Dec. 1, 1931. A. WINKLER ET AL 1,834,566

APPARATUS FOR REMOVING AND SIMULTANEOUSLY FOLDING SHEETS FROM A STACK

Filed Jan. 22, 1931

Fig. 1.

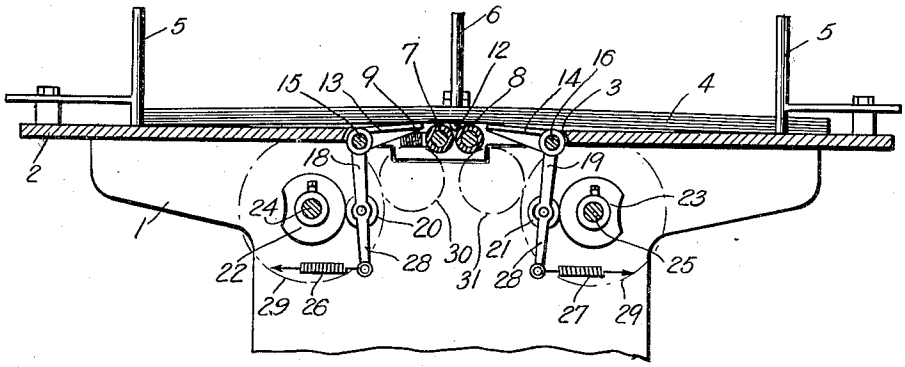
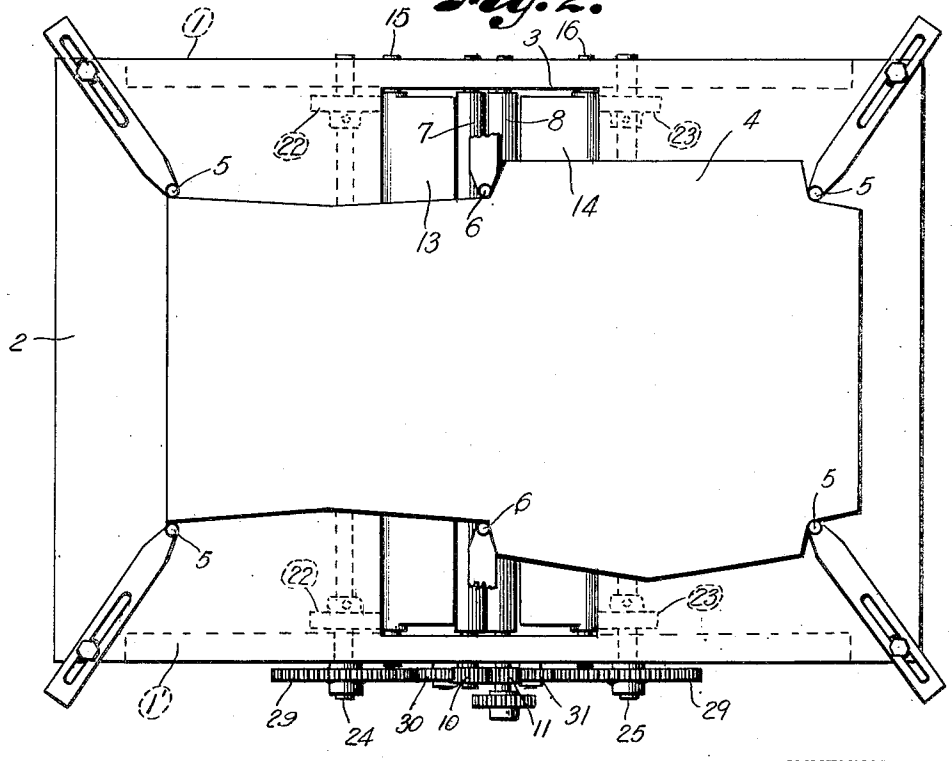


Fig. 2.



INVENTORS
Alfred Winkler and
Max Dunnebier.
BY
ATTORNEY.

Patented Dec. 1, 1931

1,834,566

UNITED STATES PATENT OFFICE

ALFRED WINKLER AND MAX DÜNNEBIER, OF NEUWIED-ON-THE-RHINE, GERMANY

APPARATUS FOR REMOVING AND SIMULTANEOUSLY FOLDING SHEETS FROM A STACK

Application filed January 22, 1931, Serial No. 510,459, and in Germany February 23, 1929.

