

Dec. 14, 1937.

I. STERN

2,102,170

PAPER MACHINERY

Filed Nov. 17, 1934

3 Sheets-Sheet 1

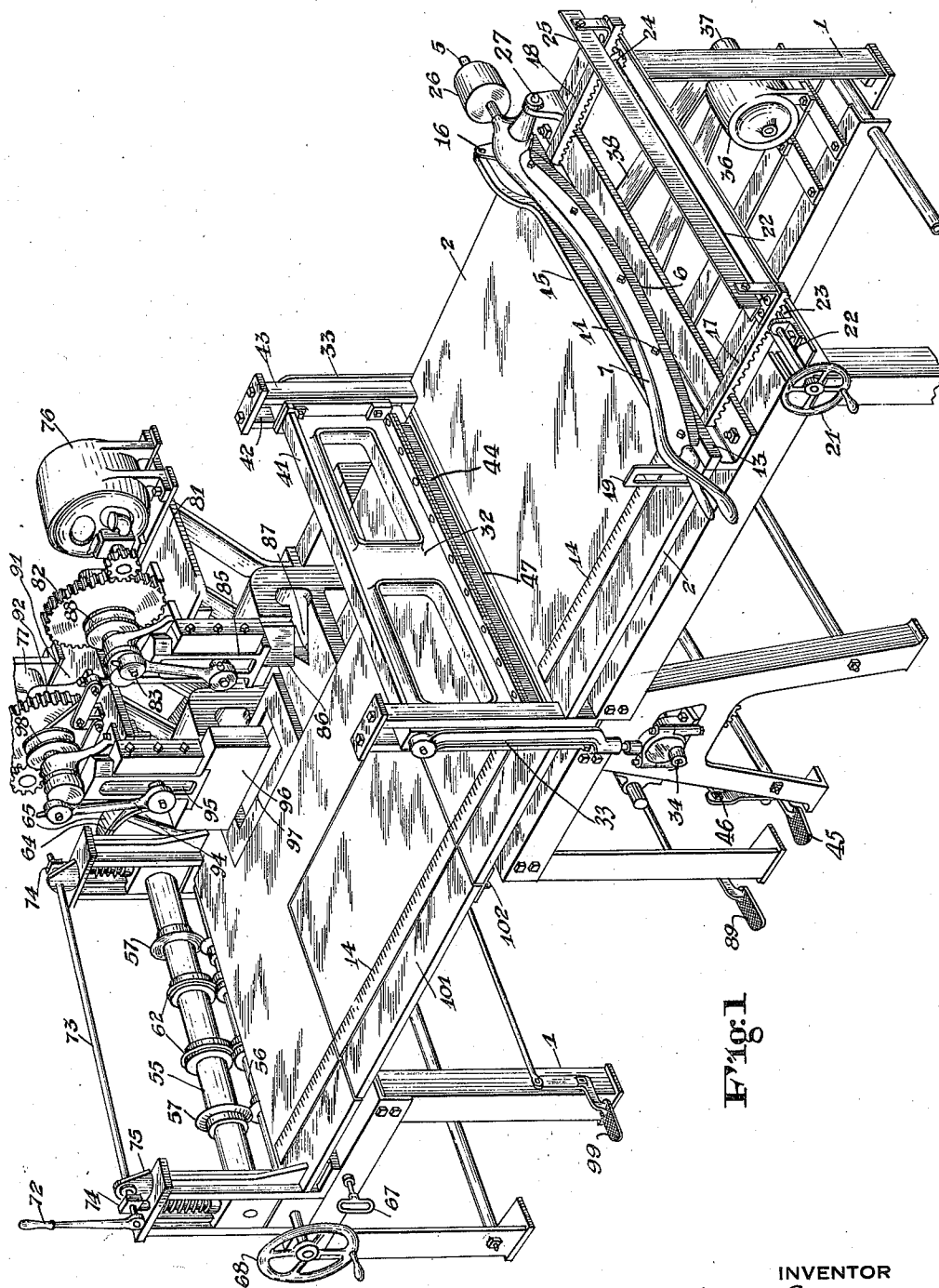


Fig. 1

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3 Sheets-Sheet 2

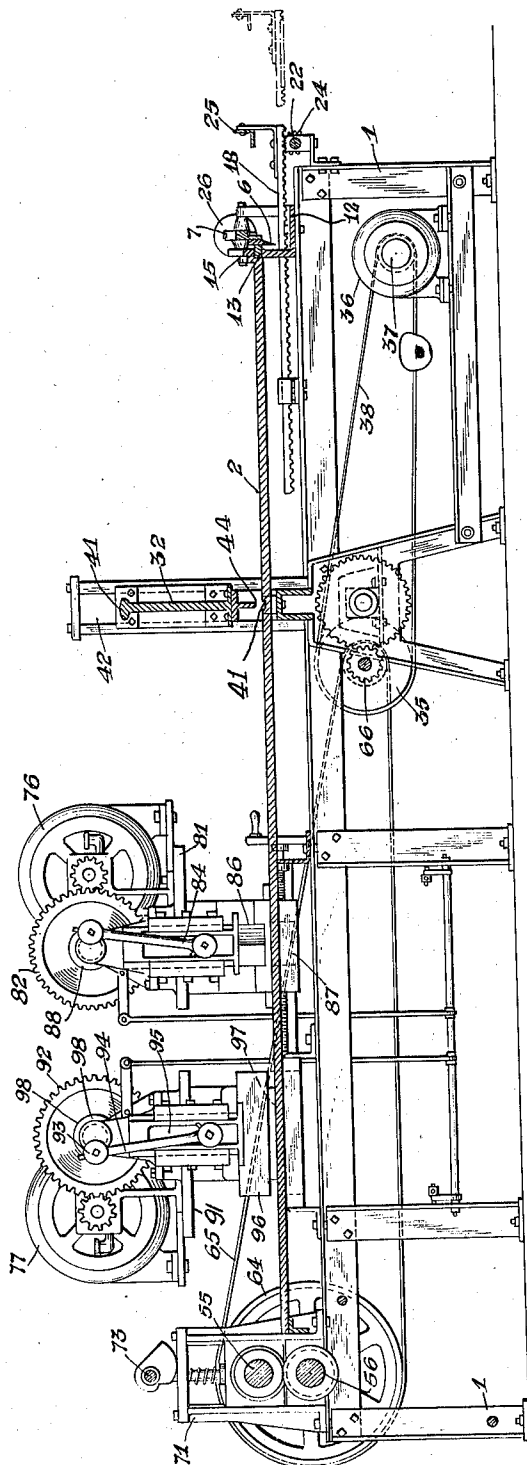


Fig. 2

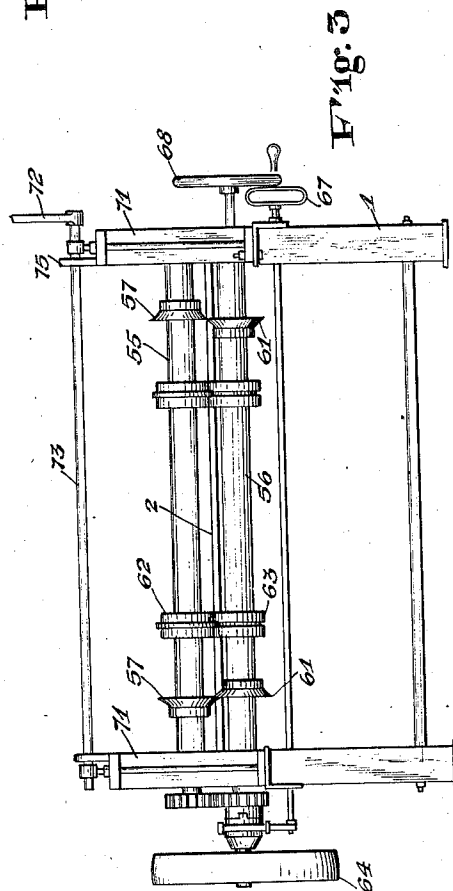


Fig. 3

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3 Sheets-Sheet 3

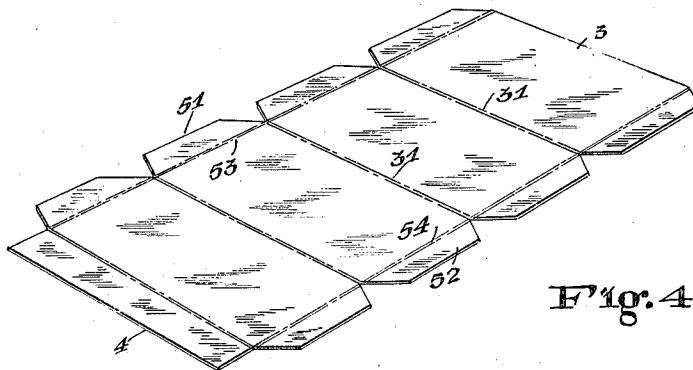


Fig. 4

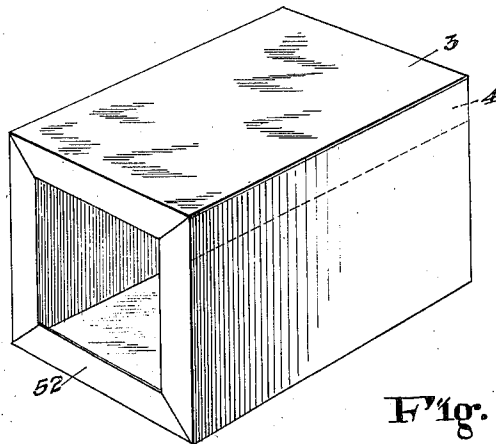


Fig. 5

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PAPER MACHINERY

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4 Claims. (Cl. 164—11)

My invention relates to novel apparatus for and methods of manufacture of paper or cardboard boxes, corrugated or otherwise, and more particularly, to novel apparatus for and methods of manufacture of samples of paper or cardboard boxes.

