April 19, 1949. I. J. GANNON ET AL 2,467,973

BLANK ALIGNING MECHANISM

Filed Oct. 12, 1945 3 Sheets-Sheet 1

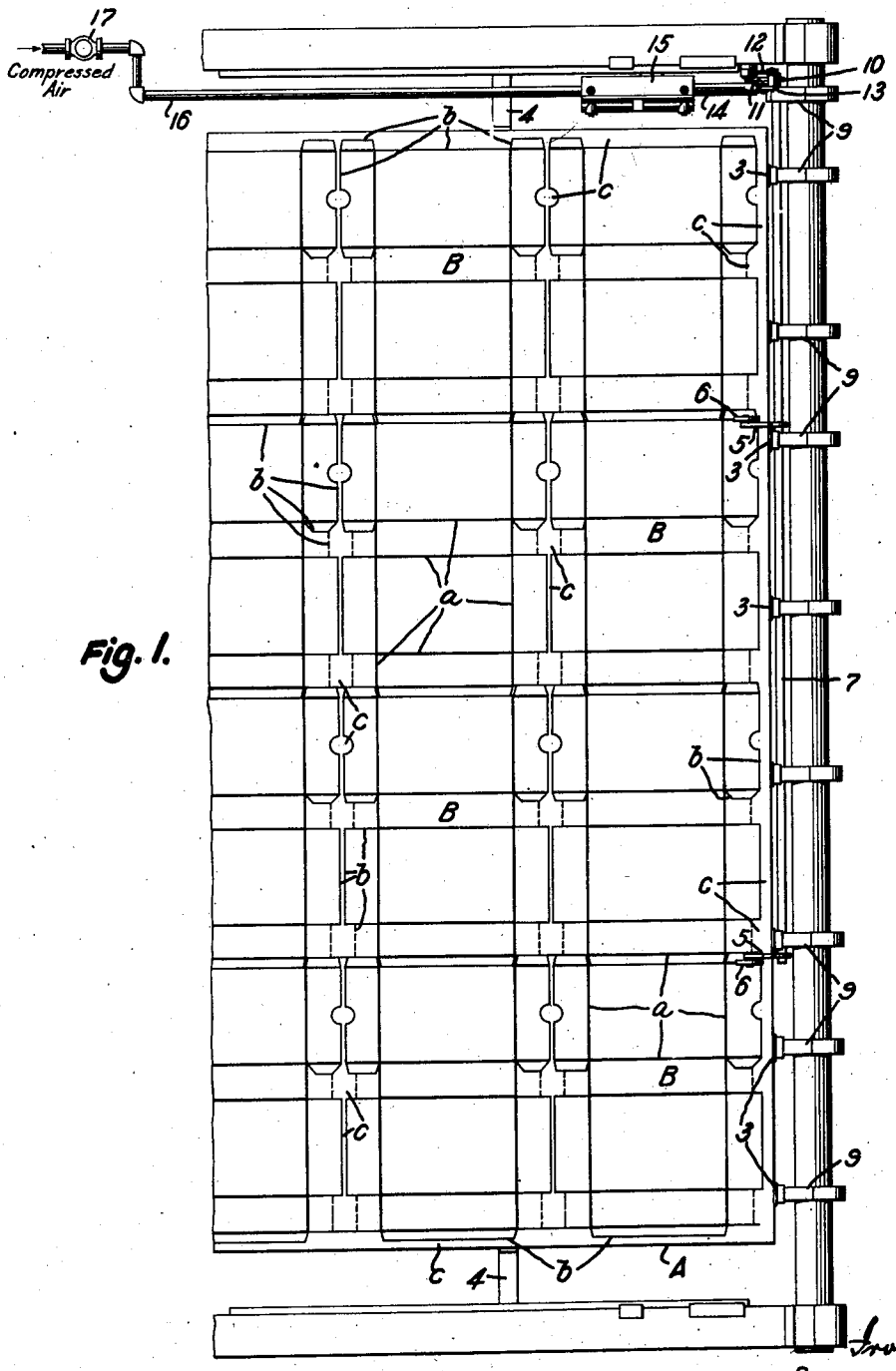


Fig. 1.

