Jan. 17, 1928. 1,656,601

A. NOVICK

PLUNGER MECHANISM

Filed June 14, 1922 2 Sheets-Sheet 1

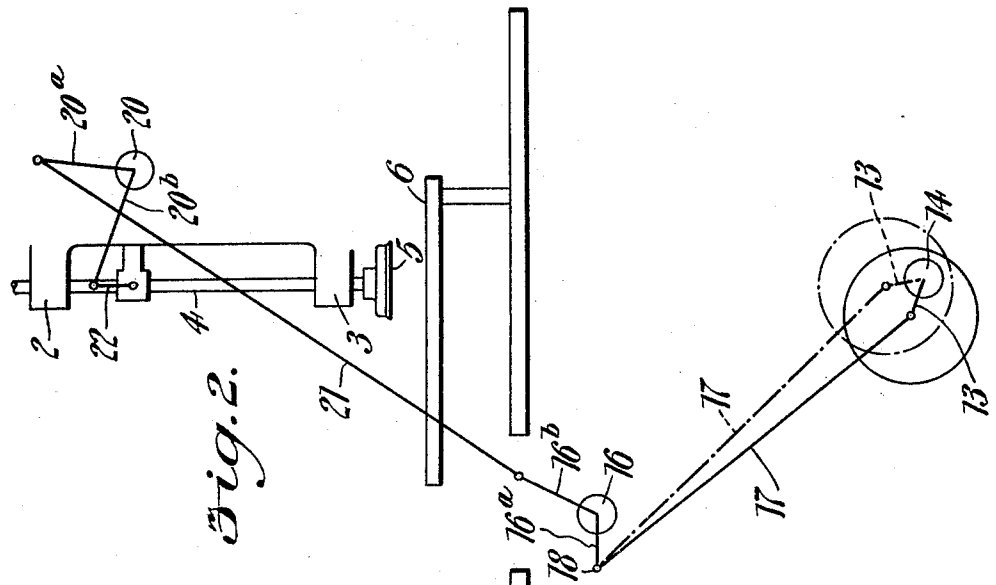


Fig. 2.

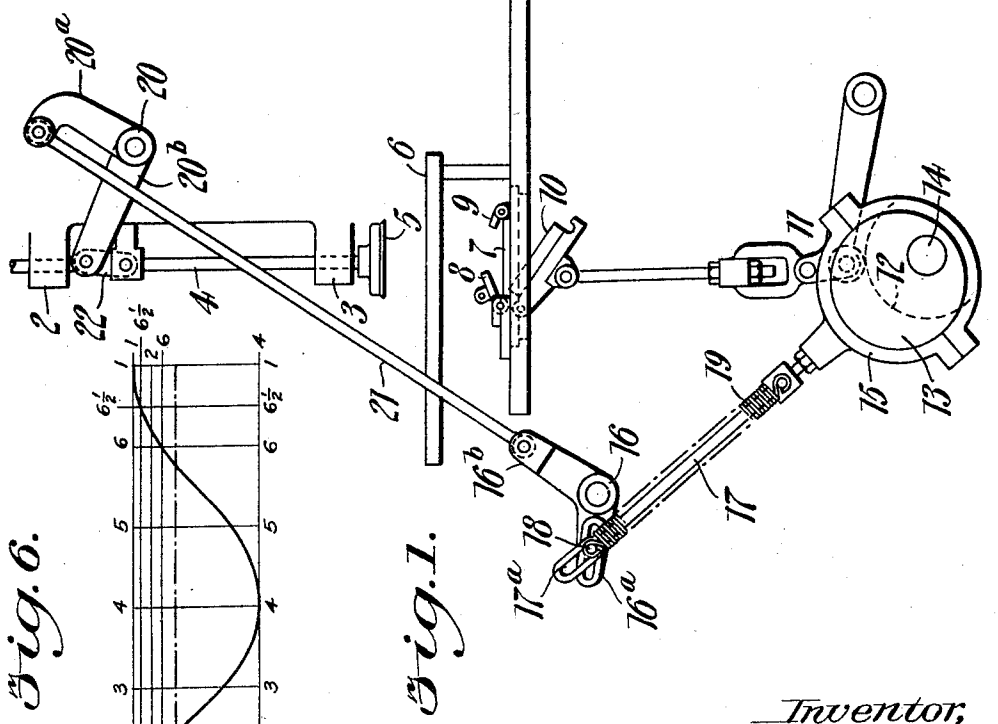


Fig. 1.

