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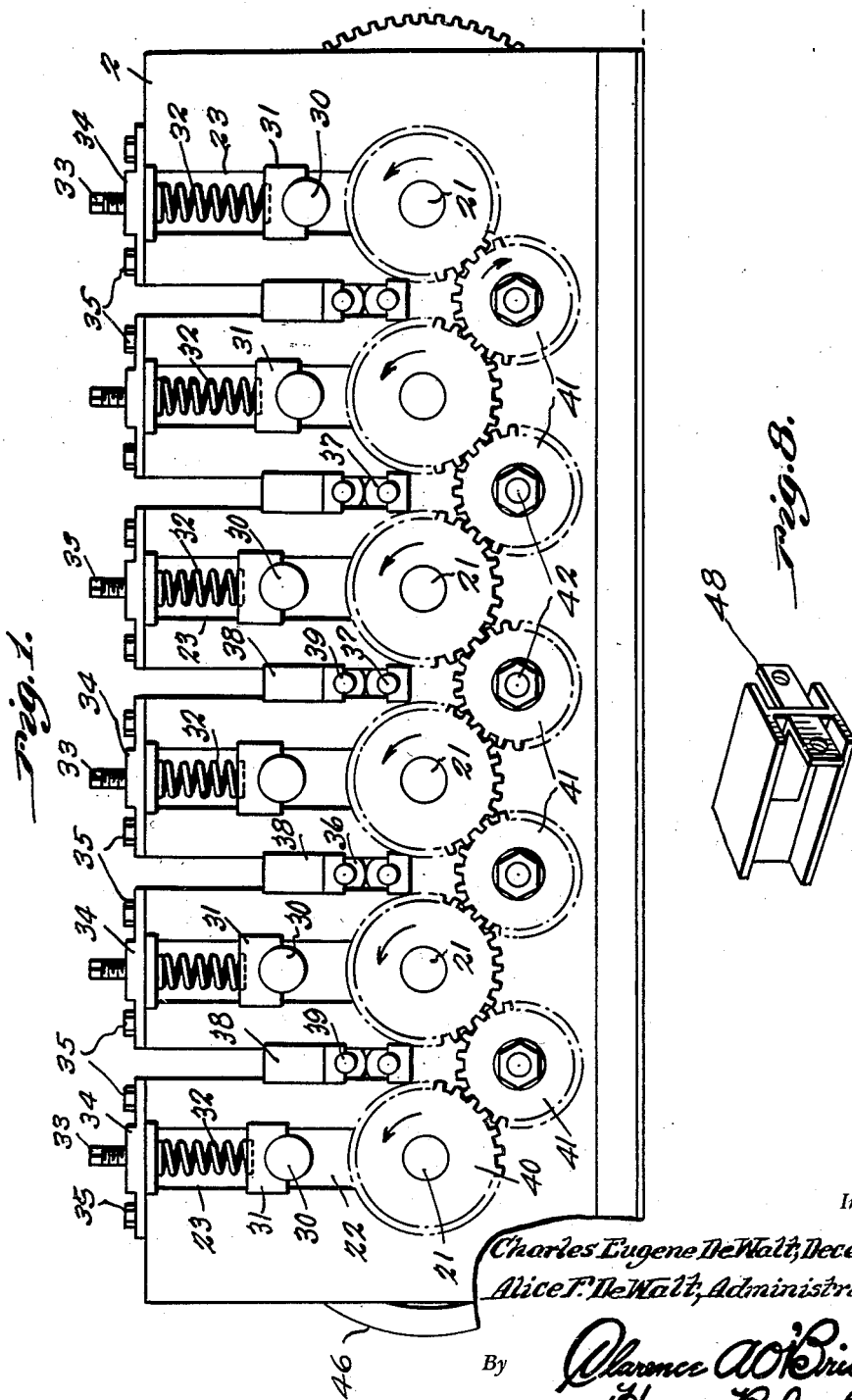
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2,364,780