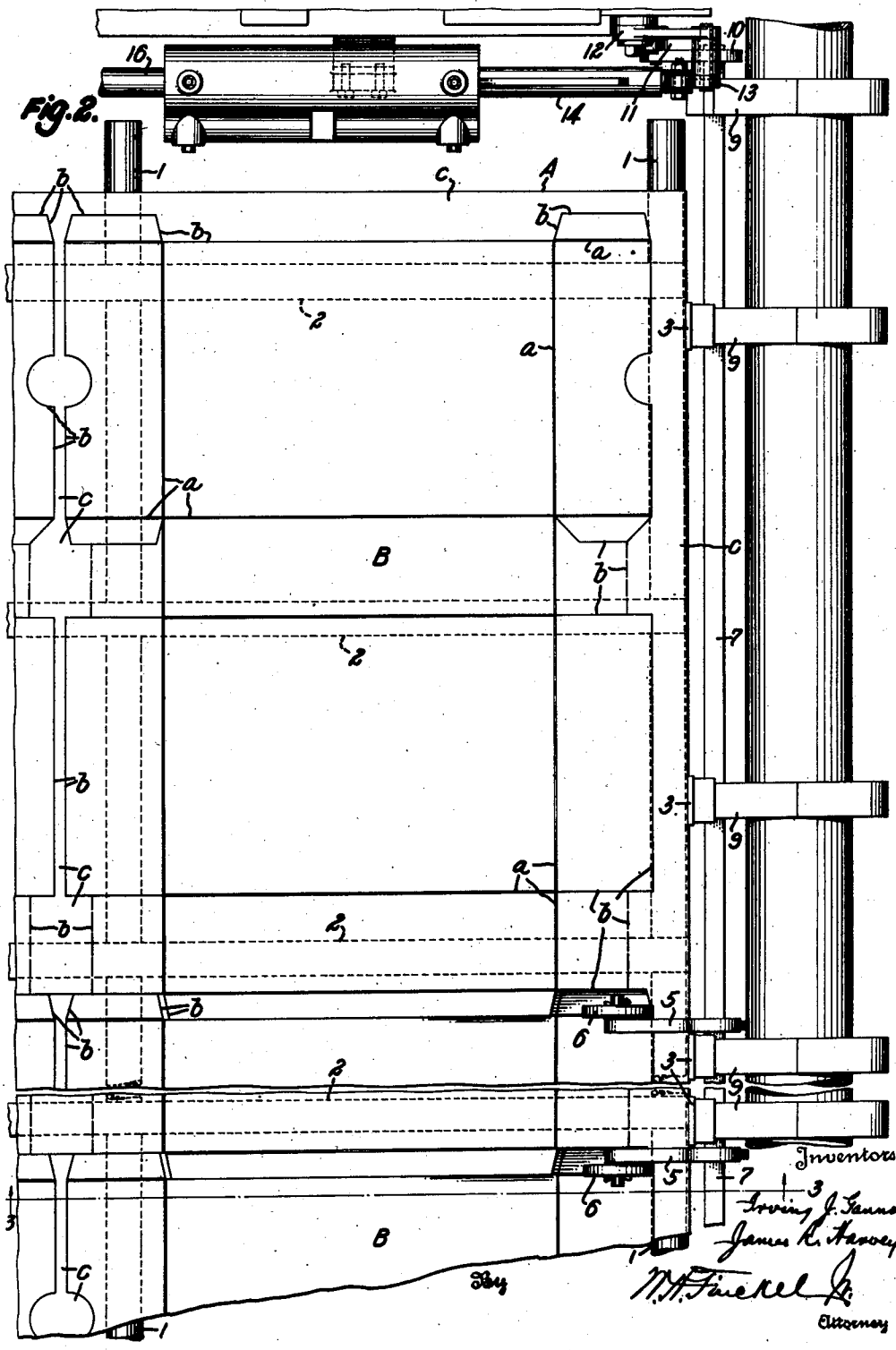
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Fig. 2.



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Fig. 3.

