

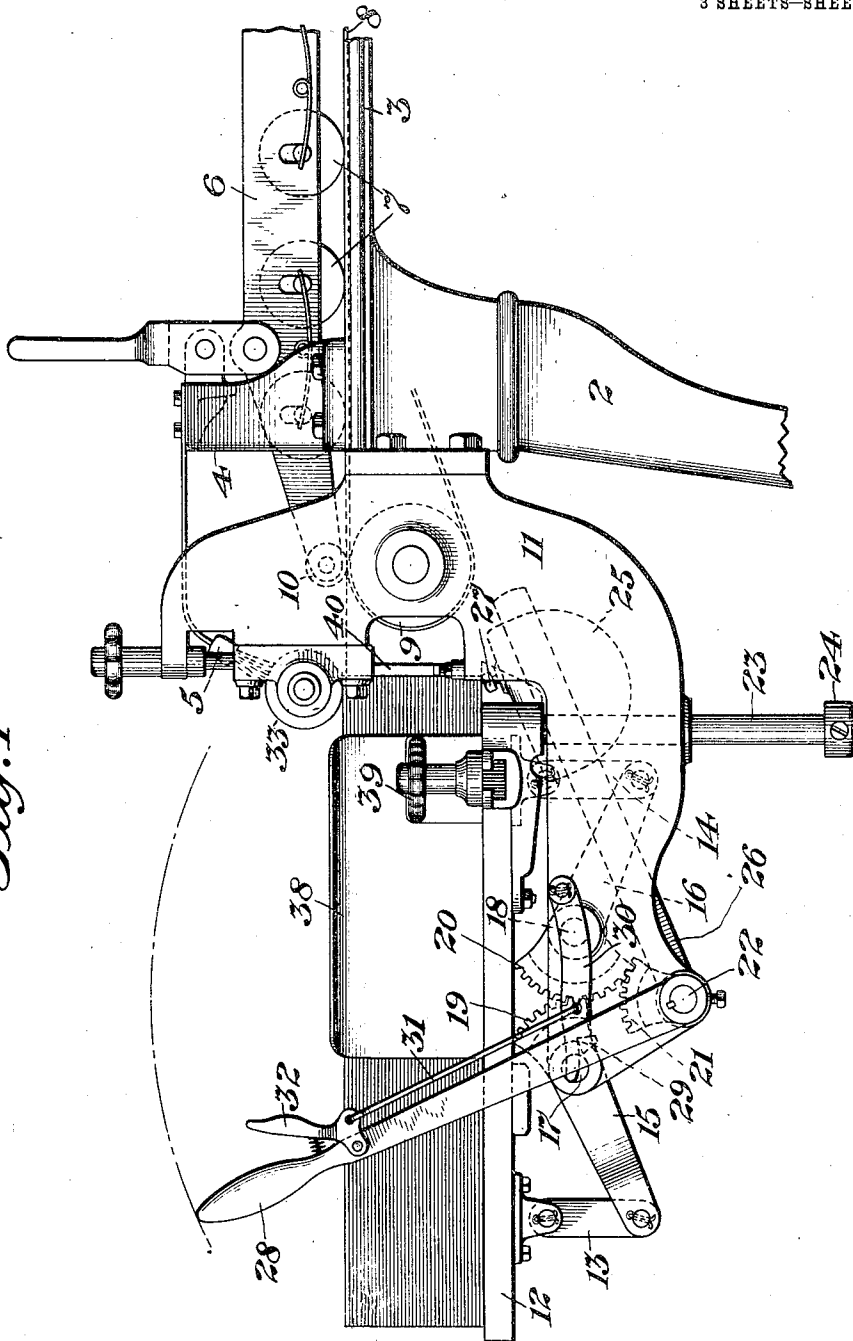
H. DE SMITH.
SHEET FEEDING MECHANISM.
APPLICATION FILED APR. 1, 1909.

1,055,719.

Patented Mar. 11, 1913.

3 SHEETS—SHEET 1.

Fig. 1



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3 SHEETS—SHEET 2.