Fig. 6.

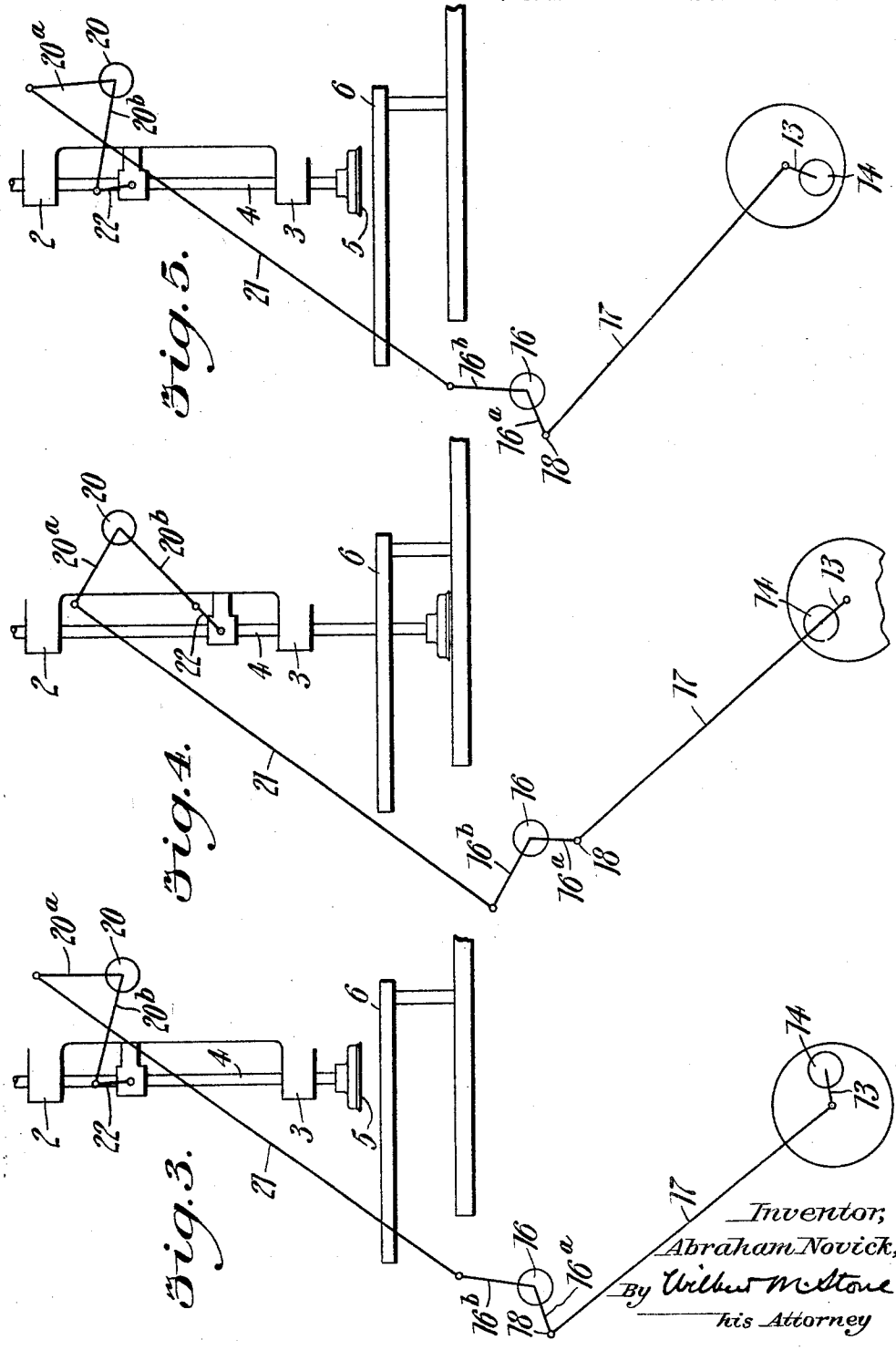
Inventor,
Abraham Novick;
By Wilbur M. Stone
his Attorney.