SHEET PACK OPENING MECHANISM

Filed July 3, 1943

4 Sheets-Sheet 1



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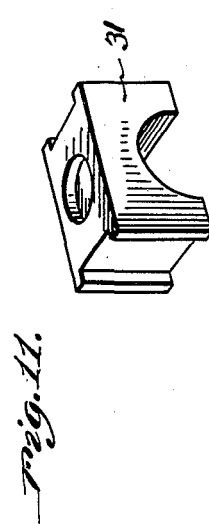
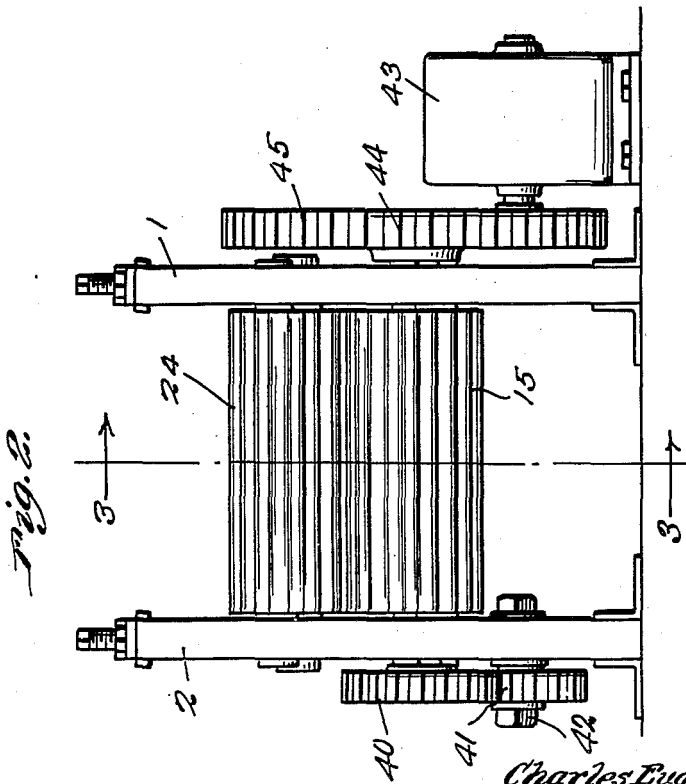
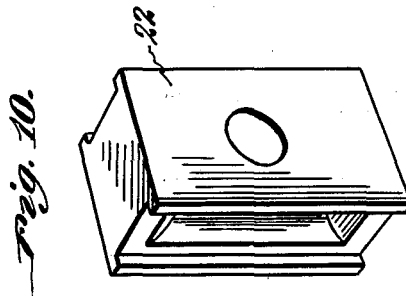
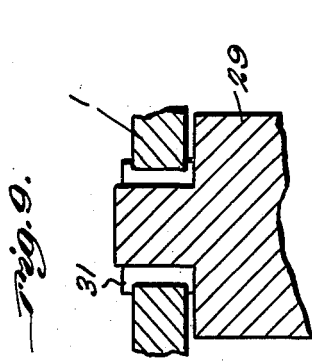
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SHEET PACK OPENING MECHANISM

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4 Sheets-Sheet 2



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SHEET PACK OPENING MECHANISM