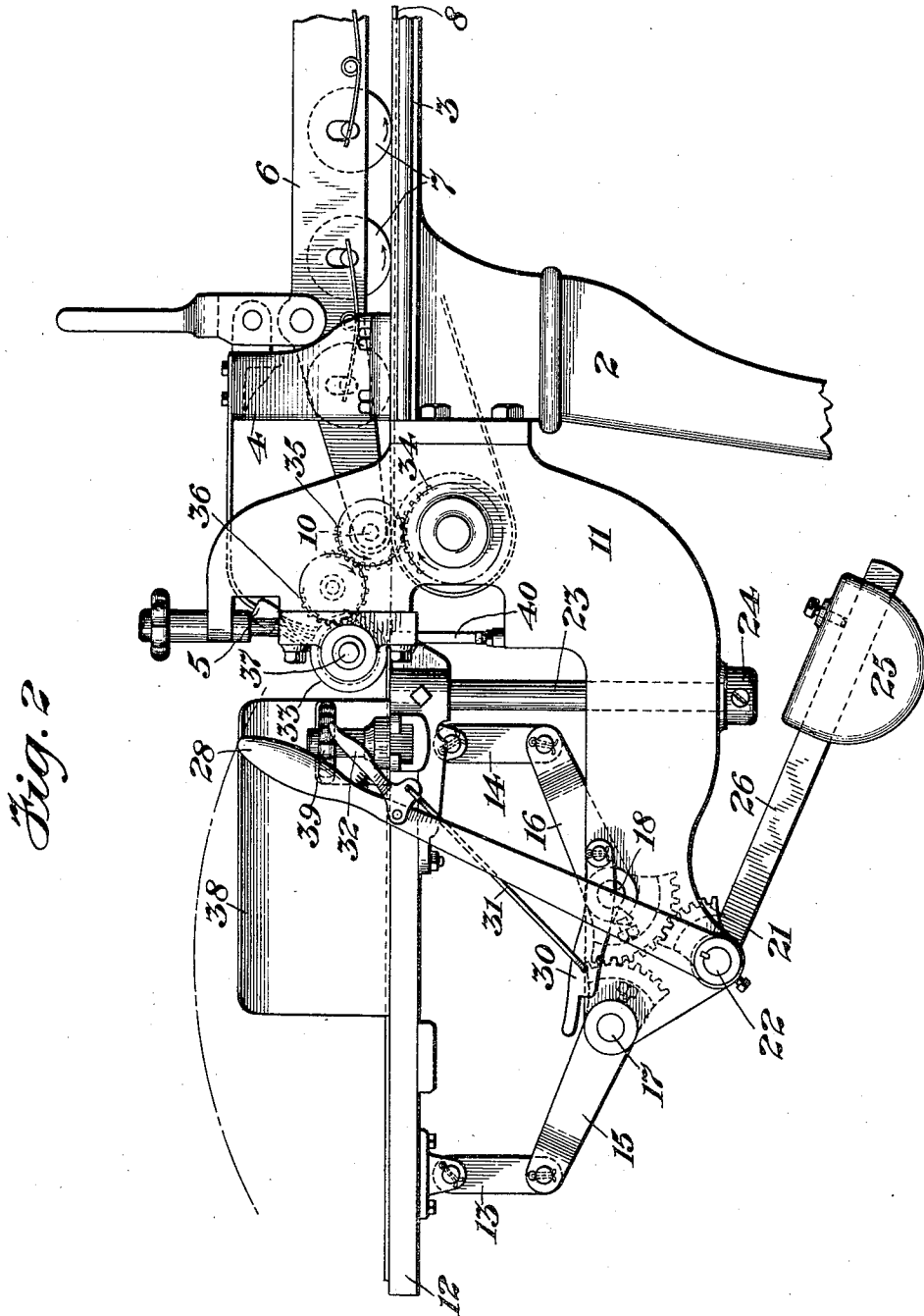


Fig. 2

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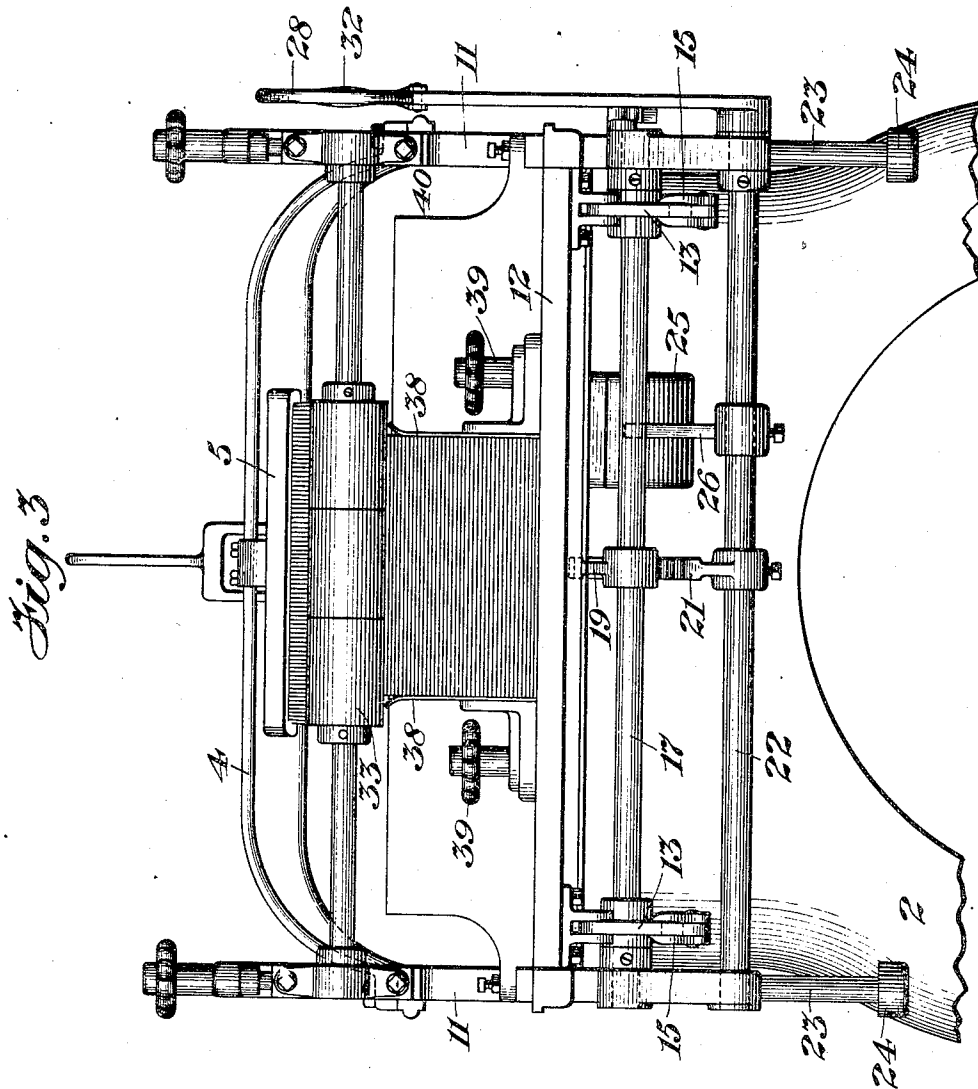
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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SHEET-FEEDING MECHANISM.

1,055,719.

Specification of Letters Patent.

Patented Mar. 11, 1913.

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To all whom it may concern:

Be it known that I, HENRY DE SMITH, citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Mechanism, of which the following is a specification.

This invention relates to means for automatically feeding sheets, and especially sheets of flexible material, such as paper-board.

One of the main objects of the invention is to provide an improved automatic sheet feeding mechanism, especially adapted in the present case for use in connection with a so-called "flange-bending" machine for bending up the edge portions of paper-board box or other container blanks, although equally adapted for use in connection with other types of machines for operating on sheet material.

In carrying the invention into effect a pile of sheets or blanks, as for example a pile of paper-board blanks, is placed upon a suitable support or table and the support is fed automatically toward a feed-roller or equivalent device for engaging the uppermost sheet or blank of the pile and feeding it away from the pile, the feed mechanism being so constructed as to feed the pile automatically as the successive sheets are removed therefrom by such feed-roller.

Important features of this automatic feed mechanism are devices for moving and guiding the support or table so that both ends thereof will move the same distance at each feed movement of the pile, this result being accomplished preferably by providing means for guiding the table up and down in straight lines, and by also providing operating connections which move the table through equal distances at both ends thereof at each feed movement.

Other features of the invention not hereinbefore referred to will be hereinafter described and claimed and are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a flange-bending machine embodying my automatic feed mechanism and illustrating the feed-table in its lowered position with a pile of blanks thereon. Fig. 2 is a similar view showing the table in its raised position with nearly all of the sheets removed

from the pile. Fig. 3 is a front elevation of the same with the parts in the positions shown in Fig. 1.

Similar characters designate like parts in all the figures of the drawing.