The object of my invention is to provide a single machine which will do the work of scoring and trimming, slicing, cutting and blocking required in the manufacture of cardboard boxes which in the past required several machines to accomplish.

Another object of my invention is to provide means for performing the above-mentioned operations by the use of power driven machinery and on a mass production basis as against the hand operated mechanisms that were used in the past in the manufacture of sample cardboard boxes.

Another object of my invention is to provide means whereby the motive powers may be connected with or detached from any one or several mechanisms in such a manner as to make the various mechanisms operate either singly or jointly or in any desired combination whatsoever.

There are other objects of my invention which together with the foregoing will appear in the detailed description which is to follow in connection with the drawings in which:

Figure 1 shows a longitudinal perspective view of a preferred type of this machine.

Figure 2 shows a longitudinal cross-sectional view of the machine, its various parts, and their location with respect to each other.

Fig. 3 is an end view in elevation looking at the left of Figure 1, showing the circular scorers and trimmers.

Figures 4 and 5 show various forms of cardboard blanks and the manner in which they may be scored, creased and cut by this and similar machines.

Referring now more particularly to Fig. 1, a metal frame serves as a support for the various mechanisms as well as for the table top 2 upon which the blanks are processed.

In carrying out my invention in connection with a blank such as shown in Figure 4, I first trim the edges 3 and 4 with shears 5 (Figure 1). These shears 5 are manipulated by hand, and consist of a blade 6 which is secured to a handle 7 by means of a number of bolts 11, and which can be removed from time to time for the purpose of sharpening. The other blade of the shears consists of a steel bar 12 (Figure 2) which is securely fastened to top 2 of the table and

forms a sharp edge 13. As the blank is laid on table 2 it is gauged by means of scale 14 and held in place under bar 15 which is pivoted at hinge 16 and travels in yoke 19.

When necessary, scale 14 can be extended beyond the table through extensions 17 and 18 which can be fed out from under the table through hand wheel 21. This wheel turns rod 22 on which are mounted geared wheels 23, 24 which engage similar teeth at the bottom of extension bars 17 and 18 and propel them forward. Bars 17 and 18 are joined by angle 25 which acts as a stop for the blank. To facilitate the operation of the shears, a counterweight 26 is placed on the far end of the shears beyond the pin 27.

Edge 4 of the blank is trimmed in the same manner as was edge 3; after which the blank is ready for the body scores 31 shown in Figure 4. The body score is made through creaser or scorer 32, which operates through eccentric straps 33 pivoted on shaft 34.

On one end of shaft 34 is mounted wheel 35 which drives member 41 vertically in slot 42 formed by the standards or guides 43. Member 41 terminates in a rounded blade 44.

When body scores 31 are to be made, the blank is so adjusted along scale 14 that blade 44 will be exactly above the line to be scored. A slight pressure of the foot on pedal 45 will operate rod 46, which acts upon clutch (not shown) thus connecting eccentric straps 33 with the motive power. Scorer 32 comes down upon the table and the cardboard is scored between blade 44 and groove 47 in top 2 of the table.

The blank is now moved farther to the left and fed under the rotary scorers and trimmers whose function it is to trim the edges 51 and 52 of the blank in Figure 4 and to produce the flap scores 53 and 54.

The rotary scorers and trimmers consist of an upper shaft 55 and a lower shaft 56. Upon these shafts are adjustably mounted upper trimming knives 57 and lower trimming knives 61, also upper scoring wheels 62 and lower scoring wheels 63.

The lower shaft 56 derives its motion from pulley 64 (Figure 2) which is driven by belt 65 riding on pulley 66 which in turn derives its motion from motor 36 through pulleys 35 and 37 and belt 38.

When necessary, shaft 56 can be disconnected from the source of power by means of hand operated clutch handle 67 controlling a suitable clutch in the usual manner (clutch not shown).

It can also be operated by hand through wheel 68.

Shaft 56 imparts motion to shaft 55 through a pair of sets of gears located on the shaft at frame 71. When it is required to disengage the upper shaft 55 from the lower shaft 56, a handle 72, Fig. 1, is turned one quarter of a revolution. This handle is rigidly connected to a rod 73 resting in bearings 74. Securely connected to rod 73 are cams 75, which press upon the top of the frame 71 when handle 72 (Figure 1) is turned and lifts shaft 55 a distance sufficient to disengage it from shaft 56, thus permitting the blank to be moved about freely between the rollers without fear of being scored or trimmed.

