UNITED STATES PATENT OFFICE.

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FORMING WELL AND PLUNGER FOR ENVELOPE-MACHINES.


To all whom it may concern:

Be it known that I, BRUNO PAILITZSCH, a subject of the Emperor of Germany, residing at Berlin, Germany, have invented new and

useful Improvements in Forming Wells and

Plungers for Envelope-Machines, of which the following is a specification.

The present invention relates generally to

envelope-machines of that type in which the

blanks are fed to the machine, gummed, folded, creased, and delivered therefrom as finished envelopes.

Particularly does it relate to the forming-well or folding and creasing box and the co-

operating forming or creasing plunger.

One of the objects of my invention is to

provide a forming-well of such construction that its adjustment to accommodate blanks of different sizes within a considerable range

may be easy and expeditiously accomplished with a minimum number of movable or adjustable parts and without the necessity of adjusting the adjacent and cooperating parts—such, for example, as the gum-box and gumming instrumentalties—each time a change is made in the area of the forming-well. Briefly stated, this result is secured by providing the forming-well with one corner fixed and non-adjustable and securing the necessary adjustment for length and width by making the opposite end and side of the forming-well adjustable toward and from the opposite fixed side and end, so as to vary at will the area of the forming-well. The gum-box may bear a fixed relation to the fixed side of the well or to the ad-

justable side, as the ease may be, so as to be always in proper relation thereto when once placed.

Another object of the invention is to pro-

vide a cooperating forming-plunger which is adjustable, so that its area may be readily varied to meet the area of the forming-well without the necessity of disturbing the connec-
tion of said plunger with the mechanism by which it is operated, so that when once assembled in the machine the plunger may be adjusted within its limits to any area without disturbing it. Briefly stated, I accom-

plish this end by providing the plunger-head with a fixed section or corner to which the plunger-reciprocating element or stem is secured, the said fixed plunger-section hav-

ing adjustedly secured thereto relatively to movable end and side sections which may be moved to increase or diminish the plunger area to correspond to the adjusted area of the well, at the same time preserving its geometrical form.

In order that the invention may be clear to those skilled in the art to which it belongs, I have illustrated in the drawings accompanying and forming a part of this specification one embodiment of my invention and that the best now known to me; but since it is obvious that divers changes may be made within the skill of the mechanician without departing from the spirit of my invention it is to be understood that this showing and description are simply illustrative and not re-

strictive of my invention.

Figure 1 is a view in side elevation of the forming-well with the plunger in raised position. Fig. 2 is a plan view of the forming-well. Fig. 3 is a plan view of the plunger.

In the present embodiment of my invention the forming-well A is mounted upon parallel rails B B’, the rails being of like construction and comprising a horizontal portion b, the ends of the rails being bent vertically, as at b’, to form supporting legs b’, and each provided with a pair b” having an open-

ning therethrough for receiving a lag-screw b”, whereby to secure the rails to the frame-

work of the envelope-machine.

One of the sides a of the forming-well A is fixed and may be constructed in any suitable manner, the said side being formed in the present instance by the side of the gum-box. The other side is movable and comprises a plate a’, the ends thereof resting upon the rails B B’ and being provided with countersunk openings a” a”, registering with longitudinal slots b” b” in the rails, the openings and slots being traversed by bolts a” a”, engaged by nuts a” a” in the countersunk portion of the openings, whereby to permit the movement of the side upon the rails and to retain it in its adjusted position.

One of the ends of the forming-well is fixed and comprises a plate a”, provided at each end with lugs a’ a”, resting upon rails B’ and secured thereto by screws a”, passing through countersunk openings in the ends and engag-

ing threaded openings in the rail. It will be observed from an inspection of Fig. 1 that that portion of the movable side a’ which rests upon the rails is of greater relative
thickness than the portion between the rails, the plate being, as it were, cut away between the rails. At that end adjacent to the rail B', the plate a' is provided on its upper face with a transverse groove a'' for receiving the fixed end a'' of the forming-well, and that portion a''' of the plate a' resting directly upon the rail B' is partly cut away, as at a'''', to receive the lug a''' when the forming-well is adjusted to its greatest width. It will be evident that the portion a'' of the plate a' moves between the lugs a'''' and a''''' and is limited thereby, the said portion engaging the lug a''' when the forming-well is at its narrowest width and engaging the lug a''' when the forming-well is at its greatest width. The other end a' of the forming-well is movable toward and from the fixed end and comprises a plurality of sections a'''''' a'''', each provided with a longitudinal slot a''''' a'''', the slot a'''' of the plate a'' registering with the slot b' of the rail B, and a bolt a'''', provided with a nut a'''', passes through the slots, whereby to permit longitudinal and lateral adjustment of the section upon the rail. The section a''' is adjustably secured to the rail B by means of a bolt a''', which passes through the slot a''''' and taps into a hole in rail B, whereby to permit longitudinal adjustment of the sections, a nut a'''', being provided on the bolt a''' for fixing the parts in their adjusted position.

