

W. R. ALLEN.
STACKING MECHANISM.
APPLICATION FILED SEPT. 16, 1912.

1,079,089.

Patented Nov. 18, 1913.

2 SHEETS—SHEET 1.

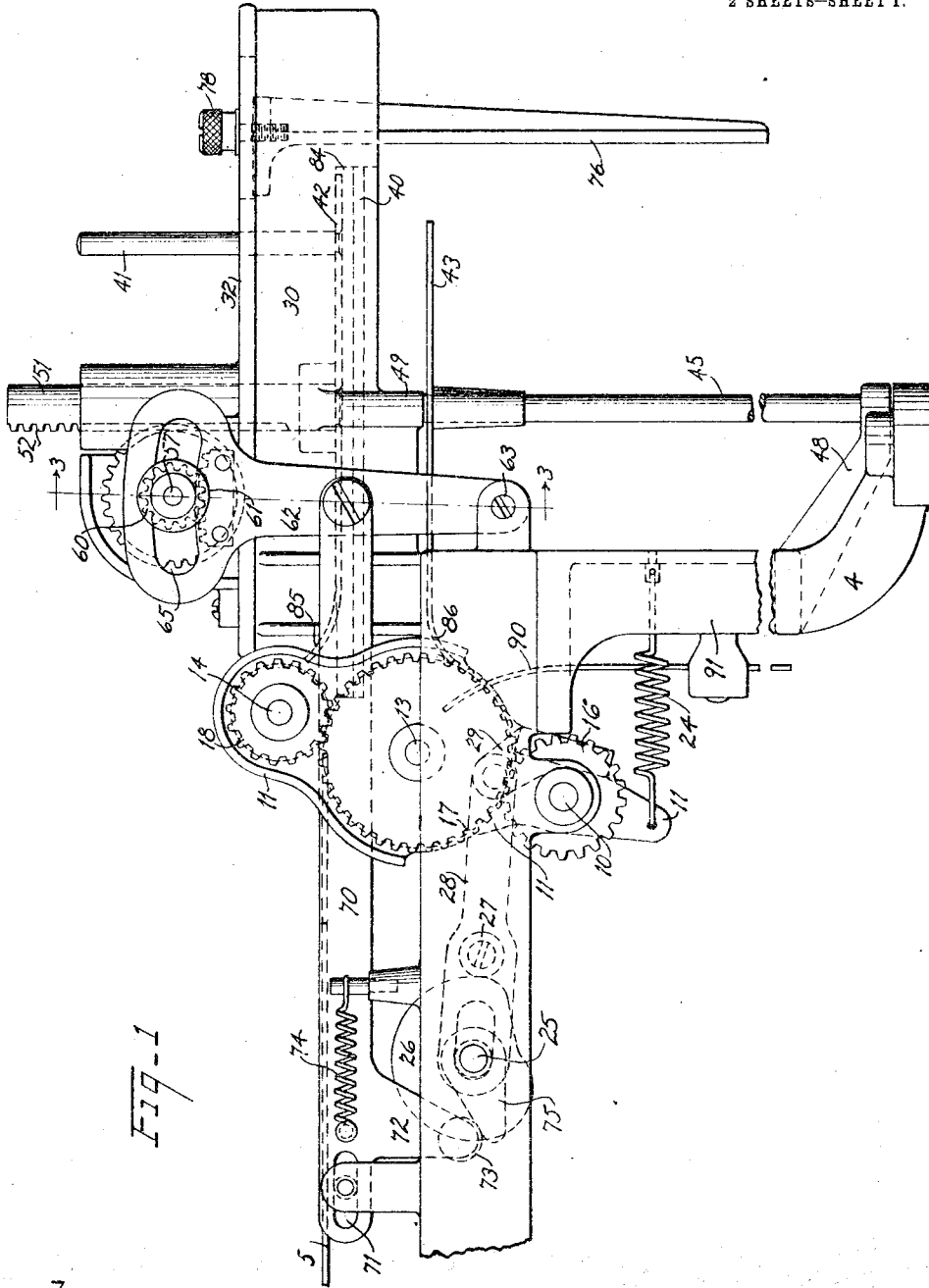


Fig. 1

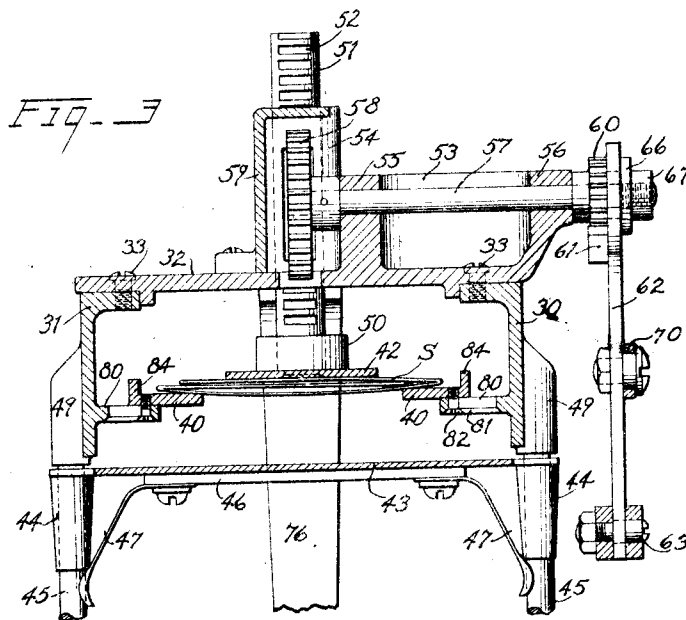
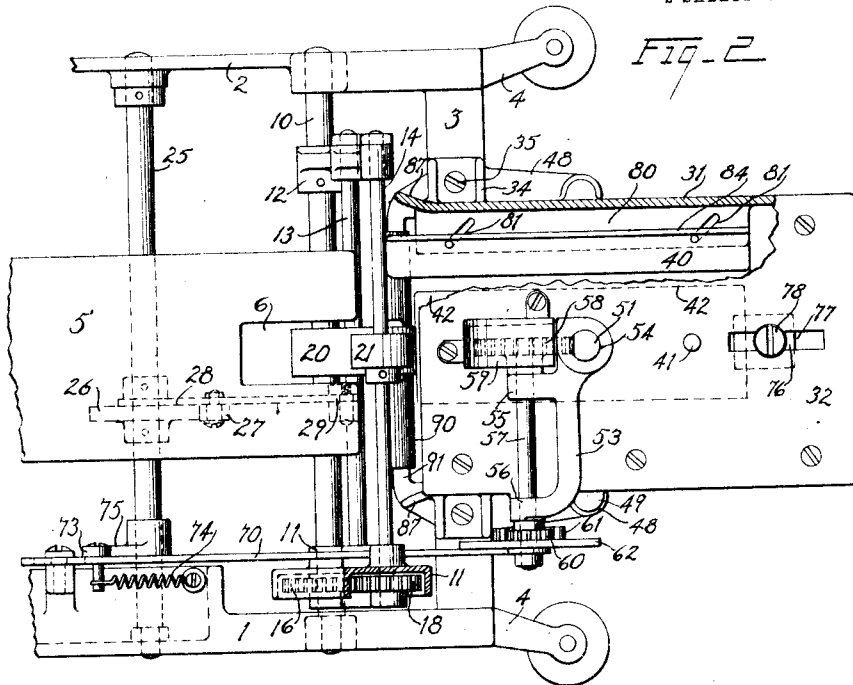
Witnesses.
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Justin W. Macklin

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UNITED STATES PATENT OFFICE.

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STACKING MECHANISM.

1,079,089.

Specification of Letters Patent.

Patented Nov. 18, 1913.

Application filed September 16, 1912. Serial No. 720,535.

To all whom it may concern:

Be it known that I, WILLIAM R. ALLEN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Stacking Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 The object of this invention is to provide simple and effective mechanism for automatically stacking articles delivered to the mechanism as, for example, folded sheets, envelopes, cards, etc.

15 The invention is shown herein as embodied in a device adapted to cooperate with a circular letter folding machine which delivers folded letters, one after another, designed to be stacked into a pile. An illustration of such folding mechanism is found in Patent 20 No. 1,048,996 of F. G. Nind and Frederick Julyan, issued to The American Multigraph Company December 31st, 1912. My stacker is an improvement on the stacker shown in 25 that application, though its use is not limited to action on folded letters.