The next process is that of blocking or angle cuts. For this purpose, two separate motors 76 and 77 are provided. Motor 76 is mounted on adjustable platform 81 which is fastened to frame 1. Motor 76 is connected to a gear 82, (Figure 1) from which projects an eccentrically located pin 83. Pivoted on pin 83 is one end of an arm 84, the other end of which slides in a vertical groove in guide 85, and is at the same time connected to a triangular cutting block 86 to which it imparts up and down motion. The sharp edge of the cutting block meets a similarly shaped cutting edge 87 on the level of the table, and the two effect a 90 degree cut-out of any desired depth in the blank. Gear 82 is connected to and disconnected from motor 76 by means of a clutch 88 which is operated by the pressure of a foot on pedal 89.

When a rectangular cut-out is required, the motor 77 is used. The operation of motor 77 is similar to that of motor 76. It is mounted on an adjustable platform 91, (Figure 2) which fastens to frame 1. Motor 77 is geared to 92 from which projects an eccentrically located pin 93. Pivoted on pin 93 is one end of arm 94 and is at the same time connected to a rectangular cutting block 96 to which it imparts up and down motion. The edge of cutting block 96 meets a similarly shaped cutting edge 97 on the level of the table and the two effect a rectangular cut-out of desired length and breadth in the blank. The connection of wheel 92 to motor 77 is controlled by means of clutch 98 which is operated by the pressure of a foot on pedal 99.

For convenience in handling the blank during the blocking process, a panel 101 forming part of top 2 of the table has been placed on hinges 102 in order that it may be dropped, and the operator be allowed to work within closer range of the cutting blocks 86 and 96.

Although I have disclosed for purposes of illustration one form of my invention, it will be obvious that it may take other forms than that herein described, and I do not intend to be limited except as set forth in the appended claims.

I claim:

1. In combination in a unitary structure, a scorer for engaging a sheet of blank material; a source of power; eccentric straps for translating the power from said source to said scorer for scoring said sheet of material; a metal pair of vertical guides for guiding said scorer in a vertical path; a plurality of rotary scorers; means for applying power from said source to said scorers for producing flap scores; a plurality of rotary trimmers; means for supplying power to said trimmers for trimming said sheets of material;

adjustable block and cut-out means; separate power means therefor; and means for controlling the application of power thereto for blocking and cutting said blanks.

2. In combination in a unitary structure, a scorer for engaging a sheet of blank material; a source of power; eccentric straps for translating the power from said source to said scorer for scoring said sheet of material; a metal pair of vertical guides for guiding said scorer in a vertical path; a plurality of rotary scorers; means for applying power from said source to said scorers for producing flap scores; a plurality of rotary trimmers; means for supplying power to said trimmers for trimming said sheets of material; a plurality of adjustable block and cut-out means; a second source of power means for selectively applying said second source of power to said block and cut-out means for operating said blanks.

3. A unitary structure for scoring, slicing, cutting and blocking fibrous material to form boxes comprising a source of power; a reciprocating scorer; eccentric straps for reciprocating said scorer in a vertical path; a shaft connected to said eccentric straps; a motor; a manually operable clutch connecting said motor to said shaft for reciprocating said scorer; rotary scorers; rotary knives; a common upper and lower shaft carrying said rotary scorers and rotary knives; a drive connection including a manually operable clutch extending from said motor to said lower shaft; means for manually operating said lower shaft independent of said motor; a drive connection from said lower shaft to said upper shaft; manually operable means for maintaining said upper and lower shafts in driving connection and for permitting said shafts to disengage; an adjustable platform; a second motor mounted on said platform; a triangular cutting block; and means controlled by said second motor and including a manually operable clutch for reciprocating said block.

4. A unitary structure for scoring, slicing, cutting and blocking fibrous material to form boxes comprising a source of power; a reciprocating scorer; eccentric straps for reciprocating said scorer in a vertical path; a shaft connected to said eccentric straps; a motor; a manually operable clutch connecting said motor to said shaft for reciprocating said scorer; rotary scorers; rotary knives; a common upper and lower shaft carrying said rotary scorers and rotary knives; a drive connection including a manually operable clutch extending from said motor to said lower shaft; means for manually operating said lower shaft independent of said motor; a drive connection from said lower shaft to said upper shaft; manually operable means for maintaining said upper and lower shafts in driving connection and for permitting said shafts to disengage, said means comprising a cam, a lever operating through said cam to urge said upper and lower shafts into engagement, and spring means operable when said lever is rocked for permitting said shafts to disengage; an adjustable platform; a second motor mounted on said platform; a triangular cutting block; and means controlled by said second motor and including a manually operable clutch for reciprocating said block.