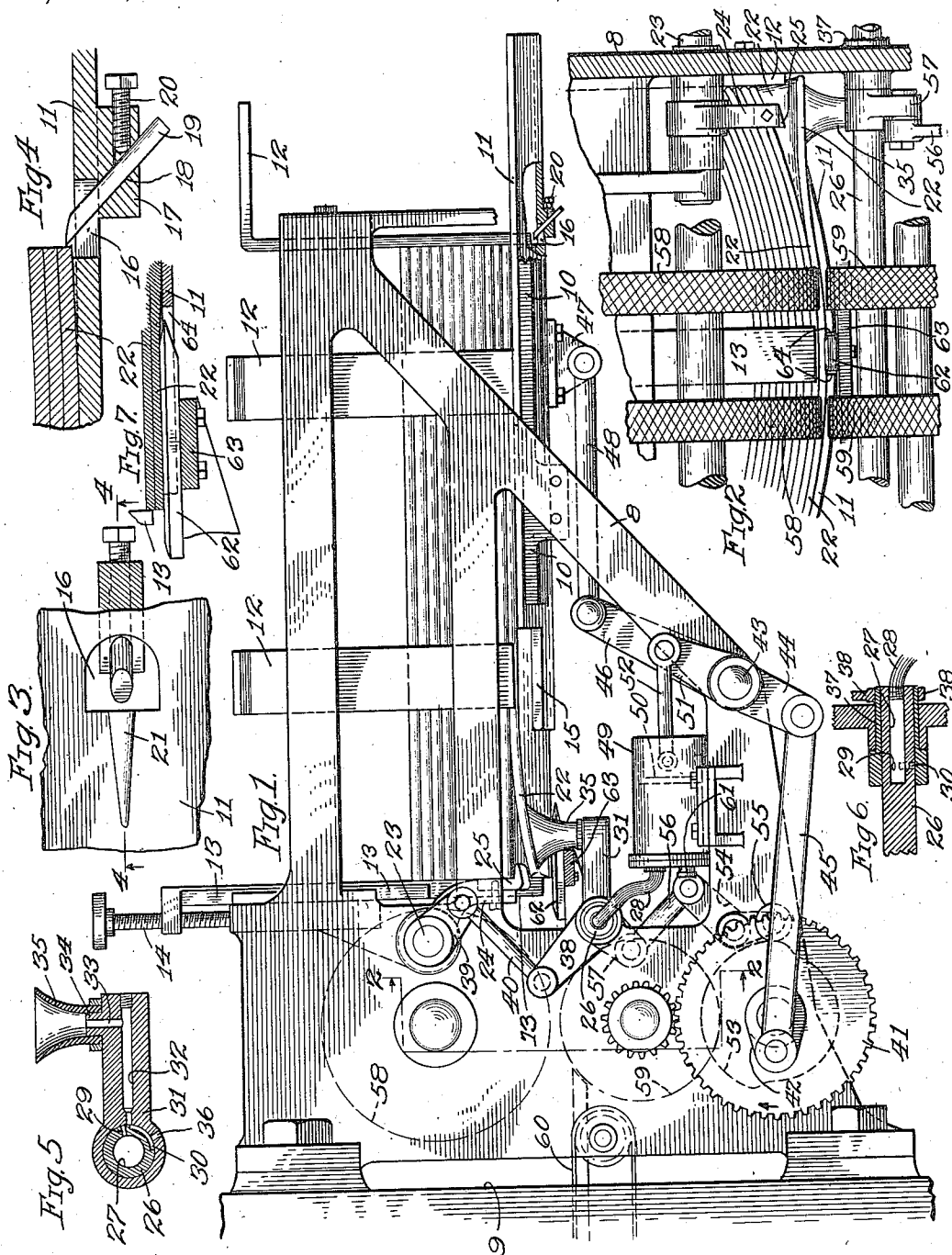


J. HUNEKE.
FEEDING DEVICE.
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Patented Mar. 14, 1916.

1,174,984.



