

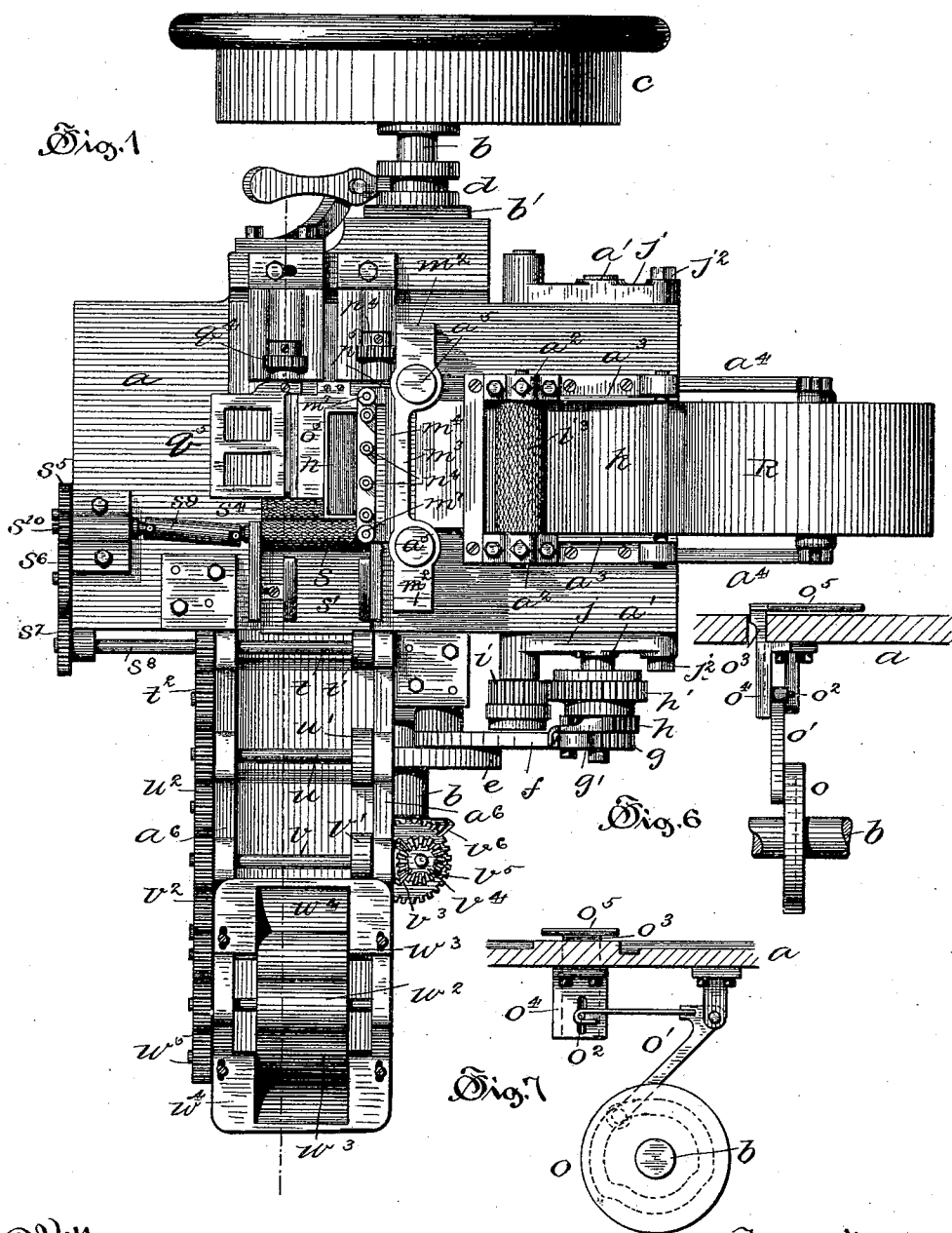
(No Model.)

3 Sheets—Sheet 1.

G. A. BARNES.
MACHINE FOR MAKING BOX COVERS.

No. 473,184.

Patented Apr. 19, 1892.