Jan. 17, 1928. 1,656,601

A. NOVICK

PLUNGER MECHANISM

Filed June 14, 1922 2 Sheets-Sheet 2



Inventor;
Abraham Novick;
By Wilbur M. Stone
his Attorney

Patented Jan. 17, 1928. 1,656,601

UNITED STATES PATENT OFFICE.

ABRAHAM NOVICK, OF BROOKLYN, NEW YORK, ASSIGNOR TO F. L. SMITHE MACHINE COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PLUNGER MECHANISM.

Application filed June 14, 1922. Serial No. 568,106.

This invention relates to plunger mechanisms and has for its object to provide a crank actuated mechanism in which is provided at one end of the stroke of the plunger a dwell of abnormal duration.

To this end my improvements comprise features illustrated in their preferred embodiment in the drawings accompanying this specification, wherein:—

Figure 1 is a side elevation of a portion of an envelope machine of known character, to which my improvements are applied. Figs. 2, 3, 4 and 5 are similar elevations in diagrammatic form of successive positions of the mechanism, to illustrate the operation of my improvements. Fig. 6 is a chart illustrating graphically the movement and timing of the plunger. The scale is the same in all of the figures.

While my improvements are useful in a number of environments, I have chosen to illustrate them as employed for moving the plunger of an envelope machine. As shown in Fig. 1, said machine comprises fixed bearings, 2, 3 in which reciprocates vertically rod 4 carrying on its lower end plunger 5 adapted for pushing an envelope blank through an opening, not shown, in the usual folding plate 6, and thence delivering the blank with its flaps folded upwardly into folding box 7, where said flaps are folded down by means of the usual hinged folders, as 8, 9.

The bottom, 10, of the folding box is hinged in the well known manner and is opened and closed at suitable times by cam 12 through the usual connections 11.

It has long been customary to operate envelope machine plungers by means of an eccentric, and it has also long been customary to give to the plunger an extra amount of upward movement to provide time for the introduction of the envelope blank onto folding plate 6 while that plunger moves upwardly from that plate and back again to the plate. Such excess movement of the plunger consumes time and entails a relatively slow movement of the machine and consequently relatively small product.

By my improvements I am able to shorten materially the stroke of the plunger whereby the speed of the machine may be increased materially without injury to either the machine or its product.

Said increased dwell of plunger 5 at the upper end of its stroke is obtained by certain links and levers interposed between eccentric 13 and plunger rod 4 and by a peculiar disposition of said parts relatively to each other.

Main shaft 14 has fixed thereto crank or eccentric 13, the strap 15 whereof is connected by rod 17 to one arm 16^a of bell-crank lever 16 by pivot 18. Said pivot 18 may be adjustable lengthwise in arm 16^a if desired and rod 17 may be provided with slotted end 17^a and spring 19 connecting pivot 18 with a relatively fixed portion of said rod near eccentric strap 15, so that, in case anything interferes with the downward movement of said plunger into folding box 7, said spring will yield and the machine be prevented from breaking.

Pivotally mounted near the upper end of rod 4 is second bell-crank 20, arm 20^a thereof being connected by link 21 with arm 16^b of bell-crank 16, and arm 20^b thereof being connected by link 22 with said rod 4.