WITNESSES:
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UNITED STATES PATENT OFFICE.

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FEEDING DEVICE.

1,174,984.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN HUNEKE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feeding Devices, of which the following is a specification.

This invention relates to feeding devices, more particularly described as devices of this class for use in connection with printing, folding or addressing machines, and the principal object of the invention is to provide a new and improved form of the feeding device which is simple in construction and effective and efficient in operation.

A further object of the invention is to provide a feeding mechanism in which the separate sheets or members to be fed are separated from the other members before being fed from a stack of the members.

A further object of the invention is to provide a feeding device of this class in which the articles to be fed are supported upon a curved base plate by which the lowermost member is fed endwise and parallel with the length of the plate.

A further object of the invention is to provide improved means for limiting the thickness of the article fed and for feeding a predetermined quantity of members at the same time.

A still further object of the invention is to provide improved adjustable means for accurately engaging the lowermost member or members of precisely the desired thickness.

A still further object of the invention is to provide improved means for engaging the lowermost member to be fed with a suction cup.

For the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts, generally shown in the accompanying drawing and described in the specification but more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a side elevation, partly cut away and in section, of a feeding device constructed in accordance with the principles of my invention; Fig. 2 is a detail sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a detail view of one

of the adjustable grippers; Fig. 4 is a sectional view of the same taken on the line 4—4 of Fig. 3; Fig. 5 is a detail sectional view of the vacuum cup and valve; Fig. 6 is a detail view of the vacuum valve connection; and Fig. 7 is a detail view of the gate device.

This invention comprises a curved reciprocable plate for feeding the lowermost sheet or pamphlet from a stack of the same between gripping rollers and for positively separating the lowermost sheet from the other sheets or pamphlets before the lower sheet or pamphlet is fed from the stack by means of a vacuum cup device and a movable finger.

Referring more particularly to the drawings, a frame 8 is secured to a suitable portion 9 of a machine to which the feeding device is to be applied, and supported by the frame 8 are various parts of the feeding device.

The feeding device comprises a base 10 upon which a reciprocable curved plate 11 is slidable. Supported by the frame 8 are a plurality of members 12 which define a magazine for containing a stack of the sheets, pamphlets or articles to be fed which are supported upon the plate 10.

At the forward end of the feeding device from which the sheets or pamphlets are to be fed is an adjustable bar 13, which is supported in any suitable manner by the frame 8, and is preferably provided with an adjusting screw 14 by means of which the lower end of the bar may be accurately positioned with respect to the lowermost member to be fed, and with respect to the reciprocable plate 11. The plate 11 is formed at one corner of its forward edge with a cut-away portion 15, and adjacent the other end of the plate it is provided with perforations 16 (see also Fig. 4), and with a depending projection 17 having an inclined perforation 18 therethrough which communicates with the perforation 16 in the plate. A feeding pin 19 is adapted to be inserted through the inclined perforation 18, the upper end extending above the plate 11 and being held in any desired position by means of an adjusting screw 20. In front of each perforation 16 is a projection 21 which inclines from the opening 16 to the plate 11 at a slight distance from the opening, as shown more clearly in Fig. 3. The

object of this raised portion 21 is to insure that the rear edge of the lowermost sheets or pamphlet will be compressed immediately in front of the feeding pins so that the pins will engage a proper and definite thickness upon each feeding movement of the plate. This will be obvious when it is considered that a sheet or pamphlet may be slightly wrinkled or distorted so that all parts of it will not lie flatly on the feeding plate 11, but by providing a raised portion on the feeding plate the weight of the lowermost sheet or pamphlet itself, or of the stack of the same upon the lowermost sheet or pamphlet, will cause it to be compressed on the raised portion so that the feeding pin will always engage exactly the proper amount of the sheet or pamphlet above the plate, for which it has been set.