It will be obvious from the description that by loosening the nuts a''''' a''''' the sections a'''''' a'''', movable end may be moved toward and from the fixed end to vary the length of the forming-well and that the end section a''' and side section a' may be moved toward and from the fixed side a to vary the width of the forming-well.

Each of the sections a'''''' a''''' is provided at its inner end with a corner-plate, which may be integral with the section or secured to it in any suitable manner. The corner-plates comprise a portion c and a portion c' at right angles thereto, the portions c of the plates being in alinement with each other and the portions c' occupying parallel planes, and the inner faces of the portions c' of the respective corner-plates are flush with the inner edges of the fixed and movable sides when the well is properly adjusted. Corner-plates are also arranged at the opposite corners of the forming-well, one being connected with the fixed end and the other being connected with the movable side a'.

Gages D for engaging the edges of one end flap and one edge of the side flaps of the envelop, whereby to properly center the same, are provided, the gages comprising a horizontal portion d, having a transverse slot d' and a flange portion d'' for engaging the flap edge, said flange portion being at the opposite end from the transverse slot and the outer face of the flange being inclined with respect to the longitudinal center of the longitudinal portion. Set-screws d'' traverse the slot and engage threaded openings in the parts to which the gages are attached for securing them with the flanges at the proper angle. One of the gages D is attached to the lug a'''', 70 of the fixed end, and the other two are connected with the movable side and partake of its movement, thus providing for an adjustment for different sizes of envelopes as well as for envelopes having differently-cut flaps. The gages attached to the movable side are connected one directly with the plate and the other with the portion a'''' resting on the rail B', the last-mentioned gage overlapping the fixed end of the forming-well. Two of the gages are relatively fixed, one being connected to the lug a''''' of the fixed end, or at a'', and the other to the fixed side, as at d''. The other two are relatively movable, being connected to the movable side, one to the body portion thereof, as at d'', and the other portion a'''' resting upon the rail B', as at d''. By attaching the two gages to the movable side two adjustments are made possible, one for different sizes of envelopes and one for different shapes of flaps.

In the ordinary form of envelop-machines in which my improvement is adapted for use the blank is placed over the forming-well by reciprocating carriage or by a pusher, and when the blank is moved against the gages it tends to spring back slightly therefrom, thereby moving out of proper position for engagement by the plunger. For the purpose of preventing this displacement a rock-shaft 100 E is journaled in suitable bearings c c' on the rear faces of the corner-plates on the movable end sections, and arms e e' are arranged on the shaft adjacent to the angle of the corner-plates, the sections a'''' a''' of the movable end 105 of the well being cut away, as at a''''' a''''' to permit the passage of the arms. The bearing e is slideable on the rock-shaft, and the arm e is adjustable on the shaft, being held thereon by a set-screw or in any other suitable manner to permit said arm to move with the section a'''' during adjustment thereof.

An arm e' is rigidly secured to one end of the rock-shaft E, and a link e connects the said arm with the arm e'' of a rock-shaft e'', 115 journaled in bearings e' on the frame of the envelop-machine. The rock-shaft e' may be oscillated by any suitable connection with the moving parts of the envelop-machine to move the arms e e' at the proper time to center the blank over the forming-well, but as such connection forms no part of my invention I have not deemed it necessary to illustrate or describe the same.

The link e' is adjustable in length, whereby to permit the rock-shaft E to move with the adjustable end of the forming-well, and comprises a plurality of sections e'' e''', each having a longitudinal slot e'', the slots registering and being traversed by a bolt e''', engaged by...
a nut $e^1$ for securing the sections in their adjusted position. The end of the rock-shaft $E$, provided with the arm $e^1$, is mounted in a block $e^2$, adjustably secured in a slot $b^16$ in a plate $b^1$, secured to the vertical portions $b'$ of the rails $B'B'$ by the screws $b^3$, the plate acting as a brace for the rails, and the block as a support for the end of the rock-shaft.

