Oct. 18, 1927. 1,646,230

E. B. BERKOWITZ

FEEDING DEVICE

Filed April 27. 1925 2 Sheets-Sheet 1

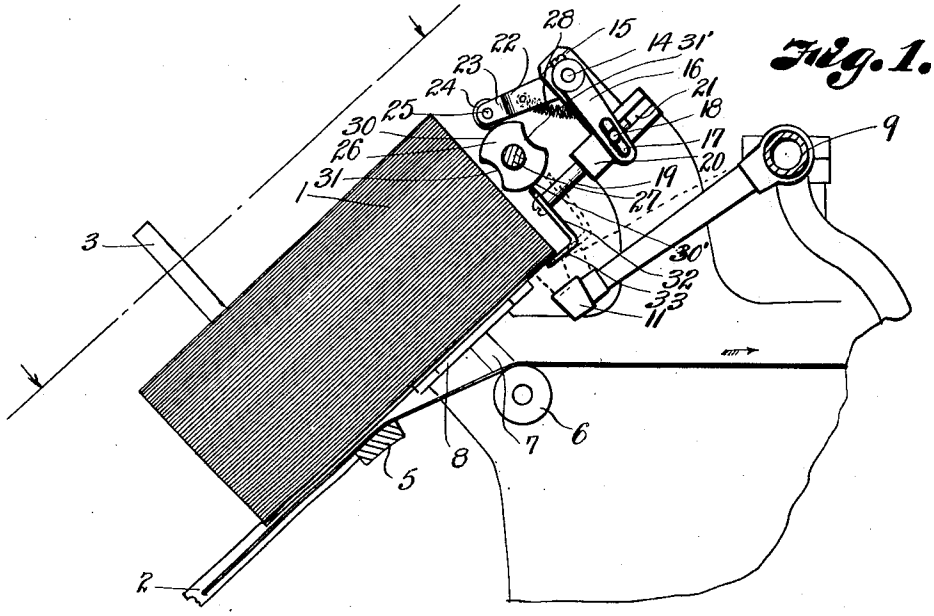


Fig. 1.

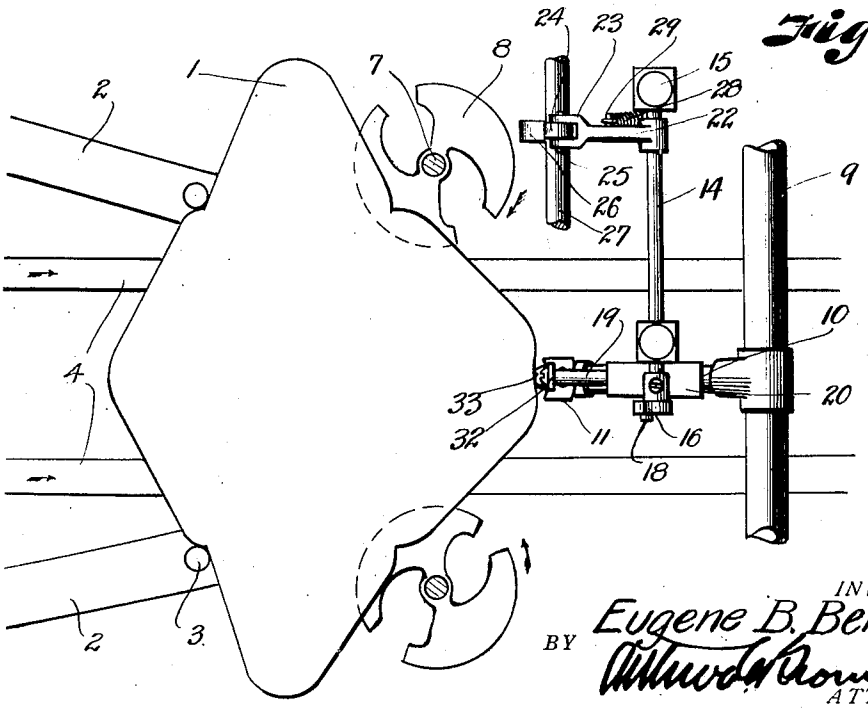


Fig. 2.

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Fig. 3.

