

Nov. 22, 1949

C. S. MALOTT, JR
STACKING MECHANISM

2,488,675

Filed March 20, 1948

2 Sheets-Sheet 1

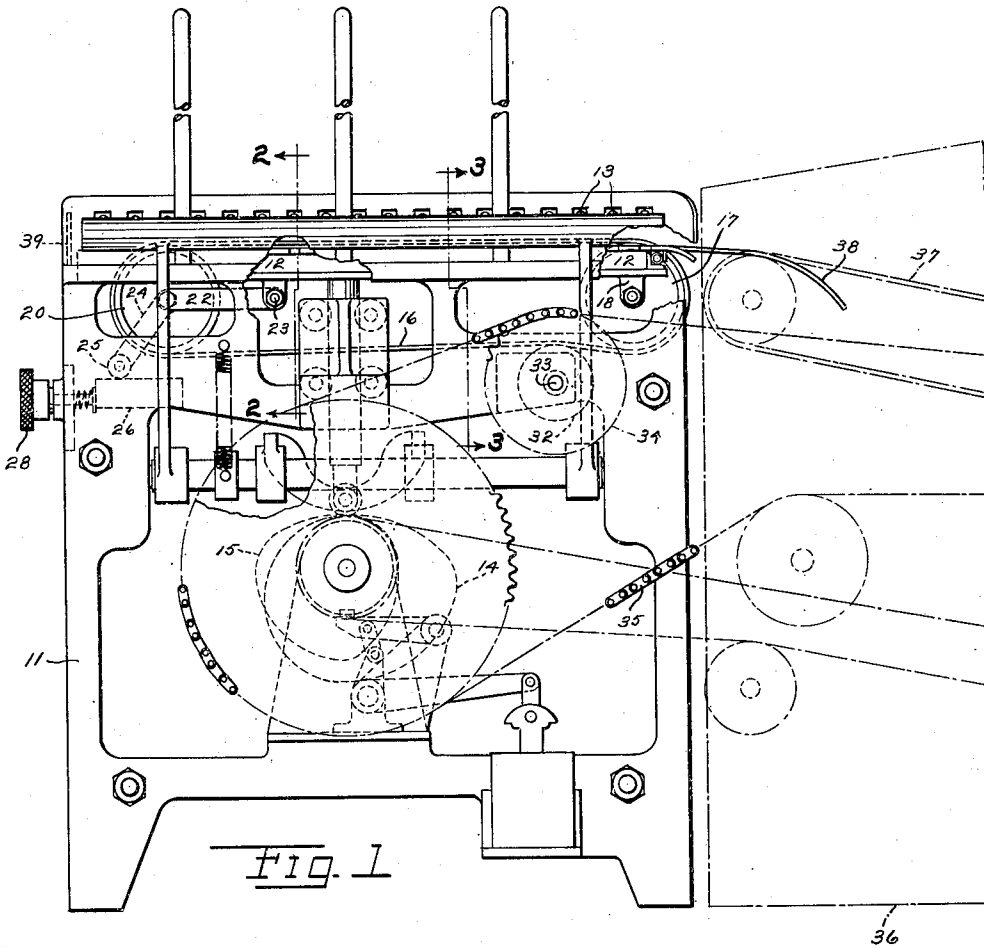


Fig. 1

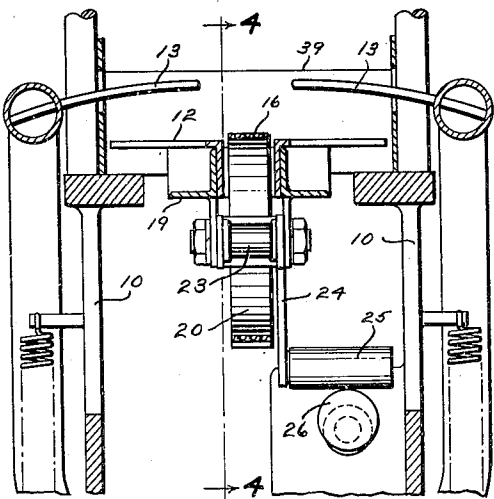


Fig. 2

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2 Sheets-Sheet 2

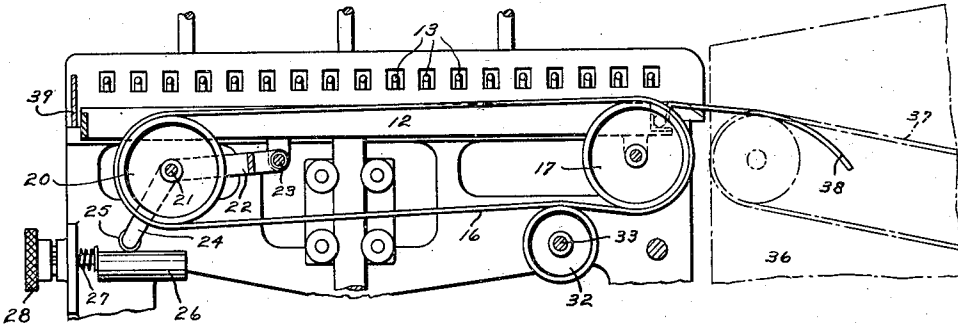


FIG. 4

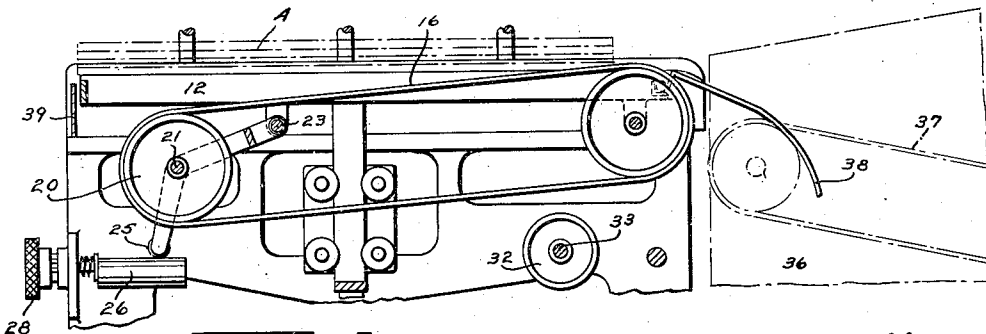


FIG. 5

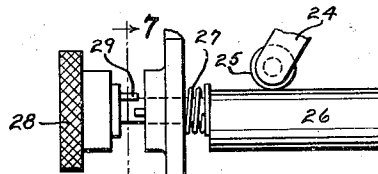


FIG. 6

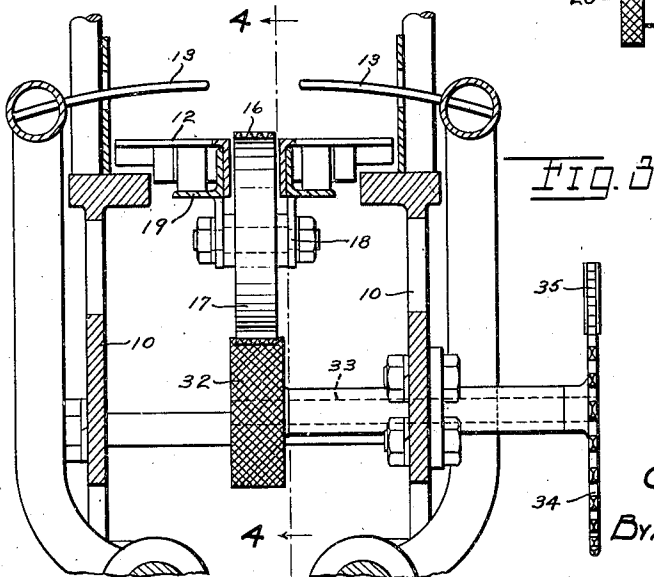


FIG. 7

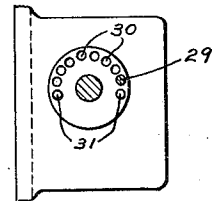


FIG. 8

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STACKING MECHANISM

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12 Claims. (Cl. 271-68)

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This invention relates to stacking mechanism, such as is used for stacking flat articles, e. g., towels, napkins or other flat articles made from textile fabrics, or paper sheets, either folded or unfolded. The invention is an improvement upon that of my prior application for Stacking device for folding machines, Serial No. 704,401, filed October 19, 1946, to which reference may be had if desirable or necessary.

One object of the invention is to provide improved stacking mechanism in which the endless belt which carries the articles into position for stacking is readily adjustable manually, at any time, while the machine is either running or stopped, to vary the final feeding impulse and thus insure that the article is fully advanced to stacking position, but without any chance of over feed which might curl over, fold back or wrinkle its leading edge where it engages the limiting stop.