In Fig. 3 is shown an adjustable plunger $G$, for cooperating with the forming-well. The plunger comprises a fixed portion $g$, having connected thereto a bracket $g^1$ on a support $g^2$ by means of the lag-screws $g^3$. The support $g^1$ is engaged by a sleeve $g^4$ on an arm $g^5$, and the arm is provided on its opposite end with a second sleeve $g^6$, engaging the plunger-rod $g^7$ and secured thereto by a setscrew. The fixed portion $g$ of the plunger is provided on its upper face with spaced parallel grooves $g^8$, $g^9$, in which are slidably-mounted arms $g^{10}$, $g^{11}$, connected to a plate $g^{12}$, forming a section of the movable side of the plunger. The arms $g^{10}$, $g^{11}$ are longitudinally slotted, as at $g^{13}$, $g^{14}$, and the slots are traversed by setscrews $g^{15}$, $g^{16}$, engaging the fixed portion of the plunger. The under face of the fixed portion $g$ is also provided with a groove $g^{17}$, said groove arranged at right angles to the grooves $g^8$, $g^9$, and in the groove is slidably mounted an arm $g^{18}$, secured to the plate $g^{19}$, forming a section of the movable end of the plunger. The arm $g^{18}$ is adjustably secured by means of a setscrew $g^{20}$, passing through a slot $g^{21}$ in the fixed section of the plunger. The section $g^{22}$ of the movable end is provided on its upper face with a groove $g^{23}$, in which is slidably mounted the arm $g^{24}$, forming with one of its faces $g^{25}$ a section of the movable side of the plunger and with the face $g^{26}$ a section of the movable end of said plunger. The arm $g^{24}$ is longitudinally slotted, as at $g^{27}$, and the slot is traversed by a setscrew $g^{28}$, engaging the plate $g^{29}$ for securing the arm in its adjusted position.

It will be evident from the description that by loosening the setscrews $g^{20}$, $g^{21}$, and $g^{28}$ the plates $g^{17}$ and $g^{23}$ may be moved toward and from the fixed portion $g$ of the plunger and the plate $g^{29}$, respectively, to adjust the width of the plunger and that by loosening the set-screw $g^{22}$ the plate $g^{25}$, and with it the plate $g^{28}$, may be moved toward and from the fixed portion $g$ and the plate $g^{29}$, respectively, to adjust the length of the plunger.

The above-described mechanism proves a very efficient means of expanding and contracting the plunger to correspond with the size of the forming-well. By first adjusting the plates $g^{23}$ to the required width the proper length may afterward be obtained without varying the width in any part, and the converse is also true.

In the operation of my improvement the forming-well and the plunger being adjusted to the proper size, the blank is moved over the forming-well, and the arms $e' e'$ engage the rear end thereof to properly position it against the gages $D$. The plunger now descends, forcing the blank into the forming-well, the sides and ends of the forming-well acting to turn the flaps up against the plunger and in connection with the plunger to crease the blank upon the folding lines. The corner-plates preserve the shape of the envelope and prevent the unfolding of the flaps. Since the folded blank tends to cling to the plunger on its return movement, strippers $H$ are provided upon each of the corner-plates for stripping it from the plunger. The strippers comprise a bar $h$, secured to the respective corner-plate by a set-screw $h'$, and provided on its free end with a pin $h''$, projecting slightly beyond the inner face of the portion of said corner-plate, the pin being adapted to engage the edges of the end flaps of the blank to strip it from the plunger. By loosening the set-screw $h''$ the position of the pin may be varied to conform to the shape of the flap.

It will be obvious from the foregoing description that the forming-well comprises two fixed walls adjacent to each other and movable walls being capable of expansion and contraction, and that while the device is especially designed for use in the enveloping-machines it is capable of use in box-machines using a forming-well.

What I claim is—

1. In a machine of the class described, a forming-well having two of the adjacent walls thereof fixed and the opposite walls movable toward and from the fixed walls, one of said movable walls comprising a plurality of sections, one of said sections being movable toward and from the other sections.

2. In a machine of the class described, a forming-well having two of the adjacent walls thereof fixed, and the opposite walls movable toward and from the fixed walls, and means whereby to expand and contract one of said movable walls.

3. In a machine of the class described, a forming-well having two of the walls thereof fixed, and the opposite walls movable toward and from the fixed walls, near the junction thereof, and gages adjustably secured to one of the movable walls at the junction thereof with one of the fixed walls.

4. In a machine of the class described, a forming-well comprising a plurality of rails spaced apart from each other, a fixed side, a movable side adjustably connected with the rails, a fixed end secured to one of the rails, and a movable end connected to the other rail, said end comprising a plurality of sections, and means for adjusting said sections toward and from each other and toward and from the fixed end.
5. In a machine of the class described, a forming-well comprising a plurality of spaced parallel rails, a fixed side, a movable side adjustably connected with the rails, a fixed end connected with one of the rails, a movable end connected with the other rail, said end comprising a plurality of sections adjustable toward and from each other and toward and from the fixed end, gages for the blank adjustably connected with the fixed side and end near the junction thereof, and gages adjustably connected with movable side at the end thereof adjacent to the fixed end.