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4 Sheets-Sheet 3

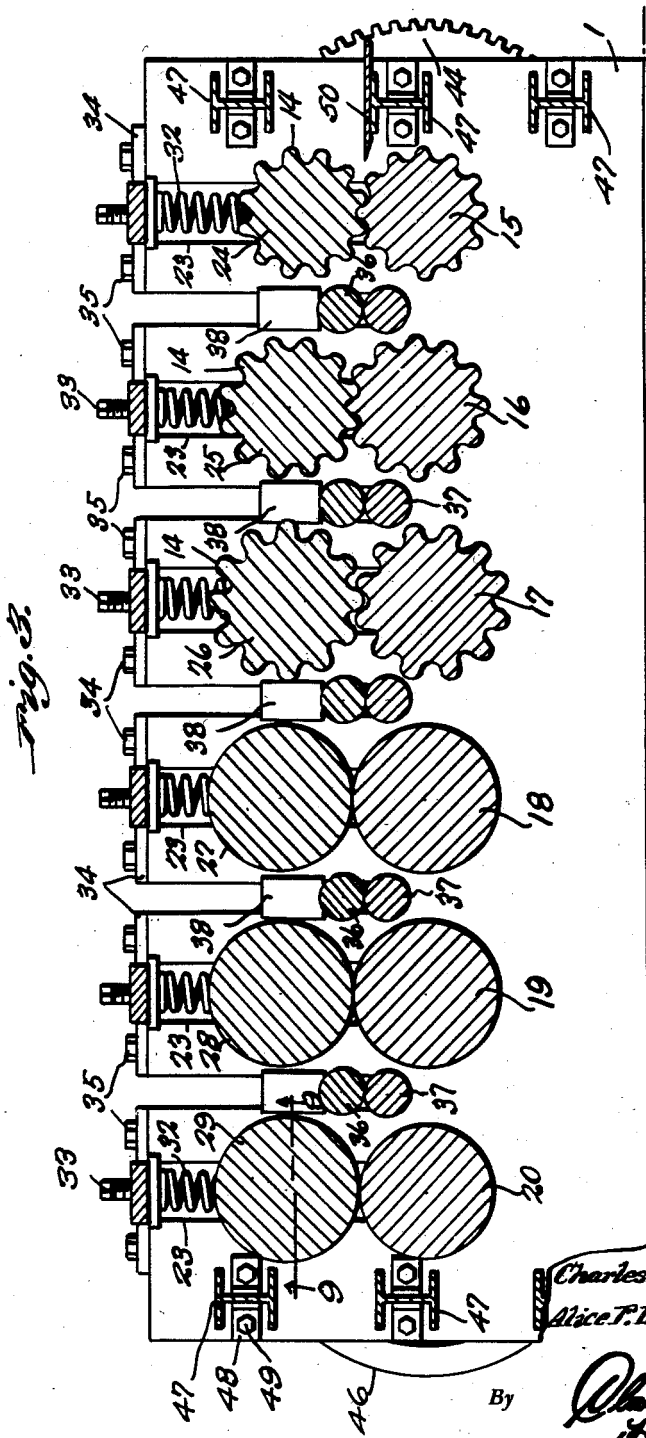


Fig. 3.

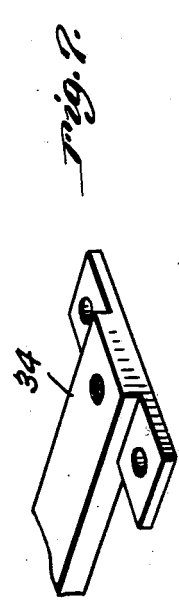


Fig. 4.

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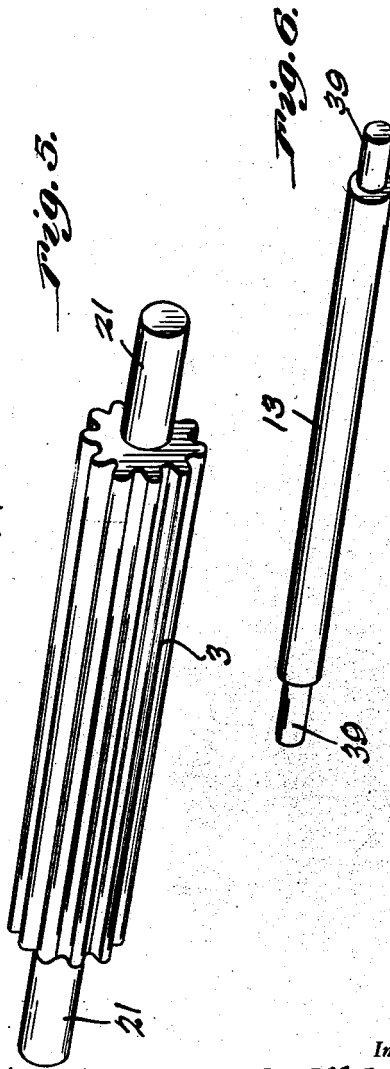
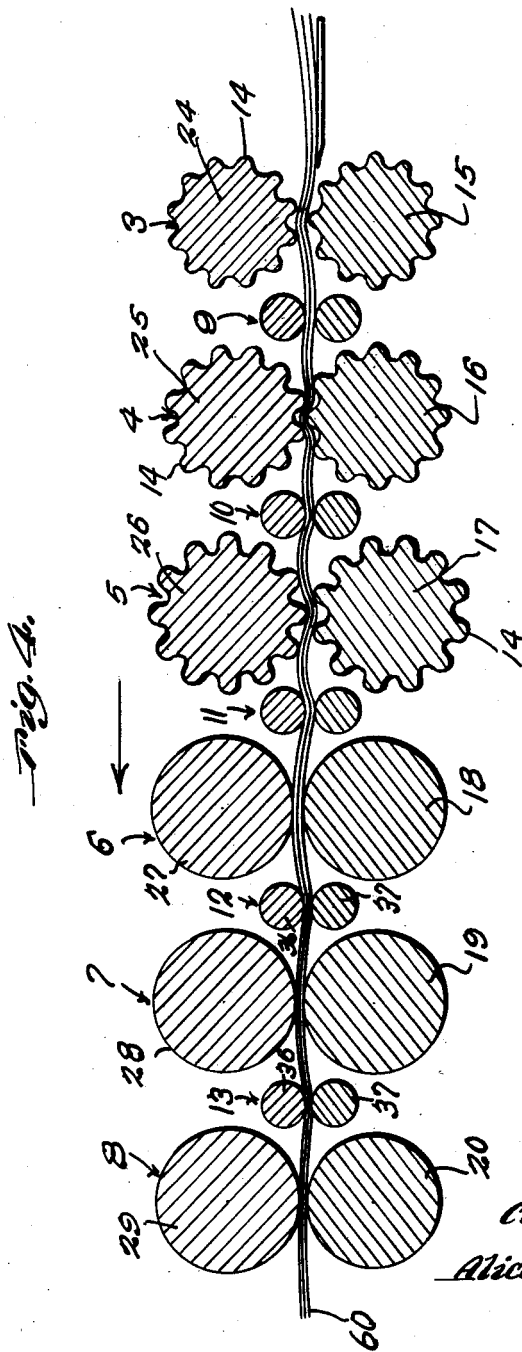
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SHEET PACK OPENING MECHANISM