The operation of my improved mechanism is as follows: In Fig. 1 crank 13 is at the upper extreme of its stroke, whereby arm 16^a of bell-crank 16 is at the upper extreme of its oscillation. Arm 16^b and link 21 are in substantially a straight line, whereby bell-crank 20 is at the extreme end of its clockwise stroke, and rod 4 and plunger 5 are at the upper end of their strokes, respectively. The position of plunger 5 in Fig. 1 corresponds with that point of the curved path of the chart of Fig. 6 indicated on the vertical line 1—1.

If now shaft 14 be rotated in anti-clockwise direction to the position of the full lines of Fig. 2, corresponding with vertical line 1½—1½ of said chart, it will be observed that arm 16^b and link 21 then form a slight angle with one another, whereby plunger 5 has descended slightly from the position of Fig. 1. Shaft 14, continuing its anti-clockwise rotation to the position of Fig. 3, said crank 13 will have turned through one sixth of the circle from the position of Fig. 1, corresponding with vertical

line 2—2 of the chart. At this point the downward movement of plunger 5 will be seen to be only slightly lower than in Fig. 2, as the angle between arm 16b and link 21 has changed but little from that of Fig. 2.

It is not until said shaft has rotated about midway between the positions indicated on the chart by vertical lines 2—2 and 3—3 that said plunger 5 reaches folding plate 6, as indicated by horizontal line 23 on said chart. To reach this point in its downward movement requires about one quarter of a revolution of shaft 14, and the distance traveled by plunger 5, during the first two thirds of that quarter of a revolution is only about one half the distance from the top of its stroke to said plate 6.

From the position of Fig. 3 to that of Fig. 4, plunger 5, corresponding in shaft rotation with the distance from said point between vertical lines 2—2 and 3—3 and vertical line 4—4 of the chart, passes through plate 6 and downwardly to the bottom of its stroke into folding box 7. Shaft 14, continuing its rotation, starts eccentric 13 on the second half of its movement and the several parts of the mechanism traverse the successive positions of Fig. 5, the dotted position of rod 17 Fig 2, and back to the position of Fig. 1. The position of Fig. 5 corresponds in the rotation of said shaft with vertical line 6—6 of the chart, and Fig. 2, dotted showing, with vertical line 6½—6½ of said chart.

It will thus be seen that plunger 5 remains above plate 6 a time equal to the horizontal distance from the left hand end of the chart to that point between lines 2—2 and 3—3 where the curved path cuts dotted line 23 plus the distance from the point where said curved path again cuts line 23 to the right hand end of the chart. The sum of these two distances equals nearly one half the total length of the chart or one cycle of operation of the machine. There is thus provided a greatly lengthened time of dwell of plunger 5 above plate 6, over the prior art.

I claim:

1. In a mechanism of the character described the combination of a rotating crank, a reciprocatable member, two bell crank levers oscillatable on fixed axes respectively, said crank being operatively connected to one arm of one of said levers, said reciprocatable member being operatively connected to one arm of the other lever, a link connecting the other arms of said bell crank levers, and said link and levers being so arranged that at one end of the throw of said crank said link and lever arms connected therewith are approximately in line whereby the dwell at one end of the stroke of said reciprocatable member is longer than at the other end thereof.

2. In a mechanism of the character described the combination of a rotating crank, a reciprocatable member, two bell crank levers oscillatable on fixed axis respectively, said crank being operatively connected to one arm of one of said levers, said reciprocatable member being operatively connected to one arm of the other lever, a link connecting the other arms of said bell crank levers, and said link and levers being so arranged that at one end of the throw of said crank said link and lever arms connected therewith are approximately in line, whereby the dwell at one end of the stroke of said reciprocatable member is longer than at the other end thereof, the connection between said rotating crank and said bell crank arm being adjustable relatively to the axis of said bell crank.

In witness whereof, I hereby affix my signature this 12th day of June, 1922.

ABRAHAM NOVICK.