6. In a machine of the class described, a forming-well having a fixed side and end wall, and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being movable toward and from the other section, gages for the blank at one end of the well, and means at the other end of the well for engaging the edges of the blank whereby to retain it in contact with the gages.

7. In a machine of the class described, a forming-well having a fixed side and end wall, and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being movable toward and from the other section, gages for the blank at one end of the well, and means at the other end of the well for engaging the edges of the blank whereby to retain it in contact with the gages, said means comprising an arm connected with each of the movable end sections and normally lying below the plane thereof, and means for moving the arms.

8. In a machine of the class described, a forming-well having a fixed side and end wall, and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being movable toward and from the other section, gages for the blank at one end of the well, and means at the other end of the well for engaging the edges of the blank whereby to retain it in contact with the gages, said means comprising a shaft journalized on the movable end sections, an arm on the shaft adjacent to each of the end sections, said arms normally lying below the plane of the sections, and means for oscillating the shaft.

9. In a machine of the class described, a forming-well having a fixed side and end wall, and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being adjustable toward and from the other, gages for the blank at the fixed end of the forming-well, and means for retaining the blank in contact with the gages, comprising a shaft journalized on the sections of the movable end wall, arms on the shaft adjacent to the sections and normally lying below the plane thereof, means whereby to permit the arms to move with the sections, a second shaft, means for oscillating said second shaft and an adjustable connection between the shafts whereby to operate the arms to engage the edge of the blank.

10. In a machine of the class described, a forming-well having a fixed side and end wall and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being movable toward and from the other section, a corner-plate secured to the end of the movable side adjacent to the fixed end, a corner-plate secured to the fixed end adjacent to the fixed side, and corner-plates secured to each of the sections of the movable end.

11. In a machine of the class described, a forming-well having a fixed side and end wall and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being movable toward and from the other section, a corner-plate secured to the end of the movable side adjacent to the fixed end, a corner-plate secured to the fixed end adjacent to the fixed side, and stopping devices adjustably connected with each of the corner-plates.

12. In a machine of the class described, a forming-well having a fixed side and end wall and a movable side and end wall, said movable end wall comprising a plurality of sections, one of said sections being movable toward and from the other section, a corner-plate secured to the end of the movable side adjacent to the fixed end, a corner-plate secured to the fixed end, adjacent to the fixed side, and a plurality of stopping devices, said stopping devices comprising a bar adjustably connected with each of the corner-plates and having a pin projecting into the path of the blank.

13. In a machine of the class described and in combination, an adjustable forming-well, a plunger cooperating therewith, means for adjusting the plunger as to length, and independent means for adjusting the plunger as to width.

14. In a machine of the class described and in combination, an adjustable forming-well, a plunger cooperating therewith and comprising a relatively fixed section, a section adjustably mounted on said fixed section for adjustment of the width of said plunger, and a second independently-adjustable section mounted on said fixed section for adjustment of the length of said plunger.

15. In a machine of the class described and in combination, an adjustable forming-well, a plunger cooperating therewith and comprising a relatively fixed section, a section independently-adjustable section mounted on said fixed section to vary the length of said plunger, and laterally-adjustable sections.
mounted on said fixed and longitudinally-adjustable sections to vary the width of said plunger.

16. In a machine of the class described, a forming-well comprising a fixed side and end wall and a movable side, and end wall, and a plunger for cooperating therewith, said plunger comprising a relatively fixed section, sections connected with said fixed section and movable toward and from the same, and at right angles with respect to each other and a section connected with one of said movable sections and movable with respect thereto in a line parallel with the other movable section.

17. In a machine of the class described, an adjustable forming-well, and a plunger for cooperating therewith, said plunger comprising a relatively fixed section having parallel grooves in the upper face thereof, and a groove in the lower face thereof at right angles to the parallel grooves, arms slidably mounted in the upper grooves a plate connected to the arms, an arm slidably mounted in the lower groove, a plate secured thereto and provided in its upper face with a groove parallel to the parallel grooves of the fixed section, an arm slidably mounted in the groove and a plate secured to the arm, one of the edges of the plate being parallel to the edge of the first-named plate and the other being parallel to the edge of the second-named plate.

18. In a machine of the class described, a forming-well having a fixed side and end wall constituting a non-adjustable corner, a movable side and end wall by which the width and length of the well can be varied, a cooperating plunger having a fixed plate forming one corner of said plunger in registration with the non-adjustable corner of said well, and adjustable plates carried by said fixed plate for increasing the width and length of said plunger.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BRUNO PAHLITZSCH.

Witnesses:

HENRY HASPER,

WOLDEMAR HAUPT.