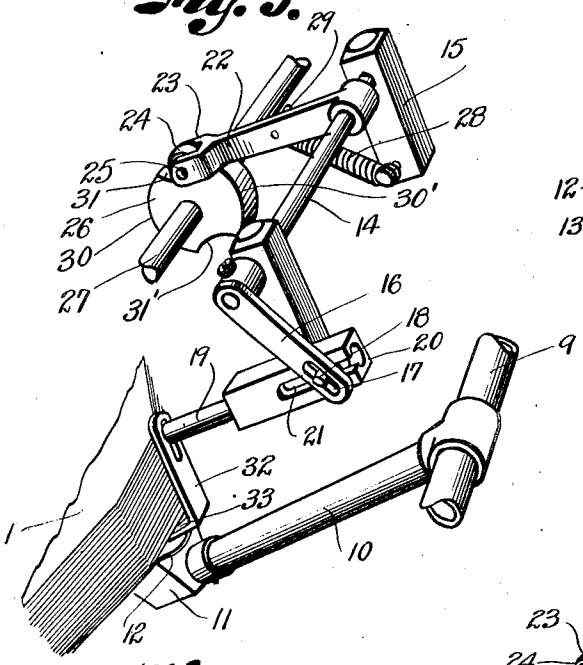


Fig. 4.

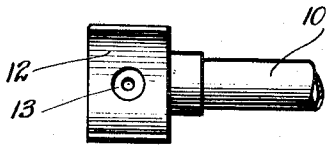


Fig. 5.

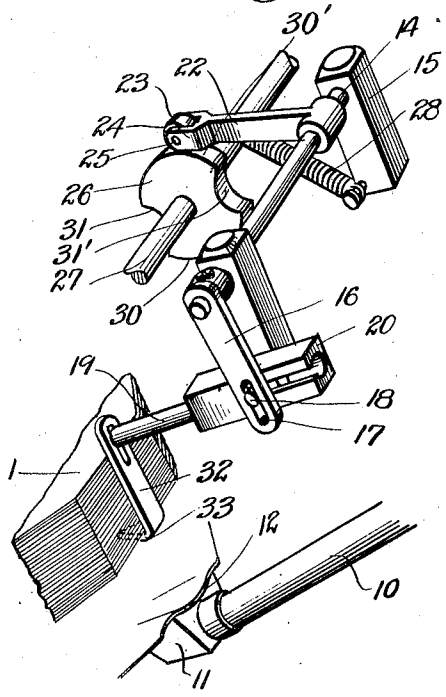


Fig. 6.

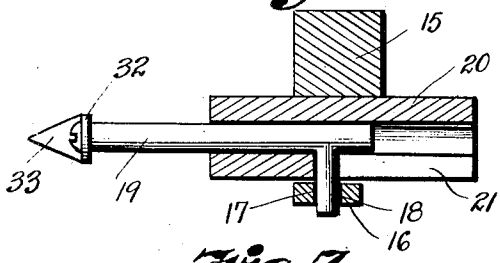
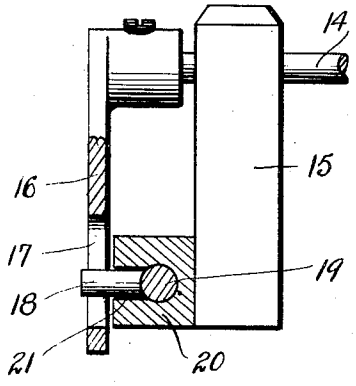


Fig. 7.



INVENTOR

BY Eugene B. Berkowitz.

Arthur C. Brown

ATTORNEY

Patented Oct. 18, 1927. 1,646,230

UNITED STATES PATENT OFFICE.

EUGENE B. BERKOWITZ, OF KANSAS CITY, MISSOURI, ASSIGNOR TO BALTIMORE PAPER COMPANY, OF KANSAS CITY, MISSOURI, A CORPORATION OF MISSOURI.

FEEDING DEVICE.

Application filed April 27, 1925. Serial No. 26,093.

My invention relates to sheet-feeding mechanism, and more particularly to one adapted for use in feeding blanks to an envelope-forming machine like that illustrated in United States Letters Patent to M. Dunnebier and A. Winkler on September 14, 1915, although the invention is not necessarily limited to use in connection with this particular machine, or to the feeding of blanks of any particular size, shape or material for any particular purpose, the present specific application of the invention being merely for purposes of better illustration.

Machines with which my invention is intended for use are customarily supplied with blanks or sheets from stacks located at convenient positions and from which the blanks or sheets are fed individually to folding or other working parts. This necessitates a degree of flexibility in the stacks to permit successive withdrawals of individual blanks or sheets from a fixed feeding position while maintaining reliable support for the body of the stack.

It is therefore the principal object of the invention to so co-ordinate the feeding parts as to permit withdrawals of the individual blanks or sheets while maintaining stability of the stacks, and this irrespective of variations in contour or thickness of the blanks or sheets.

It is also the object of the invention to eliminate pulling strains on the blanks or sheets and thereby avoid tearing those which may be of cheap grade or weak material.