While my automatic sheet-feeding mechanism may be applied to machines of various types, it is herein shown in connection with a flange-bending machine for bending up the edge portion of scored paper-board box or other container blanks. So much of such a machine is illustrated in the drawings as is necessary for an understanding of the present invention. 2 designates the legs and 3 the bed of such a machine, to the opposite sides of which are bolted the ends of an arched cross-frame 4 on which is mounted a spring-armed brush 5 and to which is pivoted a frame 6 carrying the usual spring-pressed rolls 7 for holding each sheet of paper-board down on a traveling conveyer 8, which conveyer passes over a roller 9 co-operating with a small roller 10 on the frame 6, and between which the sheets are fed from a pile and thence through the flange-bending machine. At the forward end of this machine is a heavy extension frame, designated generally by 11, and bolted to the main framework hereinbefore described. On this extension all of the parts of the automatic feed mechanism for raising a pile of sheets step-by-step as individual sheets are removed from the pile, are supported for operation. One of the main features of this mechanism is a flat bed or table, such as 12, mounted for movement up and down to either feed the pile gradually upward or to permit the table to be lowered to a point where a new pile may be placed in position. In the construction shown this table is supported at both of its ends, and also guided and actuated at both ends, in such a manner that it is positively moved at both ends through equal distances by connections from a motor. Here the table has at opposite ends thereof pairs of depending links 13 and 14 pivoted to the ends of corresponding rock-arms, such as 15 and 16, secured to rock-shafts 17 and 18 journaled in bearings in the forward ends of the extension frame 11. These rock-arms also carry intermeshing gear-segments 19 and 20, the latter of which has its arc extended to permit it to mesh with the teeth of another gear-segment 21 on another rock-shaft 22

disposed below and intermediate of the rock-shafts 17 and 18. The gear-segment 21 is the actuator for the other two gear-segments 19 and 20 and serves to move said gear-segments and the rock-arms 15 and 16 equally at all times, in order that opposite ends of the table 12 may be moved equal distances at both ends in the same period of time and the table thereby maintained in horizontal position.

The means just described for supporting the table and controlling its movements is supplemented by positive vertical guides. These positive guides are provided in the present case and are shown as depending guide-rods 23 secured to the table 12 near opposite sides thereof and having at their lower ends stops, such as 24, to limit their upward movement. These guide-rods 23 work in long vertical bores in opposite sides of the extension frame 11 and positively guide the table in its movements, as will be obvious.

Any suitable motor may be used for gradually feeding the table 12 upward to bring the individual sheets of a pile thereon into position to be fed through the flange-bending mechanism. In the present case a heavy weight is employed for the purpose, this being a very simple and effective means for accomplishing the desired result. Such a weight is shown at 25 secured to a lever-arm 26 fastened to the rock-shaft 22, said weight being preferably adjustable on such lever-arm and having suitable means, such as a set-screw 27, for securing the weight in any desired adjusted position. Means may also be employed for holding the motor out of action except when it is desired to feed the table upward step-by-step or to restore it to its normal lowered position for receiving a pile of sheets. Preferably the table and its operating parts will be latched down in the desired position when the automatic feed mechanism is not operating. To accomplish this I prefer to use a controlling lever, such as 28, which is also secured to the rock-shaft 22 and which carries a stop 29 adapted to be engaged by a latch 30, when in the position shown in Fig. 1, and held therein. This latch may be released by any suitable means, such as a connecting-rod 31 and a spring-pressed handle 32 connected to said rod, this construction being substantially that of the well-known locking and releasing lever used for various purposes.

When the parts are in the position shown in Fig. 1 the weight is up and in position to be effective and the table 12 is down in position to receive a pile of sheets. To be held in this position the lever 28 must of course be latched by the parts 29 and 30. When a pile of sheets is in position on the table, as shown in Fig. 1, and it is desired

to start operations, the latch 30 is released by means of the handle 32 and the weight 25 immediately becomes effective to force the table up until the uppermost of the pile of sheets is in engagement with the feed-roller 33, which, it will be seen by referring to Fig. 2, is positively driven by means of gears 34, 35, 36 and 37. The roller 33 not only serves to feed the topmost sheet of the pile of sheets into the folding machine, but also acts as a stop to limit the upward movement of the table 12 and the pile of sheets thereon, the inner end of said pile contacting with the bottom of said roller. The pile of blanks will preferably be held in place between a pair of side-guides, such as 38, which may be adjusted crosswise of the machine to accommodate different widths of blanks, and be clamped in place by means of the usual fastening devices 39, these parts being of well-known construction.

