures 1 and 2 to avoid confusion. One of said elements consists of a slide 84 adjustably secured to the bar 33 as by a screw, a jointed arm pivotally connected to said slide and consisting of two sections 85, 86, connected by a clamp joint 87, and having a roll 88 to bear on and deflect the lower stretch of the belt 38. The other element consists of a block 89 adjustably clamped on the bar 33, and a rod 90 having a hook 91, the rod being vertically adjustable in the block 89. By engaging the hook 91 with

the under side of the arm 40 the belt roll 39 can be held at any required point of elevation, and by means of the roll 88, the stretch of the belt 38 between rolls 39, 88, can be caused to travel in such position of inclination as to provide a throat *x* for blanks of much greater length than when the machine is adjusted as in Fig. 2. The operation of the machine is the same when adjusted as in Figure 3, as above described in connection with Figure 2, but much longer blanks can be operated upon. Since no longitudinal adjustment of the belt 38 is ever required there is always ample space on the belt 13 beyond the belt 38 for the attendant to gather up the blanks the glue laps of which have become permanent.

An important feature of our machine is that, under all adjustments, some portion of the pressure belt 38 itself always coacts with the belt 13 in providing the nip end of the throat *x*.

An especial advantage of providing for varying the inclination of the receiving belt, the outer end remaining at a uniform height while the inner end is adjustable toward and from the point where the blanks issue from the delivering rolls 11, 12, is that it facilitates the securing of a proper tapering shape of the throat *x* especially when the machine is used as illustrated in Figure 3.

The weight of the frame arm 33 and parts carried thereby is sufficient to cause the belt 38 to bear on the row of overlapped folded blanks with sufficient pressure to hold the glued laps of the blanks in firm contact while the glue is setting.

Having now described our invention, we claim:

1. Mechanism of the character described, comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, a pressing belt mounted to cause a portion of it to coact with the receiving belt in forming the nip end of a throat traversed by the blanks, and means for adjusting the pressing belt to vary the length of said throat without changing the longitudinal position of the pressing belt.

2. Mechanism of the character described comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, a pressing belt pivotally mounted to gravitate toward the receiving belt, and a positively driven pulley for the outer end of the pressing belt to keep the acting stretch of said belt taut.

3. Mechanism of the character described, comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, means for exerting pressure on said belt, and means for vertically adjusting an inner portion of said belt.

4. Mechanism of the character described

comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, a frame for said belt, means for pivotally supporting the outer
5 end of said frame, and means for swinging the frame on its pivotal support.

5. Mechanism of the character described, comprising a frame carrying a receiving belt, means for depositing articles on the
10 belt near one end thereof, said frame being pivotally supported at its outer end, and rack and pinion mechanism for adjusting the height of the inner end of the frame.

6. Mechanism of the character described, comprising a frame carrying a receiving belt, means for depositing articles on the
15 belt near one end thereof, said frame being pivotally supported at its outer end, and having vertical slots near its inner end, a rack carried by the frame, and a shaft passing through said slots and having a pinion engaging said rack.

7. Mechanism of the character described, comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, and means for engaging the rear edge of each deposited article to urge said edge downward toward the receiving belt.

8. Mechanism of the character described, comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, and a rotary member having projections to engage the rear edge
30 of each deposited article and urge it downward toward the receiving belt.

9. Mechanism of the character described, comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, and a roll having resilient projections to engage the rear edge of each deposited article and urge it downward toward the receiving belt.

10. Mechanism of the character described comprising a receiving belt, a pressing belt mounted to gravitate toward the receiving belt, means for delivering articles onto the receiving belt, and means for variably deflecting that portion of the pressing belt at the end toward which the articles are delivered.

11. Mechanism of the character described, comprising a receiving belt, a pressing belt mounted to gravitate toward the receiving
55 belt, means for delivering articles onto the receiving belt, and an adjustable roll mounted to bear on the upper surface of the lower stretch of the pressing belt.

12. Mechanism of the character described, comprising a receiving belt, a pressing belt mounted to gravitate toward the receiving belt, means for delivering articles onto the receiving belt, a vertically adjustable roll for supporting the inner end of the pressing
60 belt, and an adjustable roll mounted to bear

on the upper surface of the lower stretch of the pressing belt.

13. Mechanism of the character described, comprising a receiving belt, means for delivering articles thereon in overlapping
70 superposed relationship, a pivoted bar projecting over the receiving belt, a pulley carried by said bar, and a pressing belt running on said pulley.

14. Mechanism of the character described, comprising a receiving belt, means for delivering articles thereon in overlapping superposed relationship, a pivoted bar projecting over the receiving belt, a pulley carried by said bar, a pressing belt running on
80 said pulley, and driving connections extending along the bar to said pulley.

15. Mechanism of the character described, comprising a receiving belt, means for delivering articles thereon in overlapping
85 superposed relationship, a laterally adjustable pivoted bar projecting over the receiving belt, a pulley carried by said bar, and a pressing belt running on said pulley.

16. Mechanism of the character described, comprising a receiving belt, means for delivering articles thereon in overlapping superposed relationship, a pivoted bar projecting over the receiving belt, a pulley carried by said bar, a pressing belt running on
95 said pulley, and a belt tightener supported by said bar.

17. Mechanism of the character described, comprising a receiving belt, means for delivering articles thereon in overlapping
100 superposed relationship, a pivoted bar projecting over the receiving belt, a pulley carried by said bar, a pressing belt running on said pulley, and a counterbalanced arm supported by said bar and having a roll bearing
105 on the upper stretch of the pressing belt.

18. In mechanism of the character described, a platform, means for advancing flat articles in a plane above said platform, a belt for deflecting the articles toward the
110 platform, and means for frictionally driving said deflecting belt.

19. In mechanism of the character described, a platform, means for advancing flat articles in a plane above said platform, a pivoted arm carrying a roll above said platform, a belt running over said roll, and means for frictionally driving the belt.

20. In mechanism of the character described, a platform, means for advancing
120 flat articles in a plane above said platform, a balanced arm carrying a roll above the platform, a belt running over said roll, means for adjustably limiting the lower position to which said arm can swing, and
125 means for frictionally driving the belt.

21. In mechanism of the character described, a platform, means for advancing flat articles in a plane above said platform, a belt for deflecting the articles toward the
130

platform, means for frictionally driving the belt, and a roll on which the lower stretch of the belt bears.

22. In mechanism of the character described, a platform, means for advancing flat articles in a plane above said platform, and a frictionally driven belt and a roll having peripheral projections, said belt and roll being located to take the advancing articles between them and deflect them toward the platform.

23. Mechanism of the character described comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, and a pressing belt, both of said belts being vertically adjustable.

24. Mechanism of the character described comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, and a pressing belt,

both of said belts being laterally adjustable as a unit.

25. Mechanism of the character described comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, a pivoted member, and a pressing belt supported by said pivoted member.

26. Mechanism of the character described comprising a receiving belt, means for depositing articles thereon in overlapping superposed relationship, a pivoted member having a pulley, a pressing belt mounted at one end on said pulley, and driving connections extending from the pivoted end of said member to the pulley.

In testimony whereof we have affixed our signatures.

LEON E. LA BOMBARD.
MELVIN H. SIDEBOTHAM.