Mounted in the frame 8 at the forward end of the magazine stack is a shaft 23 to which is secured an arm 24 having an adjustable finger 25 adapted to support the stack of sheets or pamphlets in the magazine at one corner thereof, and to be moved into and out of supporting position by the oscillation of the shaft 23. Also mounted at the forward end of the magazine and fixed with respect to the frame 8 is a shaft 26 having a recess 27 in one end to which a tubular member 28 is connected. This shaft is also provided with a perforation 29 (see Fig. 5) forming a passage from the recess 27, and with a peripheral groove 30 extending partway around the shaft 26 in the same transverse plane with the opening 29. Freely mounted upon the shaft 26 is a valve member 31 having a passage 32 therein and another passage 33 communicating therewith and extending through the wall of the member through a projection 34 thereof. Mounted upon this projection and secured thereto in any suitable manner is a vacuum cup 35 preferably composed of some flexible material, such as rubber or the like. This member 31 is so mounted with respect to the passage 29 and the groove 30 that it forms communication with the passage 29 when in one position and with the groove 30 when in another position, and the valve member is provided with a discharge opening 36 which forms an outlet for the valve passage 32 when the latter is in communication with the groove 30. This valve member 31 is so positioned that the vacuum cup 35 is disposed at the corner of the magazine stack adjacent the finger 25, and the cut-away portion 15 of the reciprocable plate 11 is for the purpose of permitting the plate to be moved into its forward position without engaging the cup 35.

In order to cause the movement of the valve member 31 and the finger 25 the member 31 is formed with an extension 37 upon which is mounted an arm 38, and to the shaft

23 is connected an arm 39 and the arms 38 and 39 connected by a link 40. This will cause the finger 25 and the valve member 31 to be moved in unison.

In order to effect the reciprocation of the plate 11 a driving gear 41 is mounted in the frame which is driven by any suitable means, and a crank 42 is formed integral or secured thereto. Mounted in the frame 8 is a shaft 43 having an arm 44 secured thereto, and a crank shaft 45 connects the crank 42 and the arm 44. Also secured to the shaft 43 is an arm 46, and secured to the plate 11 is a block 47 to which one end of a link 48 is pivoted, the other end being pivotally connected to the arm 46. Secured to the frame 8 is a fluid pressure cylinder 49, to one end of which the tubular member 28 is connected. A trunk piston 50 is movable in the cylinder and mounted upon the shaft 43 is an arm 51 which is connected to the trunk piston by means of a piston rod 52.

Movable with the gear 41 is a cam 53, and pivotally mounted adjacent the cam is a bell crank 54 upon one arm of which is an anti-friction roller 55 in contact with the cam surface 53. The other arm of the bell crank is pivotally connected to one end of a link 56, and the valve member 31 is formed with a projecting arm 57 which is pivotally connected to the other end of the link 56. The anti-friction roller 55 rides on the cam surface 53 and the movement imparted to the bell crank causes the valve member 31 and the finger 25 to be moved in accordance therewith. The rotation of the gear 41 also effects the reciprocation of the plate 11 and the movement of the piston 50 in the cylinder 49 which causes the air to be drawn in through the cup member 35 and expelled through valve 61 and a partial vacuum to be formed in the cup when the lowermost sheet or pamphlet is in contact therewith.

In order to more accurately gage the thickness of the sheets or pamphlets discharged from the magazine a block 62 is mounted on a bracket 63, a portion of the block being directly below the adjustable bar 13, and the upper face of the block is beveled about the edges. When this block is applied to a machine having a curved plate 11, it is preferably disposed at the central or lowermost part of the plate. The edge of the sheets or pamphlets are supported by the block 62 slightly above the level of the plate 11 at this point, the height of the block insuring that the sheets or pamphlets will always be compressed at this point even if the edge of the sheet is wrinkled or distorted, the sheets or pamphlets above assisting to hold the lowermost ones in feeding position upon the block. The bar 13 may be accurately adjusted with respect to the block to permit any number of sheets or pamphlets to be discharged be-

tween it and the block as the plate 11 is reciprocated and since the sheets are compressed at this place only a predetermined number can be admitted between the block
 5 and the gate. This reciprocable plate 11 is preferably formed with an opening 64 in the edge thereof which fits around the block when the plate is at the forward end of its stroke so that the members in the magazine
 10 will always be compressed and supported by the block 62.