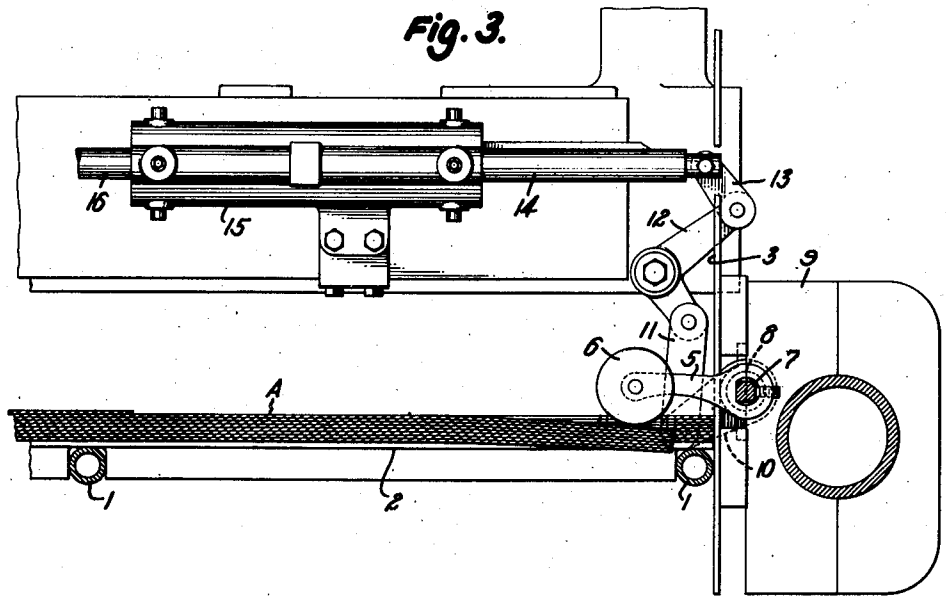


Fig. 4.

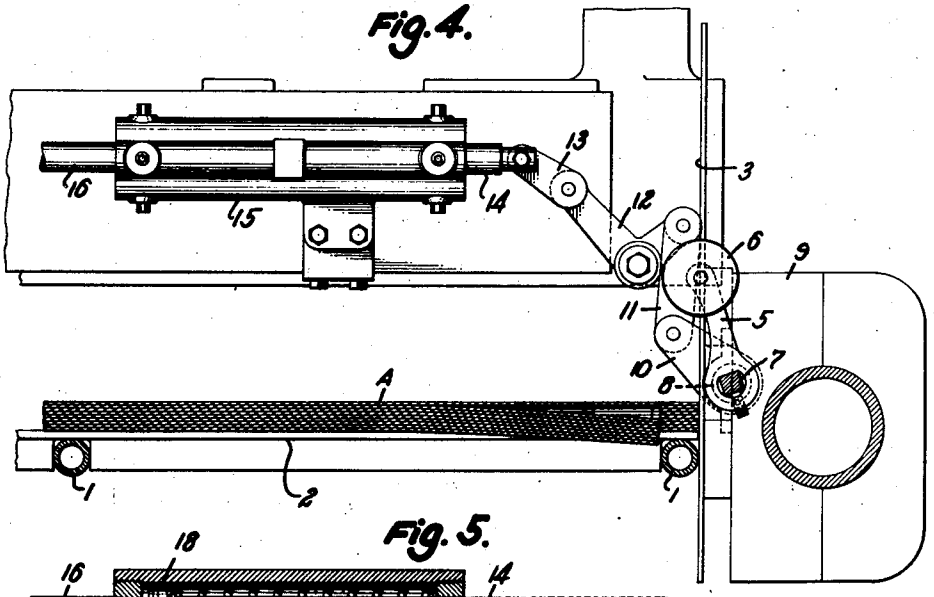
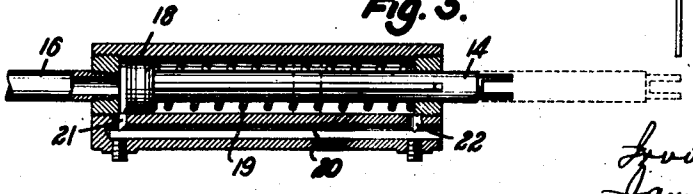


Fig. 5.



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BLANK ALIGNING MECHANISM

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Application October 12, 1945, Serial No. 621,868

6 Claims. (Cl. 93—58)

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This invention relates to the manufacture of paperboard cartons, particularly cartons of integral folded blank type such as are manufactured, in multiple, from a sheet of appropriate paperboard material by printing, scoring and cutting to form the separable finished foldable blanks, the excess of the sheet area constituting scrap from which the finished blanks must be freed.