This invention relates to an apparatus for feeding sheets from a stack into an envelope making or like machine, and more particularly to a feeding apparatus wherein the sheets are fed into the machine with an initial fold, the principal objects of the invention being to assure positive withdrawal of a single sheet at a time and to time the interval between the feed of successive sheets by intermittently raising and lowering the stack with relation to the feeding mechanism, thereby keeping all of the sheets in the stack in guided relation with its supporting means.

It is also a further object of the invention to provide a mechanism which will operate with positive and accurate feed on very thin sheets.

In accomplishing these and other objects of the invention, we have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a sectional view through a feeding apparatus embodying our invention.

Fig. 2 is a plan view of the apparatus.

Referring more in detail to the drawings:

1—1′ designate the side frames of an envelope making or like machine for supporting a substantially horizontal stack plate 2 having a central rectangular opening 3 through which sheets are fed into the machine. The stack of sheets 4 is supported on the plate 2 and positioned with relation to the opening 3 by adjustable stop members 5 engaging the stack of sheets laterally of the opening 3 and by stop or guide members 6 engaging against the end edges of the sheets at a point in alignment with the fold to be imparted thereto incidental to the feeding operation later described.

Journaled in the side frames of the machine are feed rollers 7 and 8 positioned so that their upper surfaces lie slightly above the upper face of the plate 2 and so that their line of contact is in substantially longitudinal alignment with the guide members 6. The feed rollers are preferably of small diameter so that distance between the lines of contact of the rollers with the stack is as short as possible.

The rollers 7 and 8 are preferably mounted in such a manner that they can move apart by suitable spring action as is illustrated at 9 (Fig. 1), to accommodate sheets of different thicknesses.

The rollers are thus retained in yielding contact with each other and are adapted to be rotated toward each other by gears 10 and 11 suitably timed to the actuating gearing of the envelope machine.

The lower ends 12 of the guide members 6 project downwardly between the feed rollers so that the sheets remain in guided relation thereby during the feeding operation, as later described.

In order to support the stack of blanks from contact with the rollers and to provide a time interval between the feed of blanks, rails or plates 13 and 14 are pivotally mounted within the opening 3 at opposite sides of the feed rollers. The rails thus form a support for the sheets between the rollers and the edges of the opening 3.

The rails are preferably mounted at their rear edges on shafts 15 and 16 journaled in the plate 2 and are pivotally actuated thereon by lever arms 18 and 19 depending below the stack plate and carrying rollers 20 and 21 which bear on cams 22 and 23 that are mounted on shafts 24 and 25 journaled in the side frames of the machine.

The rollers are urged to follow the contour of the cams by springs 26 and 27 connecting extensions 28 of the arms with fixed points on the machine. The cam shafts are rotated by gears 29 meshing with the idling gears 30 and 31, which mesh with the gears 10 and 11 respectively, so that the cams produce a continuous up and down movement of the plates in such a manner that the portions of the stack resting on the plates and extending over the feed rollers is intermittently raised from contact with the feed rollers and then lowered into contact therewith upon each revolution of the cams. Each time the stack is lowered, the bottom sheet of the stack contacts the feed rollers and is bulged downwardly between them to be drawn thereby from under the stack, incidentally receiving

the initial fold as it is being fed into the machine.

As soon as the rollers 7 and 8 have gripped the sheet, the cam rollers engage the low lobes of the cams to effect raising of the stack so that only the one sheet is withdrawn at a time, the next sheet following only when the stack is again lowered. The frequency of withdrawal of successive sheets can thus be regulated by frequency of the rise and fall of the rails.

As above described, the rise and fall of the rails is dependent upon the drive of the feed rollers. However, the drive may be arranged so that the cams do not rotate in a fixed relation to the feed rollers but may be actuated so that their speed may be independent thereof if desired. This is of particular importance since the intervals of time and space between the feeding steps must be regulated and graduated according to size of the sheets.

The change of speed may be accomplished by a suitable transmission or similar change speed apparatus.