Generically, the invention comprises a suction nozzle which also acts as a support for the stack and as a separator, together with a supporting blade which may be moved under the stack after a lowermost blank or sheet has been pulled down by the nozzle and which serves to support the stack after the nozzle has moved away to carry the lowermost blank forward.

Specifically, the invention comprises the details of structure hereinafter described and illustrated in the accompanying drawings wherein

Fig. 1 is a side elevation of a feeding mechanism constructed in accordance with my invention, showing the front end of the stack supported by the supporting blade and the feeding nozzle ready to function, the dotted lines showing position of the parts as the nozzle assumes its supporting position.

Fig. 2 is a top plan view of the same.

Fig. 3 is a perspective view showing the front edge of the blank or sheet bellied down by the nozzle to permit the blade to enter thereabove and beneath the stack.

Fig. 4 is an enlarged, detail plan view of the nozzle tip, illustrating the suction orifice.

Fig. 5 is a similar view illustrating withdrawal of the blank or sheet.

Fig. 6 is a horizontal, sectional view through the support blade guide, the blade being in plan.

Fig. 7 is a cross-sectional view through the guide and through the shank on the blade.

Referring more in detail to the drawings:

1 designates a stack of envelope blanks, the rear portion of which is supported on bars 2 having upstanding posts 3 which retain the stack in the inclined position from which the feeding is most conveniently effected.

Conveyor belts 4, running in the direction of the arrows, Figs. 1 and 2, extend beneath the rear portion of the stack, over a supporting and guide bar 5 and over the roll 6 in the direction of the feed, the belt spreading from the front end of the stack to afford space for separation of individual blanks or sheets and their delivery from the feeding nozzle to the conveyor belts.

Adjacent the front end of the stack and on shafts 7, extending at right angles to the plane of the stack, are combined separator and supporting disks 8 of sickle shape and paired, the pair on each shaft being spaced to permit the blades to enter beneath the body of the stack and the lowermost blank or sheet thereof to separate the blank or sheet from the body of the stack, as will presently be described.

Rockably mounted on a transverse axis, forward of the stack, is a pipe 9. Mounted on and connected with the pipe is a forwardly and downwardly extending conduit 10, provided at its rear, free end with a nozzle tip 11 adapted, when the tip is at its upper limit, to engage the lower face of the lowermost blank in the stack at the forward end thereof. The tip 11 is of peculiar construction for a particular purpose, in that it is concaved longitudinally (Figs. 3, 4 and

5) to form the cup 12 into which that portion of the lowermost sheet of the stack overlying the nozzle tip is bellied by suction applied through the tip orifice 13.

Also located forward of the stack is a rock shaft 14, rotatably mounted in bearings in posts 15 suitably mounted on the frame of the envelope machine, one end of the shaft 14 being extended through its post to carry a crank arm 16 that is rigidly fixed to the shaft.

The crank arm 16 has an elongated slot 17 at its lower, free end, receiving a pin 18 on the shank 19 of the combined supporting and separating blade, presently mentioned.

The shank 19 slides in a block 20 rigidly attached to the adjacent post 15, and provided with a laterally opening slot 21, through which the shank pin 18 projects, and has guided travel during the operation of the feeding mechanism.

Fixed to the rock shaft 14 is a rocker arm 22 having a yoke 23 at its free end in which a roller 24 is rotatably mounted on an axle 25. The roller 24 is engageable with a cam block 26 fixed on a rotatable shaft 27, and held to the block by a spring 28, one end of which is anchored to one of the posts 15, and the other end on a pin 29 on the rocker arm, so that the roller 24 is yieldingly held to its contact with the cam block.

The cam block comprises high lobes 30 and 30′ on a long axis of the cam, and low lobes 31 and 31′ on the short axis thereof, so that when the shaft 27 is rotated the rocker arm 22 is raised and lowered and the shank 19 reciprocated toward and from the front end of the stack of blanks or sheets.

The feeding parts just described are so arranged that the shank 19 reciprocates in a plane parallel with that of the stack support and therefore of the stack body, and adjustably mounted on the shank 19 and extending at right angles thereto, is a blade 32 having a right-angular, rearwardly-directed tooth 33 at its lower end adapted for projection beneath the bottom of the stack of blanks or sheets to separate the lowermost blank or sheet from the body of the stack when the tooth is in its rearward position, and to free the stack when the tooth is at its forward position. Movement of the tooth and the nozzle synchronize so that rearward movement of the blade will not tend to project the tooth beneath the stack until after the nozzle has acted on the lowermost sheet to provide a space for the tooth, the tooth remaining beneath the stack to support the forward end thereof during the greater portion of the feeding throw of the nozzle. The ratio of movement to effect the stack withdrawal and return of the tooth is indicated by the lengths of the high and low lobes of the rocking cam.