Witnesses:

Wm. Musser.
Ar. Jenkins.

Inventor,

George A. Barber by,
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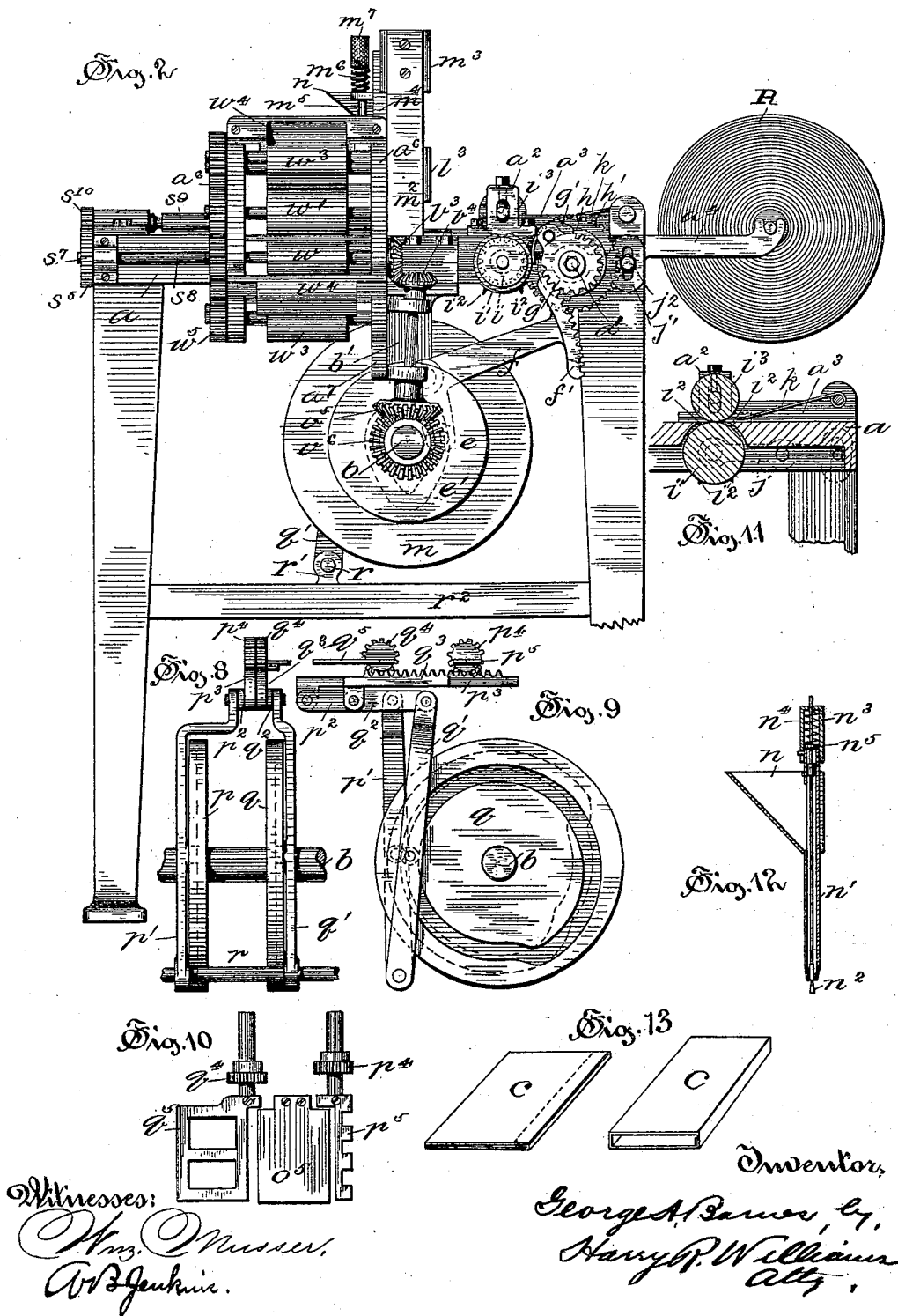