The conventional method of removing the scrap, called "scrapping" or "stripping" in the industry, is to transfer a "lift" (a stack 6" to 10" high) of printed, scored and cut blanks from the load of blanks delivered from the cutting press, to a table and, manually, by the use of hand hammers, to knock the piles of finished blanks loose from the scrap.

Another, recently developed, "scrapping" or "stripping" method which has marked speed advantage over the hand method just described, is to use a power hammer, such as an air hammer, instead of a hand hammer, upon a complete load (a stack about 5' high) of the printed, scored and cut sheets.

It has been found that in the use of power hammers for "scrapping" or "stripping," the operation is efficient and successful only when the blanks of the sheets in a pile are locked in perfect alignment or register, and in view of this fact early users of the power hammer method stationed operatives at the delivery of the cutting press whose duty it was to successively interlock the sheets, as delivered to the load or pile, with their blanks in perfect alignment, by depressing cut portions of the blanks, preferably at two or more locations in the sheets.

The present invention provides power actuated means, preferably operated in timed relation to the delivery of the press, for performing the interlocking operation upon the blanks in simulation of the hand method just described, thus not only effecting a saving in labor but serving to increase the speed and accuracy of the operation, and to increase production.

It will be understood that the principle of the interlocking operation consists in forcing cut portions, preferably at the corners of two or more carton blanks of each sheet as it is delivered to the load or pile, out of horizontal alignment with adjacent portions or scrap of such sheet and downwardly into the pile of previously delivered sheets. The interaction between the undepressed edges of the sheets in the pile and the edges of portions of the blanks adjacent thereto, when depressed, imparts enough lateral motion to each

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sheet as it is delivered to achieve perfect alignment and register of its blanks with those of the previously delivered sheets in the pile, and friction between these interengaged edges serves to hold the depressed portions in their depressed condition and the multiple of sheets thereby interlocked in perfect alignment and register throughout the pile.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated,

Fig. 1 is a fragmentary plan view of the delivery end of a cutting press, with delivered sheets of printed (not indicated), scored and cut carton blanks in delivered position with respect thereto, and including the blank aligning mechanism of the invention with its parts in position to depress cut corner portions of at least two of the carton blanks,

Fig. 2 is an enlarged fragmentary plan view of the parts illustrated in Fig. 1,

Fig. 3 is a sectional elevation taken substantially on line 3—3 of Fig. 2, with the parts of the apparatus in the position illustrated in Figs. 1 and 2,

Fig. 4 is a view similar to Fig. 3, but with the parts of the apparatus in retracted position and ready to operate upon another delivered sheet, and

Fig. 5 is an axial, horizontal sectional elevation of the pneumatic cylinder mechanism of the apparatus.

Referring to Figs. 1 and 2 it will be understood that the sheets A are printed, scored as indicated at *a* by double lines, and cut as indicated at *b* by full and broken lines, to produce a multiple of carton blanks B determined by the relationship of the area of the blanks and the area of the sheet. Scrap area is indicated at *c*.

These sheets are delivered from the press onto an open-framework platform including the transverse supporting members 1 and longitudinal slat members 2 (Fig. 2), the platform being automatically lowered, step-by-step, as the pile of sheets increases in height, thus providing for the delivery of each sheet upon the top of the pile at substantially a predetermined fixed level or height in order that the aligning and interlocking mechanism may operate effectively upon the blanks of each of the successively delivered sheets. End guides or stops 3 ensure substantially uniform alignment of the leading edges of the delivered sheets, and lateral guides 4 serve to maintain a substantially uniform alignment of the lateral edges of the sheets.

Thus, aside from such minor deviations from

accurate register of the leading and lateral edges of the sheets as may be caused as the successive sheets settle upon the pile, the scored and cut blanks of the sheets will be in register, and such minor deviations will be taken care of, as hereinbefore indicated, by the blank aligning and interlocking mechanism upon its operation in depressing the cut corner portions of selected blanks.

In the form illustrated, the blank aligning and interlocking mechanism includes depressor means comprising, preferably, at least two lever arms 5 carrying rollers 6 and oscillatable with a shaft 7 mounted in bearings 8 (Figs. 3 and 4) supported by the brackets 9 which also serve as mounts for the guides or stops 3.