Another object is to provide such adjustment to take care of variations in size, weight or texture of different articles and insure bringing them to rest accurately in the desired stacking position.

Still another object is to provide improved stacking mechanism in which the final feed belt is so arranged that upon each elevation of the stacking plate the belt drive is stopped and the belt comes to rest, thus preventing it from rubbing against the article being stacked or the bottom front edge of the stack of articles to which it is being supplied.

Another object is to provide an improved stacking machine in which the pulleys for supporting and driving the final feed belt are all mounted in the stacker itself, so that it is entirely independent of the folding machine and may be handled as a distinct unit.

Another object is to provide an improved stacker in which the final feed belt travels over two pulleys, one near to and the other considerably in advance of the limiting stop, said pulleys being so arranged that the upper stretch of the belt, effective to feed the article, is inclined downwardly or slopes toward the stop, and the belt is adjustable to vary the length of its operating portion effective to feed the articles, for purposes later described.

Further objects of the invention in part are obvious and in part will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention,

Fig. 1 is a side elevation, partly broken out

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and in section, showing the conveyor or feed belt in operating position;

Fig. 2 is a detail sectional elevation, on a larger scale, on the line 2-2, Fig. 1;

Fig. 3 is a similar sectional elevation on the line 3-3, Fig. 1;

Fig. 4 is a sectional elevation on the line 4-4, Figs. 2 and 3;

Fig. 5 is a similar section, but showing the conveyor belt and stacking plate in elevated position;

Fig. 6 is a detail view, on a larger scale, of certain adjusting mechanism; and

Fig. 7 is a section on the line 7-7, Fig. 6.

As to many of its features, the stacking machine shown in the drawings is identical with that of my prior application referred to, so that such features require but brief reference.

Between the side members 10 of the stationary frame 11 is mounted a rising and falling stacking plate 12, above which are two sets of laterally movable swinging stack supporting fingers 13. Plate 12 normally lies in its lower article receiving position shown in Figs. 1 and 2, but is elevated at intervals by a cam 14 to lift an article fed to the plate and add it to the bottom of the stack of previously fed articles. The stack being formed is supported by fingers 13, which, at corresponding intervals are swung outwardly to permit the rising stacking plate to pass, said fingers being operated by cam 15 (Fig. 1).

The endless conveyor or feed belt 16 here is wholly a part of the stacking machine, the rollers for supporting and operating it all being mounted in and made a part of the stacker. Said belt travels over front roller 17 rotatable on a shaft supported by brackets 18 carried by angle members 19 attached to stacker plate 12 (Fig. 3), so that said roller and its convolution of the belt rise and fall in unison with the stacker plate, and also travels over rear roller 20, adjustable or movable with respect to said plate. This rear roller (Figs. 4 and 5) is mounted on a shaft 21 carried by the arms of a yoke 22 pivoted at 23 between the side members of stacker plate 12, one of the yoke arms being provided with an extension 24 having a roller 25 riding on an adjustable eccentric 26. Thus the rear roller 20 is free to swing about pivot 23 with reference to the stacking plate, but rides upon the eccentric, its level being controlled by adjustment of the eccentric.

Eccentric 26 is normally held to the right (Fig. 6) by compression spring 27 but may be shifted to the left by pulling out knob 28, with which

the eccentric may be turned to vary the level of its top upon which rides roller 25. Pin 29 may enter any one of holes 30 to lock the eccentric against rotation and stop pins 31 limit rotative adjustment in either direction. Knob 28 is exposed on the outside of the machine frame and thus is readily accessible at all times.

Conveyor or feed belt 16 is driven frictionally by driving roller 32 (Fig. 3), but only when the stacking plate is in its lowermost position. This friction roller 32 is constantly driven in the clockwise direction (Fig. 1) by its attachment to a shaft 33 carrying a sprocket 34 driven by the same chain 35 which actuates cams 14, 15 and which derives its power from the folding machine 36 with which the stacker is associated. The arrangement causes travel of the belt 16 in the counterclockwise direction (Fig. 1) the gear ratios being such that linear speed of travel of belt 16 is slightly less than that of the delivery belt 37 of the folding machine, to thus provide an initial braking effect upon the article being stacked.

Bridge fingers 38 carry the articles across the gap between the belts 37 and 16, and a stop 39 limits endwise feed of the articles into stacking position.