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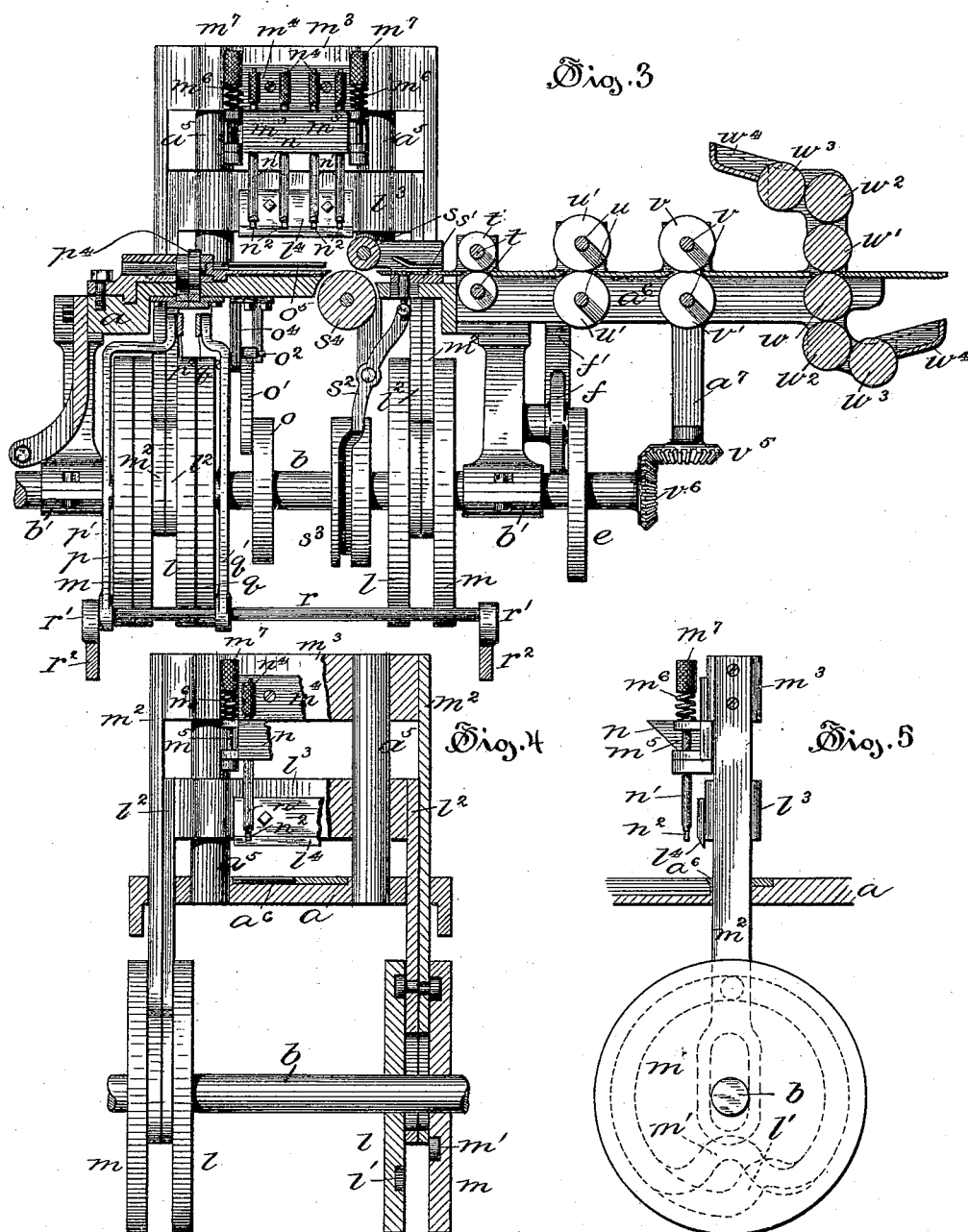
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UNITED STATES PATENT OFFICE.