Oscillation is imparted to the shaft 7 to move the arms 5 and their contact rollers 6 from inoperative (Fig. 4) to operative (Figs. 1, 2 and 3) position through a crank and link mechanism 10, 11, 12, 13 by the piston rod 14 of an air cylinder 15 connected to a source of compressed air through a pipe 16 controlled by an "on-off" air valve 17 (Fig. 1) preferably actuated in timed relation to the delivery mechanism of the press by a moving part (not shown) thereof.

The piston 18 of cylinder 15 is moved upon its power or operataive stroke to force the contact rollers 6 to depress appropriate cut corner portions of the carton blanks B into registering, interlocking relation (Figs. 1, 2 and 3) by air admitted to the cylinder when the valve 17 is in its "on" position, and when the valve 17 is thereafter released to its "off" position and air is cut off, the piston is returned by a spring 19 and the arms 5 and their rollers 6 retracted to inoperative position (Figs. 4 and 5).

The air cylinder 15 is of known, valveless, type, having a restricted exhaust passage 20 connected with the two ends of the cylinder by ports 21 and 22, respectively. Upon the power stroke air is admitted to the cylinder through pipe 16 in such volume and under such pressure that only a small portion bleeds off through port 21 and passage 20, and the power stroke of the piston is accomplished with such speed and force as to operate the aligning and interlocking mechanism 5, 6, as desired, the port 22 meanwhile serving to prevent any dash-pot action. Upon stoppage of entrance of air to the cylinder, and return of the piston by the spring 19, the air in the cylinder will be exhausted through port 21 and passage 20.

Referring to Figs. 3 and 4, it will be seen that as each sheet of carton blanks is delivered against the guides or stops 3 the air cylinder and associated link and lever mechanism will be actuated to oscillate shaft 7 to move arms 5 and contact rollers 6 to depress spaced cut corner portions of selected blanks to blank aligning and interlocking condition (Fig. 3), and will thereafter, when air is cut off at valve 17, return the arms 5 and rollers 6 to inoperative position, whereafter another sheet may be delivered against the guides or stops 3 (Fig. 4).

When a completed pile or load of sheets (say 5' high) has been delivered by the press, and its blanks aligned and interlocked in register throughout the height of the pile by the mechanism of the invention, this load is removed from

the press delivery and power (air) hammers are used for "scrapping" or "stripping" the carton blanks B from the scrap c, as hereinbefore described. Meanwhile, the press and the mechanism of the invention are forming another pile or load of aligned and interlocked registering sheets of carton blanks.

Various changes and modifications are considered to be within the principle of the invention and the scope of the following claims.

What we claim is:

1. In mechanism for insuring the aligning and registering, and for interlocking, the cut carton blanks of sheets of same delivered to form a pile, by depressing portions of said blanks adjacent to cuts therein, guide means for accomplishing approximate uniform edge alignment of the sheets as they are delivered to form the pile, depressor means operative to depress and interlock the said portions of the blanks with respect to adjacent sheets in the pile, and means including power mechanism operable in timed relation to the delivery of said sheets for imparting said operative movement, and return movement, to said depressor means.

2. Mechanism as claimed in claim 1, in which said power mechanism is independent of the source of power for the sheet delivery mechanism.

3. Mechanism as claimed in claim 1, in which the power mechanism includes a cylinder and piston, and means for supplying motive fluid thereto.

4. Mechanism as claimed in claim 1, in which the power mechanism includes a pneumatic cylinder and piston arrangement, and means for supplying compressed air thereto.

5. Mechanism as claimed in claim 1, in which the power mechanism comprises a pneumatic cylinder and piston arrangement, and means for supplying compressed air thereto including an air valve capable of being actuated in timed relation to the delivery of sheets.

6. In a device for use with a cutting machine for cutting the blanks of paperboard carton blanks sheets, guide means for accomplishing approximate uniform edge alignment of the sheets as they are delivered from the cutting machine to form a pile, and mechanism for insuring the aligning and registering, and for interlocking, the cut carton blanks of said sheets as they are successively delivered to the pile, by depressing portions of said blanks adjacent to cuts therein with respect to adjacent sheets in the pile, including an oscillatable shaft, depressor means oscillatable with said shaft, and power mechanism for imparting oscillatory movement to said shaft.

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