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4 Sheets—Sheet 4



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# UNITED STATES PATENT OFFICE

2,364,780

## SHEET PACK OPENING MECHANISM

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Application July 3, 1943, Serial No. 493,470

3 Claims. (Cl. 29—17)

The present invention relates to improvements in mechanisms for opening sheet packs, the principal object in view being to provide a simply constructed, efficient mechanism for separating sheets in tin packs which have adhered together in the rolling mill and effecting such separation completely and quickly without damage to the sheets.

Other and subordinate objects are also comprehended by the invention, all of which, together with the precise nature of the improvements, will be readily understood when the succeeding description and claims are read with reference to the drawings accompanying and forming part of this specification.

In said drawings:

Figure 1 is a view in side elevation of the invention in its preferred embodiment,

Figure 2 is a view in end elevation looking at the intake end of the mechanism,

Figure 3 is a view in vertical longitudinal section taken on the line 3—3 of Figure 2,

Figure 4 is a detail view similar to Figure 3 illustrating the manner in which the rollers operate;

Figure 5 is a view in perspective of one of the corrugating rollers,

Figure 6 is a similar view of one of the idler rollers,

Figure 7 is a fragmentary view in perspective of one of the bridging plates.

Figure 8 is a similar view of one of the I beams,

Figure 9 is a detailed view in horizontal section taken on the line 9—9 of Figure 3 and drawn to an enlarged scale,

Figure 10 is a view in perspective of one of the slide bearings, and

Figure 11 is a similar view of one of the cap bearings.

Referring to the drawings by numerals, according to the present invention, a sheet pack opening mechanism is provided comprising a pair of elongated side frames 1, 2 of any suitable construction, in other respects than as hereinafter specified, and between which is interposed a series of longitudinally spaced pairs of upper and lower transverse rollers disposed parallel in each pair, the pairs being equidistantly spaced apart, substantially, in close together relation, preferably. The series of rollers comprises a battery of three pairs of longitudinally ribbed, or toothed, corrugating rollers designated by pairs 3, 4, and 5, and which are spaced apart successively from one end of the mechanism constituting the

intake end thereof, a battery of three pairs of smooth finishing rollers spaced apart successively, equidistantly, from the innermost pair 5 of corrugating rollers and designated by pairs 6, 7, and 8, and pairs of like, smooth idler rollers of relatively smaller diameter than the rollers of said batteries and succeeding these pairs 3, 4, 5, 6, and 7, and being designated by pairs 9, 10, 11, 12, and 13.

The pairs of corrugating rollers 3, 4, and 5, are provided with the same number of ribs 14, or teeth, in each instance, and arranged in intermeshing relation in each pair, but, spaced apart circumferentially in greater degree in each succeeding pair as compared with the preceding pair.

The lower rollers, designated 15, 16, 17, 18, 19 and 20 of the pairs 3 to 8, are provided with end trunnions, as at 21, suitably journaled in slide bearings 22 fitted in the bottom of vertical guide ways 23 in the frames 1, 2 and resting on said bottoms. The upper rollers, designated 24 to 29, of said pairs 3 to 8 are provided with similar end trunnions 30 finding bearings in the upper ends of the bearings 22 and surmounted by cap bearings 31 vertically slidable in said guide ways 23. The cap bearings 31 are backed by coil springs 32, in said guide ways 23, interposed between the cap bearings 31 and tension adjusting studs 33 threaded downwardly through plates 34 bridging the upper ends of the guide ways 23 and bolted, as at 35, on top of the frames 1, 2.