GEORGE A. BARNES, OF NEW HAVEN, CONNECTICUT.

MACHINE FOR MAKING BOX-COVERS.

SPECIFICATION forming part of Letters Patent No. 473,184, dated April 19, 1892.

Application filed March 11, 1891. Serial No. 384,557. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. BARNES, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Machines for Making Box-Covers, of which the following is a full, clear, and exact specification.

The invention relates to the class of machines which form tubular covers or outsides for boxes, more particularly the outsides of boxes for holding matches.

The object of the invention is to provide a simple, cheap, and easily-controlled machine which will rapidly and automatically form from a single sheet of material such covers and at the same time provide them with suitable marks, titles, or labels.

To this end the invention resides in a machine having a scoring mechanism, cutting mechanism, folding mechanism, gluing mechanism, and glue-hardening and marking mechanism, as more particularly hereinafter described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation. Fig. 3 is a vertical section on plane of broken line in Fig. 1. Fig. 4 is a face view of the cutting and gluing mechanisms with parts broken in section. Fig. 5 is a side view of the same. Fig. 6 is a face view of the anvil or form and its reciprocating mechanism. Fig. 7 is a side view of the latter. Fig. 8 is a face view of the mechanism for operating the folders. Fig. 9 is a side view of the same. Fig. 10 is a plan of the folders and the form over which the covers are folded. Fig. 11 is a detail vertical section of the scoring and feeding rolls. Fig. 12 is a detail enlarged vertical section of the gluing apparatus. Fig. 13 are views of the cover as it comes from the machine and ready for use.

In the views, the letter *a* indicates the bed supported by any form of legs. In bearings *b*', preferably formed in hangers dependent from the bed, is journaled a driving-shaft *b*, with a loose pulley *c*, which may be belted to any source of power, and a clutch *d* for engaging the pulley with or disengaging it from the shaft for starting or stopping the machine. Near one end the shaft bears a block *e*, hav-

ing in its face a cam-groove *e'*, into which projects a roll on the short arm of a bent lever *f*, the end of the long arm of which bears a segmental rack *f'*, the teeth of which mesh with a segmental gear *g* on a pivot *a'*, projecting from the side of the bed. Pivoted to this gear *g* is a spring-actuated pawl *g'*, held in contact with the surface of a disk *h*, having on its periphery two ratchet-teeth. This disk is fast to a gear *h'*, turning freely on the pivot *a'*, in mesh with a pinion *i* on the end of the shaft of the roll *i'*, that bears scoring-teeth *i''*, located upon its periphery at such distances apart that at each revolution of the roll *i'* the material passing beneath the roll *i''* will be marked and creased, so that it can be easily bent by the folders to form the cover C.

The shaft of the scoring-roll *i'* is journaled in bearings in levers *j*, that oscillate upon the pivots *a'*, the opposite ends of which levers are so clamped by bolts *j''* to the bed that the scoring-points will project through the bed into the path of the material as it moves along the bed. These bearings of the scoring-roll are adjustable, in order that rolls of varying diameters with scoring-points at wider or narrower distances apart may be used for scoring material for covers of different sizes. When the bolts *j''* are loosened, the opposite ends of the levers may be moved and a larger or smaller roll substituted and its periphery held with the scoring-points in position to crease the material without disengaging the driving gear and pinion.

The roll *i''* is journaled in standards *a''*, rising from the bed in such position as to hold the material down to the scoring-roll as the material passes between the rolls. A spring-tension *k* is supported above the bed over the path between the guides *a''*, so as to hold the material as it unwinds from the roll *R*, mounted upon any suitable brackets *a''*, projecting from the side of the bed.

Near each side of the bed the shaft *b* bears two pairs of cam-disks *l m*, in the grooves *l' m'* of which run rolls attached to vertically-movable plates *l'' m''*, that project independently upward through the bed and are connected in pairs at different heights at their upper ends by bars *l''' m'''*, that are free to move vertically upon guide-posts *a'''*, that stand up from the bed. The lower one of these bars *l'''* bears

a knife l^4 , so located that when at the proper time this bar is reciprocated by the cams it acts with a complementary knife a^b on the bed to sever the material from which the cover is to be folded as it passes along the bed. The upper of the bars m^3 bears a plate m^4 , having studs m^5 , upon which a glue-reservoir n is set. This reservoir is preferably held to place upon the studs m^5 with a yielding pressure by springs m^6 , inserted between the supporting-ears of the reservoir and caps m^7 , secured to the upper ends of said stud.