Figs. 1 to 4 illustrate the parts in operating position ready to receive another article preparatory to adding it to the previously formed stack of articles, shown at A, Fig. 5, held or supported on fingers 13. Belt 16 is in contact with roller 32 and is being constantly rotated counterclockwise, Fig. 4, at a speed less than that in the folder.

The next folded article moves from the folder conveyor across fingers 38 to slower moving stacker belt 16, with a slight braking effect upon the article, which is now advanced to the back or end stop 39, where it stops. Now the stacker plate 12 rises, roller 25 riding forward along eccentric 26, permitting roller 20 to lag behind or below the stacker plate, but roller 17 rising with said plate. Promptly the belt 16 rises out of contact with driving roller 32, so that its drive ceases and its travel stops. Thus when the belt engages the stack above it, especially with long articles, there is no rubbing of the belt against the stack and no tendency to disarrange it.

Fingers 13 retire, the fresh article is added to the bottom of the stack, the stacking plate moves down, and all parts return to their former positions with the belt 16 again moving and ready to advance the next article.

At any time, even while the machine is operating, the stacker belt may be conveniently adjusted by manipulating eccentric 26, thus to vary the length of that portion of the upper stretch of belt 16 which is exposed above plate 12 and thus is effective to advance the articles. In general long or heavy articles require less advancing effect, their momentum assisting their advance toward the stop, while shorter, lighter or flimsier articles require more push, with a greater length of belt exposed. In the limit, the entire length may be exposed, as in Fig. 1. Inclination of the operating portion of the belt of course always is downwardly in the direction of article travel.

Further advantages of the invention will be apparent to those skilled in the art.

What I claim is:

1. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down move-

ment therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, and supporting rollers for the end convolutions of said belt, one thereof being supported by said plate for up and down movement therewith.

2. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, and supporting rollers for the end convolutions of said belt, one thereof being supported by said plate for up and down movement therewith and the other being supported by the frame.

3. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, supporting rollers for the end convolutions of said belt, one thereof being supported by said plate for up and down movement therewith and the other being supported by the frame, and means mounted on the frame for adjusting the frame supported roller vertically.

4. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, the upper article engaging stretch of the belt extending and inclined in the direction of article advance from a point above to a point below said plate, and means extending to a point outside of the machine frame for adjusting said belt to vary its inclination to the stacking plate.

5. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, a roller rotatably mounted upon the stacking plate for supporting the work receiving convolution of the belt, and a second roller mounted for swinging movement on the plate and supported on the frame for supporting the other convolution of the belt.

6. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, a roller rotatably mounted upon the stacking plate for supporting the work receiving convolution of the belt, a supporting device carried by the frame, and a second roller supported by said device and over which the other convolution of the belt travels, said device being adjustable in the frame to vary the level therein of said second roller.

7. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, a roller rotatably mounted upon the stacking plate for supporting the work receiving convolution of the belt, a supporting device carried by the frame, a second roller supported by said device and over which the other convolution of the belt travels, said device being adjustable in the frame to vary the level therein of said second roller and means extending to the outside of the frame for manually adjusting said device.

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8. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, two rollers supporting said belt, one thereof movable with said plate, and a friction driving roller beneath said belt.

9. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, two rollers supporting said belt, one thereof movable with said plate, and a friction driving roller beneath said belt located at such level that as the plate rises it carries the belt away from the driving roller and stops belt travel.

10. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, two rollers supporting said belt, one thereof movable with said plate, a friction driving roller beneath said belt located at such level that as the plate rises it carries the belt away from the driving roller and stops belt travel, and means for varying the level of one of the convolutions of said belt when the plate is in its lowermost position.

11. Stacking apparatus, comprising a frame, a

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stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, a roller rotatably mounted in the plate for supporting one convolution of said conveyor, and a yoke mounted for swinging movement upon the plate and carrying a second roller over which travels another convolution of said conveyor.

12. Stacking apparatus, comprising a frame, a stacking plate mounted for up and down movement therein, stack supporting means above said plate, an endless belt conveyor for advancing an article along said plate to stacking position, a roller rotatably mounted in the plate for supporting one convolution of said conveyor, a yoke mounted for swinging movement upon the plate and carrying a second roller over which travels another convolution of said conveyor, and an adjustable eccentric upon the frame for supporting a movable portion of said yoke.

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REFERENCES CITED

The following references are of record in the file of this patent:

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