The upper and lower rollers 36, 37 of the idler pairs 9 to 13 are mounted in the frames 1, 2 in the same manner as the rollers of the pairs 3 to 8, with the exception that the cap bearings 38 for the trunnions 39 of the upper rollers 36 are free to move upwardly.

As will now be clear, the upper rollers 24 to 29 of the pairs 3 to 8 are yieldingly movable upwardly in opposition to the springs 32, whereas, the upper rollers 36 of the idler pairs 9 to 13 are freely movable, being free from tension.

The lower rollers 15 to 20 of the pairs 3 to 8 are driven at the same rate of speed and in the proper direction, i. e., counter-clockwise as viewed in Figure 1, to cause said pairs to feed sheet packs gripped between the pairs from the intake end of the mechanism and out of the opposite, discharge end thereof. For this purpose, the trunnions 21 on one side of the mechanism are provided with like gear wheels 40 fast thereon and suitably connected by idler gears 41 mounted on stud shafts 42 on the frame 2, and the trunnion 21, on the opposite side of the mechanism, of the lower roller 15 of the pair designat-

ed 3 is motor driven by a suitable motor 43 and a pair of reduction gears 44, 45. A fly wheel 46 may be provided on one end trunnion 21 of the lower roller 20 of the pair designated 6.

The frames 1, 2 are connected together at the ends thereof by suitable pairs of I beams 47 secured to said frames by brackets 48 and bolts 49. A short feed table 50 is provided at the intake end of the mechanism.

Referring now to the operation of the described mechanism, a sheet pack 60 passing through the battery of corrugating rollers is corrugated transversely by the pairs of rollers 3, 4, 5 with corrugations spaced successively further apart by the teeth 14 of the successive pairs. The result is that the pack is subjected to impact by the revolving teeth throughout its entire length and the sheets completely separated. The pack then passes between the finishing rollers of the pairs 6, 7, 8 which act by compression to straighten out the sheets. The pairs of idler rollers 9 to 13, as will be clear, are interposed substantially in the line of travel of the pack 60 to guide the pack intermediate the pairs of rollers 3 to 8 and prevent the sheets from buckling intermediate said pairs of rollers 3 to 8.

The foregoing will, it is believed, suffice to impart a clear understanding of the invention without further explanation.

Manifestly the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the amended claims.

What is claimed is:

1. In a mechanism for opening sheet packs, a pair of side frames, a series of pairs of upper and lower transverse rollers between said frames spaced apart in side-by-side substantially equidistant relation, and including a battery of longitudinally ribbed corrugating rollers arranged in succeeding pairs, and a battery of smooth finishing rollers also arranged in succeeding pairs, and pairs of relatively smaller rollers alternating with the pairs of rollers of each battery, the upper rollers of the pairs of said series being mounted for vertical yielding movement to per-

mit a stack to pass between the rollers of said pairs, and means to drive the lower rollers of the pairs of said series, in each battery in the same direction and at the same speed, the ribs of the corrugating rollers being differently spaced around the rollers of each pair thereof.

2. In a mechanism for opening sheet packs, a pair of side frames, a series of pairs of upper and lower transverse rollers between said frames spaced apart in side-by-side substantially equidistant relation, and including a battery of longitudinally ribbed corrugating rollers arranged in succeeding pairs, and a battery of smooth finishing rollers also arranged in succeeding pairs, and pairs of relatively smaller rollers alternating with the pairs of rollers of each battery, the upper rollers of the pairs of said series being mounted for vertical yielding movement to permit a stack to pass between the rollers of the pairs of said series, and means to drive the lower rollers of the pairs of said series, in each battery in the same direction and at the same speed, the ribs of the corrugating rollers being spaced further apart around the same in succeeding pairs thereof than in preceding pairs.

3. In a mechanism for opening sheet packs, a pair of side frames, a series of pairs of upper and lower transverse rollers between said frames spaced apart in side-by-side substantially equidistant relation, and including a battery of longitudinally ribbed corrugating rollers arranged in succeeding pairs, and a battery of smooth finishing rollers also arranged in succeeding pairs, and pairs of relatively smaller rollers alternating with the pairs of rollers of each battery, the upper rollers of the pairs of said series being mounted for vertical yielding movement to permit a stack to pass between the rollers of the pairs of said series, and means to drive the lower rollers of the pairs in each battery in the same direction and at the same speed, the ribs of the corrugating rollers being spaced further apart around the same in succeeding pairs thereof than in preceding pairs, and corresponding in number on each roller.

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