The mechanism by means of which a sheet or pamphlet is drawn from beneath the stack after one end of the same has been
 15 advanced by means of the feeding plate 11, consists of rollers 58 and 59 which may be driven in any desired or suitable manner, as for example, by geared connection with the driving gear 41. These gripping rollers
 20 may be toothed or knurled to grip the pamphlet or sheet firmly, and any suitable conveying device, as for example, a belt conveyor 60, may be employed for disposing of the separate sheets or pamphlets as they are
 25 fed from the bottom of the stack.

In operation the magazine is filled with a number of the sheets or pamphlets to be fed, the adjustable bar 13 and the feeding pins 19 being previously positioned, and the
 30 mechanism is then automatically operated by the rotation of the driving gear 41. The movement of the driving gear 41 causes the plate 11 to feed the lowermost sheet, also causes the member 31 to be withdrawn from
 35 the lowermost sheet and to release the vacuum when the passage 32 registers with the groove 30, and the finger 25 to be positioned to support the corner of the stack of articles to be fed between the lowermost article and the ones above it. The movement
 40 also causes the piston 50 to be moved forwardly in the cylinder. The continued movement of the driving gear 41 brings the reduced portion of the cam surface to bear
 45 against the anti-friction roller 55 which causes the valve member 31 to be moved into engagement with the lowermost sheet and the finger 25 to be withdrawn at the same time. During this movement the feeding
 50 plate 11 will be drawn back and the piston 50 will be moved rearwardly in the cylinder. With the valve member in this position, it registers with the opening 29 in the shaft 26 and the movement of the piston in the
 55 cylinder will cause the partial vacuum to draw the lowermost sheet in contact with the vacuum cup 35, whereupon the feeding movement of the plate previously described will be repeated. The head of the feeding
 60 pin 19 is preferably rounded, as shown more clearly by Fig. 4, so that the backward movement of the feeding plate will not cause the pin to score or tear the bottom face of the lowermost sheet.

65 It is obvious that various changes may

be made in the construction, combination and arrangement of the several parts without departing from the spirit and scope of the invention.

What I claim is:

1. In a feeding device of the class described, the combination of a curved reciprocable plate having an opening therein and a projection inclined from the edge of the opening to the face of the plate, and a
 70 feeding pin adjustable in the opening and spaced therein from the projection. 75

2. In a feeding device of the class described, the combination with means forming a magazine for the articles to be fed,
 80 of a curved reciprocable plate at the bottom thereof for supporting the articles, and upon which the articles lie compactly at the center of curvature, an adjustable bar at the center of curvature to limit the number of
 85 articles fed by the plate at each movement thereof, a block fixed below the bar with the upper surface above the plate to compress the articles fed in front of the plate, and adjustable feeding pins adapted to en-
 90 gage a predetermined number of members to be fed upon each reciprocation of the plate.

3. In a feeding device of the class described, the combination of a reciprocable plate for supporting and feeding the mem-
 95 bers having one corner thereof cut away, and a suction device, movable into position to engage the lowermost member to be fed, adapted to be disposed in the cut-away space at the end of the plate when it is reciprocated. 100

4. In a feeding device for sheets, pamphlets and the like, the combination with a curved reciprocable plate for supporting and feeding the members from the bottom of a
 105 stack thereof, of means in connection with the plate at one end to predetermine the number of members to be fed by the plate upon its reciprocation, a movable arm pivotally mounted at the other end of the plate,
 110 and a finger supported by the arm movable with it in position to separate the members to be fed upon the reciprocation of the plate.