The glue-reservoir consists of a receptacle having at intervals a number of depending tubes n^1 , the openings through the bottoms of which are closed by the enlarged ends of plungers n^2 , held down by springs n^3 under compression between a cap n^4 and a washer n^5 on the spindle of the plunger. The ends of the plungers are cut away or reduced, so that when pushed inward against the action of the springs a small quantity of glue is forced to escape to the outer end of the plunger when it springs outward. When the cams reciprocate the bar bearing the glue-reservoir, the ends of the plungers come in contact with the material of the cover being formed and leave a small deposit of glue in position to stick and hold the edge which is to be folded upon the glued portion. At the same time the plungers are pressed inward and the ends gather a supply of glue for the next cover.

Near the middle of the machine the shaft bears a cam-wheel o , in the groove in which runs a roll on the end of a bent lever o' , the opposite end of which is somewhat elastic. This elastic or spring end of the lever is connected with a pin o^2 , that projects from the side of a plate o^3 , free to reciprocate vertically in ways in a support o^4 , attached to the bed. The upper end of this plate, which passes through the bed, bears an anvil or form o^5 , over which the material of the cover is folded. As the cam o revolves, this form o^5 is lifted, and after a sufficient length of material is passed beneath the form is pulled down by the cam and lever, so as to clamp the material until it is folded to shape. It then rises to release the material and receive the next following piece.

Upon each side of one pair of the cams $l m$ the shaft bears cam-wheels $p q$, in the grooves of which run rollers upon levers $p' q'$, pivoted upon a rod r , extending transversely between bearings r' , secured to the frame r^2 of the machine. The upper ends of these levers are connected by links $p^2 q^2$ with racks $p^3 q^3$, that are free to reciprocate in ways secured to the bed. The teeth of these racks mesh with pinions $p^4 q^4$, mounted upon shafts supported in bearings on the bed, and to the shafts of these pinions the folders $p^5 q^5$ are attached. These folders lie open upon each side of the form o^5 ; but after a sufficient length of material for a cover has been fed beneath the form the cam p reciprocates the rack and rotates the pinion p^4 , so as to cause

the folder p^5 to bend over the form o^5 , the short end of the material to form the edge of the cover. After the gluers have deposited glue upon the edge folded over, the cam q , through its levers, rack, and pinion, causes the folder q^5 to bend over the wide end of the material to form the side of the cover. As the rotation of the cams continues and throws the levers in the opposite direction the racks reverse their motion, and the folders unfold, and the form rises slightly and releases the cover.

A roll s is mounted upon a slide s' , that is connected with the end of a lever s^2 , having its opposite end in engagement with a groove in the periphery of a cam-wheel s^3 , so placed upon the shaft b that after the cover has been glued and folded the slide carrying the roll is moved backward, so as to grasp the cover and bring it forward between the rolls s and s^4 . The end of the shaft of the roll s^4 has a gear s^5 , meshing with a gear s^6 , driven by a pinion s^7 on the end of a shaft s^8 , and the roll s is connected by a jointed shaft s^9 (to permit the vibration of the roll) with the shaft of a pinion s^{10} , that meshes with the gear s^5 .

A frame a^6 projects from one side of the bed and supports above and below the plane of its floor several pairs of shafts $t u v$, upon which are mounted the several pairs of pressure or glue-hardening rolls $t' u' v'$. These shafts have upon one end intermeshing gears that are connected in train by the idle-gears $t^2 u^2 v^2$. The lower shaft of the pair t is joined with the shaft s^8 and drives the pinion s^7 , and the lower of the shafts v has upon one end a bevel-gear v^3 , that meshes with a gear v^4 on a shaft supported by the arm a^7 , that bears a bevel-gear v^5 in mesh with a similar gear v^6 on the end of the shaft b .