The automatic feed mechanism hereinbefore described in detail constitutes a very simple and effective mechanism for feeding up one by one the sheets of a pile, and especially the sheets of a pile of paper-board preparatory to leading these sheets through a flange-bending mechanism, each sheet as it is presented in contact with the feed-roller 33 being frictionally engaged by said roller and fed into the flange-bending mechanism, when the weight is in action, and the next succeeding sheet being in readiness to go through the same operations as soon as the first sheet passes clear of the feed-roller 33 and into said flange-bending mechanism. Thus step-by-step the table and the pile of sheets thereon are raised gradually with a movement that is uniform at both the front and rear ends of the table, by the power exerted by the weight 25 transmitted through the positive connections hereinbefore described, the amount of movement at each step being controlled by the sheets themselves and by the thickness thereof.

It will be clear that all of the sheets of a pile except the uppermost one should be held by a suitable stop, such as the end-stop 40, in such a manner that it will be impossible for the sheets to be fed forward into the flange-bending mechanism until they rise above the top edge of this stop, which top edge is made relatively narrow across its face in order to avoid twisting of the sheets as they pass thereover. The pass between the top of this stop and the feed-roller 33 is of such width as to permit only a single sheet to enter it at a time. This construction therefore assures the positive feeding forward of the sheets singly as they come into contact with the feed-roller, to which position they are elevated one after the other by the rising step-by-step movement of the table 12.

What I claim is:

1. A sheet feeding mechanism for automatically feeding a pile of sheets, comprising a movable feed table for holding the pile, a feed roller, a pair of rock shafts, intermeshing gear segments on said rock shafts, rock arms connecting said rock shafts and said feed table, a third rock shaft, a gear segment on said third rock shaft operatively connected with one of said first mentioned rock shafts, and a motor connected to said third rock shaft whereby said table is adapted to move toward said feed roller to bring the upper sheet of the pile of sheets into engagement with said roller.

2. A sheet feeding mechanism for automatically feeding a pile of sheets, comprising a movable feed table for holding the pile, a feed roller, a pair of rock shafts, means on said rock shafts for establishing connection therebetween and also having connection to said feed table, a third rock shaft, means carried by said third rock shaft for cooperating with the means on said pair of rock shafts; and a motor connected to said third rock shaft whereby said table is adapted to move toward said feed roller to bring the upper sheet of the pile of sheets into engagement with said roller.

3. A sheet feeding mechanism for automatically feeding a pile of sheets, comprising a movable feed table for holding the pile, a feed roller, a pair of rock shafts having intermeshing gear-segments and also having rock arms operatively connected with the feed table at opposite sides of its center, a third rock shaft having a gear segment thereon intermeshing with one of said first-mentioned gear segments, a motor connected to said third rock shaft whereby said table is adapted to move toward said feed roller to bring the upper sheet of the pile of sheets into engagement with said roller, and means independent of said motor for controlling the action of said third rock shaft.

4. A sheet feeding mechanism for automatically feeding a pile of sheets, comprising a movable feed table for holding the pile, a feed roller, a pair of rock shafts having intermeshing gear segments and also having rock arms operatively connected

with the feed table at opposite sides of its center, a third rock shaft having a gear segment thereon intermeshing with one of said first mentioned gear segments, a weight connected to said third rock shaft for actuating the latter whereby said table is adapted to move toward said feed roller to bring the upper sheet of the pile of sheets into engagement with said roller, and means independent of said weight for controlling the action of said third rock shaft.

5. A sheet feeding mechanism for automatically feeding a pile of sheets, comprising a movable feed table for holding the pile, a feed roller, a pair of rock shafts, intermeshing gear segments on said rock shafts, rock arms connecting said rock shafts and said feed table, a third rock shaft, a gear segment on said third rock shaft intermeshing with one of said first mentioned gear segments, a motor connected to said third rock shaft whereby said table is adapted to move toward said feed roller to bring the upper sheet of the pile of sheets into engagement with said roller, and means independent of said motor for controlling the action of said third rock shaft.

6. A sheet feeding mechanism for automatically feeding a pile of sheets, comprising a movable feed-table for holding the pile, a feed-roller, a motor for moving said table toward said feed-roller to bring the upper sheet of the pile of sheets into engagement with said roller, and connections between said motor and said feed-table including a pair of rock-shafts having intermeshing gear-segments and also having rock-arms operatively connected with the feed table at opposite sides of its center, a third rock-shaft having a gear-segment thereon intermeshing with one of said first-mentioned gear-segments, and means for controlling the action of said third rock-shaft.

Signed at Rochester, in the county of Monroe, and State of New York, this 29th day of March A. D. 1909.

HENRY DE SMITH.

Witnesses:

WILLIAM GETMAN,
JOHN G. FLORACK.