In operating a machine of the character described, the sheets are placed in a stack on the plate 2 so that the point at which the initial fold is to be imparted lies in alignment with the guide members 6. The guide members 6 and the stops 5 are then adjusted against the sides of the stack and the machine is started. When the rails 13 and 14 are swung downwardly, due to the cams, the stack is lowered so that the lower sheet is frictionally engaged by the feed rollers. The feed rollers cup or bulge the sheet downwardly to feed it therebetween, drawing the ends of the sheet from under the stack and feeding it into the machine initially folded. During the downward movement of the stack, all of the sheets, even the very lowermost, remain in guided relation with the members 6. As soon as the sheet has been engaged by the rollers, the cams cause the plates to raise the stack so that only one sheet is fed at a time.

What we claim and desire to secure by Letters Patent is:

1. In a sheet feeding apparatus of the character described, means for supporting a stack of sheets, feed rollers rotatable on fixed axes and arranged for contact with the face of the bottom sheet of the stack between the ends of the stack, to grip and feed sheets individually from the stack, and means for moving the stack vertically to and from contact with the rollers to effect feed of sheets from the stack.

2. In a sheet feeding apparatus of the character described, means for supporting a stack of sheets, feed rollers rotatable on fixed axes and arranged for contact with the face of the bottom sheet of the stack between the ends of the stack, to grip and feed sheets individually from the stack, and means including a cam for moving the stack vertically to and from contact with the rollers to effect successive feed of sheets from the stack.

3. In a sheet feeding apparatus of the character described, means for supporting a stack of sheets, feed rollers rotatable on fixed axes and arranged for contact with the face of the bottom sheet of the stack between the ends of the stack, to grip and feed sheets individually from the stack, and means actuated in timed relation with the rollers for moving the stack vertically to and from contact with the rollers to effect feed of sheets from the stack.

4. In a sheet feeding apparatus of the character described, a plate having a delivery opening for supporting a stack of sheets, feed rollers rotatably mounted below said stack on fixed axes arranged for contact with the face of the bottom sheet of the stack between the ends of the sheet, to grip and feed sheets individually from the stack, and means for raising and lowering said stack to and from feeding relation with said rollers to effect feed of sheets from the stack.

5. In a sheet feeding apparatus of the character described, a plate for supporting a stack of sheets, having a delivery opening, feed rollers mounted for rotation below the stack, rails associated with said rollers and movable through the opening to raise and lower the stack from and to contact with the rollers, and means for actuating the rails.

6. In a sheet feeding apparatus of the character described, a plate for supporting a stack of sheets, having a delivery opening, feed rollers mounted for rotation below the stack, pivoted rails associated with said rollers and movable through the opening to raise and lower the stack from and to contact with the rollers, and means for actuating the rails.

7. In a sheet feeding apparatus of the character described, a plate for supporting a stack of sheets, having a delivery opening, feed rollers mounted for rotation below the stack, rails associated with said rollers and movable through the opening to raise and lower the stack from and to contact with the rollers, and cams geared to said rollers for actuating the rails.

8. In a sheet feeding apparatus of the character described, a plate for supporting a stack of sheets, having a delivery opening, feed rollers mounted for rotation below the stack, rails pivotally mounted on said plate for engaging the bottom of the stack, arms fixed to the rails, cams operable in relation with the rollers, means for retaining the arms in frictional relation with the cam to move the rails for raising the stack to and from the rollers for effecting withdrawal of sheets from the stack.

9. In a sheet feeding apparatus of the character described, means for supporting a stack of sheets, feed rollers rotatable on fixed axes

and arranged for contact with the face of the bottom sheet of the stack between the ends of the sheet, to grip and feed sheets individually from the stack, and means for lowering and raising the stack to and from contact with the rollers to effect feed of sheets from the stack.

10. In a sheet feeding apparatus of the character described, a plate having a delivery opening for passage of sheets from a stack supported on the plate, guide members supported by the plate for engaging the edges of the sheets, feed rollers mounted in the opening in line with the guide members, rails movable through the opening to raise and lower the stack to and from contact with the rollers to effect feed of the sheets.

11. In a sheet feeding apparatus of the character described, a plate having a delivery opening for passage of sheets from a stack supported on the plate, guide members supported by and extending below said plate for engaging the edges of the sheets, feed rollers mounted in the opening in line with the guide members, and rails movable through the opening to raise and lower the stack to and from contact with the rollers to effect feed of the sheets.

In testimony whereof we affix our signatures.

ALFRED WINKLER.
MAX DÜNNEBIER.