5. In a feeding device for sheets, pamphlets and the like, the combination with
 115 means forming a magazine for members to be fed, of a longitudinally reciprocable plate at the bottom of the magazine, means in connection therewith to engage a predetermined number of members to be fed by the
 120 reciprocation of the plate, a suction device at the feeding end of the magazine movable to engage the lowermost member to be fed and movable away from the article to be fed, and a finger movable into position between the
 125 article to be fed and the superposed articles.

6. In a feeding device for sheets, pamphlets and the like, the combination with a longitudinally reciprocable supporting and feeding plate, of a suction cup bodily 130

movable into and out of position below the plate to engage one corner of the lowermost sheet and to withdraw it from the other sheets, a fluid pressure device in connection with said suction cup, and driving mechanism comprising means to reciprocate the plate and to operate the fluid pressure device and the suction cup simultaneously.

7. In a feeding device for sheets, pamphlets and the like, a fixed tubular member having an opening therethrough and a peripheral groove in transverse alinement therewith, a valve member having a passage therein freely mounted upon the fixed tubular member, the passage being adapted to register with the passage and groove of the tubular member, a flexible suction cup secured to the valve member and having communication with the valve passage, a fluid pressure cylinder and piston, means forming the communication between the cylinder and the fixed tubular member, and driving means to actuate the piston in the cylinder and to move the valve member in accordance with the movement of the piston in the cylinder.

8. In a feeding device for sheets, pamphlets and the like, the combination with means forming a magazine for member to be fed, of a curved reciprocable plate at the bottom thereof having one corner cut away, adjustable feeding pins in connection with the plate, a suction cup, a movable valve member for supporting the cup adjacent the cut-away corner of the reciprocable plate, a fluid pressure exhausting device, means connecting the device with the suction cup, a finger movable into and out of position between the lowermost member to be fed and the remaining members at the corner thereof when the lowermost member is bent down by the suction device, a driving shaft, a driving gear mounted thereon having a crank, means connecting the crank with the fluid pressure device and with the reciprocable plate, a cam mounted upon said shaft, means in connection with said cam for moving said finger and the valve member simultaneously, and gripping rollers in driving connection with the driving gear to engage and discharge the members after they are fed by the reciprocable plate.

9. In a feeding device of the class described, the combination with a reciprocable plate for supporting and feeding a stack of

articles to be fed with a recess in the forward edge, of a supporting block adapted to be seated in the recess at the forward limit of travel of the plate, with its upper face projecting above the face of the plate, and a bar adjustable in position above the block, the forward edge of articles to be fed being supported by the block and the bar being adjusted to permit a predetermined number of articles to be fed between it and the block when the plate is reciprocated.

10. In a feeding device of the class described, the combination with a reciprocable plate for supporting articles to be fed, having an opening at the forward end thereof, a fixed block with its upper face disposed above the face of the said plate, the edges of the upper face being beveled, the plate being movable in its forward direction of movement to receive the block in the opening, and a bar disposed above the block at the forward limit of travel of the plate to limit the number of articles to be fed from the bottom of the stack when the plate is reciprocated.

11. In a feeding device of the class described, the combination of a curved reciprocable plate for supporting articles to be fed, having an opening from the forward edge of the plate, a fixed block at the forward limit of travel of the plate adapted to be received in the opening of the plate at its forward limit of travel, the upper face of the block being beveled about the edges and disposed above the upper face of the curved plate at the lowermost portion thereof, the articles to be fed being also supported at the forward edge upon the said block, means in connection with the plate for feeding a predetermined number of articles when the plate is reciprocated, and an adjustable bar disposed over the block and forming therewith a guide for permitting a predetermined number of articles to be fed therethrough when the curved plate is reciprocated.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 6th day of March, A. D. 1913.

JOHN HUNEKE.

Witnesses:

CHARLES L. KUEHNLE,
K. W. WONNELL.