Assuming that the parts are constructed and assembled as described, with a stack of envelopes in place, the operation is as follows:

Starting with the parts as shown in Fig. 1, the conveyor belt being in motion, the separating and supporting disks and the cam 26 in rotation, and the hollow rock shaft 10 in reciprocation, the nozzle tip is moved up toward the bottom of the stack, and as it moves upwardly the tooth of the separating and supporting blade is withdrawn from beneath the stack. When the nozzle contacts the lowermost blank or sheet of the stack, suction through the conduit and pipe draws the flexible blank or sheet into the concave seat of the nozzle tip, bellying that portion of the lowermost portion to form a recess between it and the next upper sheet into which the tooth of the separating and supporting blade may project. Immediately upon the formation of this recess, the blade moves back and the tooth projects into the recess. Thereupon the nozzle moves downwardly and forwardly, carrying the lowermost blank or sheet with it, spacing the same from the body of the stack.

While these movements have been going on the separator and supporting disks 8 have been revolving so that as the lowermost blank or sheet is spaced from the bottom of the stack, the proper sickle enters between said bottom blank or sheet and the stack and tends to separate the same. Movement of the nozzle is faster than movement of the conveyor. The weight of the stack presses the lowermost blank or sheet against its support, consisting in part of the conveyor belts, forming a drag on the blank or sheet, which tends to hold the blank or sheet while the nozzle moves away from it, releasing the blank or sheet from the nozzle suction so that the forward end of the blank or sheet leaves the nozzle and drops onto the conveyor belt, so that the belt may carry the freed blank or sheet on into the envelope machine, the nozzle then returning to repeat its operation on the next succeeding blank or sheet.

As heretofore stated, my invention is not limited to the particular use above described, nor in connection with any particular kind of blanks or sheets, although the principal use for which the invention is now contemplated is in connection with the type of envelope machine hereinbefore referred to.

What I claim and desire to secure by Letters Patent is:—

1. In a device of the character described, a support for a stack of blanks, a suction nozzle, having a swinging movement toward and away from the stack whereby the bottom blank is moved bodily from the stack, and a horizontally movable, intermittently operated separator alternating with the movement of the nozzle to project between the lowermost blank and the stack when the

suction nozzle moves the edge of the lowermost blank away from the stack.

2. In a device of the character described, a support for a stack of blanks, a suction nozzle movable toward and away from the bottom of the stack to successively draw edges of the bottom blanks away from the stack and move the same bodily away from the stack, and a reciprocatory separator movable in between the drawn-away edge and the stack, and movable away from the stack upon the approach of the nozzle toward the stack.

3. In a device of the character described, a support for a stack of blanks, a feeding member for moving a blank transversely of said stack comprising suction means for pulling the edge of the lowermost blank away from the stack and a reciprocatory separator member movable in a plane into the space between the edge of the lowermost blank and the stack, said feeding member being movable transversely of said stack to move the lowermost blank away from said stack after said separator has moved between the stack and blank.

4. In a device of the character described, a support for a stack of blanks, means for pulling the edge of the lowermost blank away from the stack, a reciprocatory rod, a separator carried by the rod movable in a plane passing through the space between the edge of the lowermost blank and the stack, and cam actuated means for operating the reciprocatory rod, said means comprising a rock shaft, a crank on the rock shaft having a slot, a pin projecting from the rod into the slot, a second crank arm on the shaft, a rotatable cam, and means for holding the second-mentioned arm in contact with the periphery of the cam.

5. In a device of the character described, a blank stack support, means for pulling the edge of the lowermost blank away from the stack, a reciprocatory rod, a separator carried by the rod movable in a plane passing through the space between the edge of the lowermost blank and the stack, and cam-actuated means for operating the reciprocatory rod, said means comprising a rock shaft, a crank on the rock shaft having a slot, a pin projecting from the rod into the slot, a second crank arm on the shaft, a rotatable cam, and means for holding the second-mentioned arm in contact with the periphery of the cam, said means comprising a spring.

6. In a device of the character described, a support for a stack of blanks, a suction nozzle movable toward and away from the bottom of the stack and comprising a cupped seat into which the edge portion of a lowermost blank is bellied to form a receiving recess between the lowermost blank and the stack, and a reciprocatory member alternating in its movement with the nozzle and having a tooth projectable into said receiving recess, for the purpose set forth.

In testimony whereof I affix my signature.

EUGENE B. BERKOWITZ.