The invention is hereafter more fully described and its essential characteristics set out in the claims.

30 In the drawings, Figure 1 is a side elevation of my stacking mechanism and a suitable delivering device for conveying folded sheets to the stacking mechanism; Fig. 2 is a plan, partly sectional, of the stacking 35 mechanism together with such delivery device and the former plate of a folding machine; Fig. 3 is a vertical section through the stacking mechanism, as indicated by the line 3-3 of Fig. 1.

40 Referring to the parts by reference numerals, 1 and 2 indicate side bars, 3 an end bar, and 4 legs of the frame of the folding and delivery mechanism.

5 indicates the former plate of the folding 45 mechanism, such former plate being suitably supported at the left of Figs. 1 and 2 by means not shown. In the folding machine, suitable mechanism is provided for feeding a sheet beneath the former plate and for 50 then bending the side panels of such sheet over onto the former plate, so that the center panel of the sheet stands below the plate and the two panels folded one on top of the other

above the plate. Mechanism, about to be described, withdraws such folded sheet from 55 the former plate and delivers it to my stacking mechanism, which will be described later.

Mounted in the side bars 1 and 2 of the frame is a rock shaft 10 on which are arms 11 and 12 carrying shafts 13 and 14. On the 60 three shafts 10, 13 and 14 are meshing gears 16, 17 and 18. Any suitable means, not shown, is provided for rotating the gear 16, and this rotates in unison the shafts 13 and 14 and turns the coacting feeding rollers 20 65 and 21 which are mounted on the shafts 13 and 14 respectively.

On a shaft 25, carried by the side bars of the frame, is a cam 26 cooperating with a roller 27 on a link 28 which connects 70 with a rock arm 29 on the shaft 10. This cam is so formed and timed that, as the top panels of the sheet are folded onto the top of the former plate 5, a decreasing face of the cam 26 allows the spring 24 to act on the 75 rocking frame and carry the roller shafts toward the left, so that the two rollers 20 and 21 move into the notch 6 in the former plate and pinch between them the folded sheet. Now after the rollers have pinched 80 the folded sheet, they roll it between them toward the right, that is toward the stacking mechanism. As this rolling is going on, the cam 26 acts in the reverse direction to rock 85 the delivery frame toward the right so that the folded sheet is not only fed by the rotating rollers, but bodily shoved by the rocking frame into the stacking mechanism.

The mechanism so far described is not claimed in this application but in the prior 90 application of Messrs. Nind and Julyan above referred to. It is explained herein, for the purpose of making clearer my stacking mechanism which coacts therewith and which will now be particularly described. 95

Secured to the folding machine frame 100 above described is the frame of my stacking mechanism. As shown, this consists primarily of side plates 30 and 31 and a top plate 32 connected to them. The top plate is 105 shown as secured to the side members 30 and 31 by means of screws 33 which screw into inwardly extending flanges of the side members. The top plate and side members constitute in use one rigid structure or housing. This housing or stacker frame is se-

cured to the folding machine frame, preferably to the cross bars 3. As shown this fastening is obtained by means of ears 34 on the side of the side members 30 and 31 through which ears screws 35 pass into the cross bars 3.

The folded sheets are delivered by the delivery mechanism heretofore described into the housing 30, 31 and 32, just described. In this position they rest on suitable ledges 40 projecting inwardly from the inner face of the side plates 30 and 31, a folded sheet being shown in this position at S in Fig. 3. A suitable plunger 42 above the folded sheet acts downwardly periodically to force it below the ledges onto a receiving table 43, which moves downwardly as successive sheets are added above it. The ledges referred to, as well as the mechanism for operating the plunger, will be hereinafter more fully described.

The table 43 which forms the bottom of the stacker receptacle consists of a plate having a pair of sleeves 44 surrounding rods 45 connected with the stacker frame. This guides the plate so that it may travel. To restrain its downward movement, I provide a pair of springs 47 which are secured to a reinforce 46 on the under side of the plate and incline downwardly and outwardly and frictionally engage the side of the rods 45, the springs being preferably curved at the point of engagement to make a better contact. This frictionally supported table provides means for maintaining the stack of folded sheets while allowing the continuous addition of additional sheets at the top of the pile. The rods 45 are conveniently mounted at their lower ends in a cross plate or bracket 48 of the folding machine, while at their upper ends they enter sockets 49 formed on the side of the stacker frame plates 30 and 31.