Near the end of the frame a^6 is mounted a pair of rollers $w w'$, having their surface provided with characters for impressing a title or label upon the opposite sides of the cover as it passes between these rollers. Above and below these rollers are placed rollers w^2 , bearing against the surface of the printing-rollers for applying ink or a similar marking material. These latter rollers preferably run in contact with the surface of rollers w^3 , that revolve with a portion of their surface in the ink-receptacles w^4 . The end of the shaft of each roller is provided with an intermeshing gear w^5 , and the gear of the lower printing-roller meshes with and is driven by the idle-gear v^2 .

The material, preferably paper-board, from which the covers are to be made when the machine is in operation, moves from the roll under the tension to the scoring-roll, which scores and then passes along enough of the material beneath the form to fold a cover. The form is dropped and clamps the material while the knife descends and cuts the blank from the continuous strip. The edge-folder then bends the cut end over the form and the gluer descends and deposits a small quantity of

glue on the folded edge between the openings of the edge-folder. As the gluer rises, the side-folder bends over the wide side, so that its edge laps upon the narrow edge upon
 5 which glue has been deposited and the edge folder unfolds. As the side-folder unfolds, the form is slightly raised to release the blanks thus folded and glued, and the vibrating roll is moved backward, grasps the blank, and
 10 brings it forward, so as to be passed between the pressure-rollers, which bear upon the edge which has been glued to harden the glue and cause the edges to adhere. These pressure-rolls pass the blank along the floor, and the
 15 last pair which bear the characters impress their markings upon the opposite sides of the flattened blank as it emerges from the machine, after which it is opened to form the cover of the box for which it is intended.

20 I claim as my invention—

1. The combination, with a bed and a rotative shaft, of a cam on said shaft, a vertical plate loosely mounted in and projecting upward through the bed, a form fixed to the
 25 top of said plate, a bent pivoted lever having one elastic arm connected with said vertical plate and another arm connected with said cam, substantially as set forth and described.

2. The combination, with a bed, of two pinions journaled in bearings thereon, each pinion having a folding device secured thereto,
 30 two reciprocating racks in ways on said bed, said racks being in position to engage said pinions, two levers which are pivoted at their lower ends to a fixed rod and have pivoted
 35 connection at their upper ends with said racks, and mechanism for vibrating said levers, substantially as set forth and described.

3. The combination, with a bed, of two pinions journaled in bearings thereon, folding devices connected with said pinions, two racks
 40 in position to engage said pinions, two levers, each of which is connected at its upper end by a link with one of said racks and pivoted
 45 at its lower end to a fixed rod, two wheels on a rotative shaft, said wheels being provided

with grooves, and rollers secured to the sides of said levers in position to run in the said grooves, substantially as set forth and described.

4. The combination, with a bed provided with guide-posts, of two pairs of vertically-movable plates projecting upward from said bed, each pair of said plates being provided
 50 with a cross-bar which is movable on said guide-posts, a glue-reservoir connected with the upper cross-bar and provided with a series of vertical tubes extending through the reservoir, each of said tubes containing a plunger,
 55 a knife connected with the lower cross-bar, and a driving-shaft provided with cams having connection with said vertical plates, substantially as set forth and described.

5. The combination, with a bed provided with guide-posts, of two vertically-movable
 60 plates projecting upward through said bed and provided with a cross-bar which is movable on said guide-posts, a plate secured to said cross-bar and provided with studs, and a glue-reservoir connected with said studs,
 65 the latter being provided with springs whereby the reservoir has an elastic connection with said cross-bar, substantially as and for the purposes described.

6. In a box-cover machine, in combination
 70 with the driving-shaft, a cam borne on the shaft, a lever with a spring end oscillated by the cam, and a form adjacent to the folders, vibrated by the oscillation of the lever, substantially as specified.

7. In a box-cover machine, in combination
 75 with the driving-shaft, a cam, a lever oscillated by the cam, a slide reciprocated by the lever, a roll borne by the slide, and a jointed shaft connecting the roll with a rotary pinion,
 80 whereby revolution is imparted to the vibrating roll, substantially as specified.

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Witnesses:

H. R. WILLIAMS,
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