The plunger 42 heretofore referred to is preferably provided with a guide rod 41 which rises through an opening in the top plate; it has also a boss 50 on its upper surface, from which rises a vertical rod 51 having rack teeth 52 formed along one edge. This plunger rod is guided in a suitable sleeve or boss 54 secured to or formed on the top plate 32 of the stacker frame. Mounted on this plate are ears 55 and 56 which may be part of a bracket 53 integral with the top plate and boss. Journaled in these ears is a shaft 57 which carries on its inner end a gear 58 meshing with the rack 52 through an opening in the boss 54. A suitable housing 59 preferably incloses the gear 58. On the other end of the shaft 57 is a pinion 60 which meshes a short arcual rack 61 on the side of the lever 62. This lever is pivoted at 63 to ears extending from the end bar 3 of the machine frame. At its upper end it has an arcual slot 65 by which it loosely

yokes about the shaft 57. A suitable washer 66 and nut 67 on the shaft confine this rocking lever between the pinion 60 and the washer 66.

Connected with the lever 62 between its pivot and the rack 61 is a link 70. This link is slidably guided near its other end by a slot 71 passing around a frame stud and is impelled toward the right by a spring 74. Carried by a depending portion 72 of the link is a roller 73 which coacts with a cam 75 on the shaft 25. This cam is adapted to force the roller toward the left in Fig. 1 and when it so acts the lever 62 is rocked in that direction and the pinion 60, shaft 57 and gear 58 are accordingly turned in the right hand direction (Fig. 1) which forces down the plunger rod 51. Accordingly, the plunger plate 42 on the lower end of this rod forces the folded sheet S downwardly, its edges springing beneath the ledges 40 so that the folded sheet comes onto the table 43 or onto the top of previously folded and stacked sheets resting on that table.

The cams 26 and 75 are so positioned and timed that, as the folding of the sheet is completed, the delivery device engages it and forces it, partly by rolling action and partly by shoving, toward the right above the ledges 40 and beneath the plunger 42, and then, just after it comes into this position the plunger acts downwardly on the folded sheet to bend it beneath the ledges 40 so that it comes onto the top of the pile of sheets.

A suitable abutment bar 76 depends from the stacker frame into the path of the delivered sheet and forms a stop therefor, as well as an end member for the skeleton receptacle for the stacked sheets, this skeleton receptacle being provided by the bottom 43, side bars 45, the end bar 76, and the plate 90, hereinafter mentioned, at the other end. The abutment bar 76 is shown as adjustably secured to the top plate 32 so that it may be adjusted for different lengths of the sheets. The adjustment is shown as provided by having a slot 77 in the top plate. A screw 78 passing through this slot into the bar 76 holds the latter rigidly, but, by means of the screw, the bar may be adjusted forwardly or backwardly, as desired.

To provide for the stacking of various widths of folded sheets or other articles, I make the ledges 40 adjustable in position so that whatever the width of the article to be stacked, these ledges may extend under the delivered article sufficiently to support it, but not far enough to prevent it being conveniently forced downwardly beyond the ledges by the plunger 42. A convenient way of making the adjustment is to provide integral inwardly projecting flanges or ribs 80 on the inner faces of the side plates 30

and 31, and to adjustably secure to these the movable bars 40 by providing slots 81 in the flanges and screws 82 which screw through these slots into the bars 40. The screws may have countersunk heads resting on chamfered edges of the slots, as shown in Fig. 3.

The bars 40 are preferably provided with upwardly projecting flanges 84 at their outer edges to form side guides for the folded sheet delivered to the stacker. As shown in Fig. 2, the slots 81 are diagonal, so that, as the bars 40 are adjusted in or out, they are always maintained parallel. In such adjustment they travel a little toward or from the folding mechanism, but that is immaterial. When these bars are clamped in position determined by the width of the folded sheet they are rigid with the stationary flanges 30 and with them constitute the ledges referred to.

To provide for the convenient entrance of the folded sheet into the stacker housing, I curve upwardly the forward edge of the plunger plate 42, as shown at 85 (Fig. 1), and I curve downwardly the forward edge of the table 43, as shown at 86. The sides of the frame members 30 and 31 are curved outwardly, as indicated at 87. A front wall for the skeleton receptacle for the stacked sheets is provided by a plate 90, which is supported by a cross member 91 secured to the frame of the folding machine. This plate stands in an upright position with its upper edge curving away from the table 43. As the stacked sheets with the table move downwardly by reason of the addition of new stacked sheets above them, any sheets which did not quite enter the housing have their rear edges engage the curve of the plate 90, which trues them up against the back bar 76.

It will be seen that my stacking mechanism is very simple in construction. Practice has demonstrated that it is very effective in stacking. It receives various sizes of folded sheets, or other articles and automatically delivers them, without marring them, into the proper pile. The pile is trued up by the parts of the skeleton receptacle as the pile increases its size.

When sufficient sheets have been stacked to depress the table 43 to its lowermost position (or to any other position where it is desired to remove the sheets) the pile, or the lower portion of it, may be conveniently removed beneath the stop bar 76 by withdrawing the pile or portion thereof endwise by hand, the table being raised to a considerable distance below the lowermost stop bar (as indicated by the dotted line in Figs. 45 and 46 in Fig. 2). Or, if necessary, the pile may be compressed by hand to pass beneath the stop bar. After removal the table is raised by hand. The withdrawal of

the stacked articles does not interfere with the continuous operation of the stacking mechanism.

Having thus described my invention, what I claim is:

1. The combination, with means for delivering articles to be stacked, of a stacker housing having a cross-plate and side walls, a slidable table, a pair of ledges projecting inwardly from the side walls for engaging the article to be stacked, a plunger adapted to stand on the opposite side of said article from the table and be moved between the ledges, a rod extending from the plunger through the housing cross plate and carrying a rack, a gear meshing with said rack, and mechanism for rotating said gear to move the plunger past the ledges.

2. The combination, with means for delivering articles to be stacked, of a stacker frame, a pair of rods carried thereby, a table slidably engaging said rods, springs for maintaining friction between the table and rods, a pair of ledges for supporting the article to be stacked above the table, a plunger adapted to stand above said article when on the ledges and be moved between the ledges, a rod rising from the plunger and carrying a rack, a gear meshing with said rack, and mechanism for rotating said gear to move the plunger past the ledges.

3. The combination of stacker housing having side walls, a pair of separated ledges carried by said walls, each of said ledges consisting of a strip rigid with the side wall and a second strip adjustably mounted on the first and adapted to project inwardly beyond it, a plunger narrower than the space between the ledges, means for moving the plunger between the ledges and past them, and a movable receiving table on the opposite side of the ledges from the plunger.

4. The combination, with means for delivering articles to be stacked, of a pair of separated ledges, a plunger narrower than the space between the ledges, means for moving the plunger past the ledges, a table to receive the articles, and flanges carried by said ledges and projecting in a direction away from the table and forming side guides for the articles delivered to the ledges.

5. The combination, with means for delivering articles to be stacked, of a stacker housing having a top plate and side walls, a pair of ledges carried on the inner side of the side walls of said housing, a plunger having a rod extending through the top plate of the housing, means for operating the rod to move the plunger below the ledges, a pair of guide rods connected with the housing, and a receiving table slidably mounted on said guide rods.

6. The combination of a stacker housing including side walls and a top plate, rods extending longitudinally from the side walls,

a table slidably carried by said rods, a plunger above the table, an operating member therefor extending through the top plate, ledges carried by the side walls of the housing projecting inwardly in an intermediate position between the plunger and table, a depending top bar adjustably carried by the top plate of the housing beyond one end of the plunger.

10 7. The combination, with means for delivering articles to be stacked, of a stacker housing having side walls and a top plate, rods extending downwardly from the side walls, a table slidably carried by said rods,

15 a plunger above the table, ledges carried by

the side walls of the housing projecting inwardly in an intermediate position between the plunger and table, a stop bar depending from the top plate of the housing beyond one end of the table, and a stationary stop beyond the other end of the table, the rods, stop bar, front stop and table constituting a skeleton receptacle for stacked articles.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

WILLIAM R. ALLEN.

Witnesses:

ALBERT H. BATES,
H. H. GRIFFIN.