No. 733,507. PATENTED JULY 14, 1903.

C. REDD.

END CLOSING MACHINE FOR PAPER BOXES.

APPLICATION FILED APR. 12, 1901.

NO MODEL. 7 SHEETS—SHEET 1.

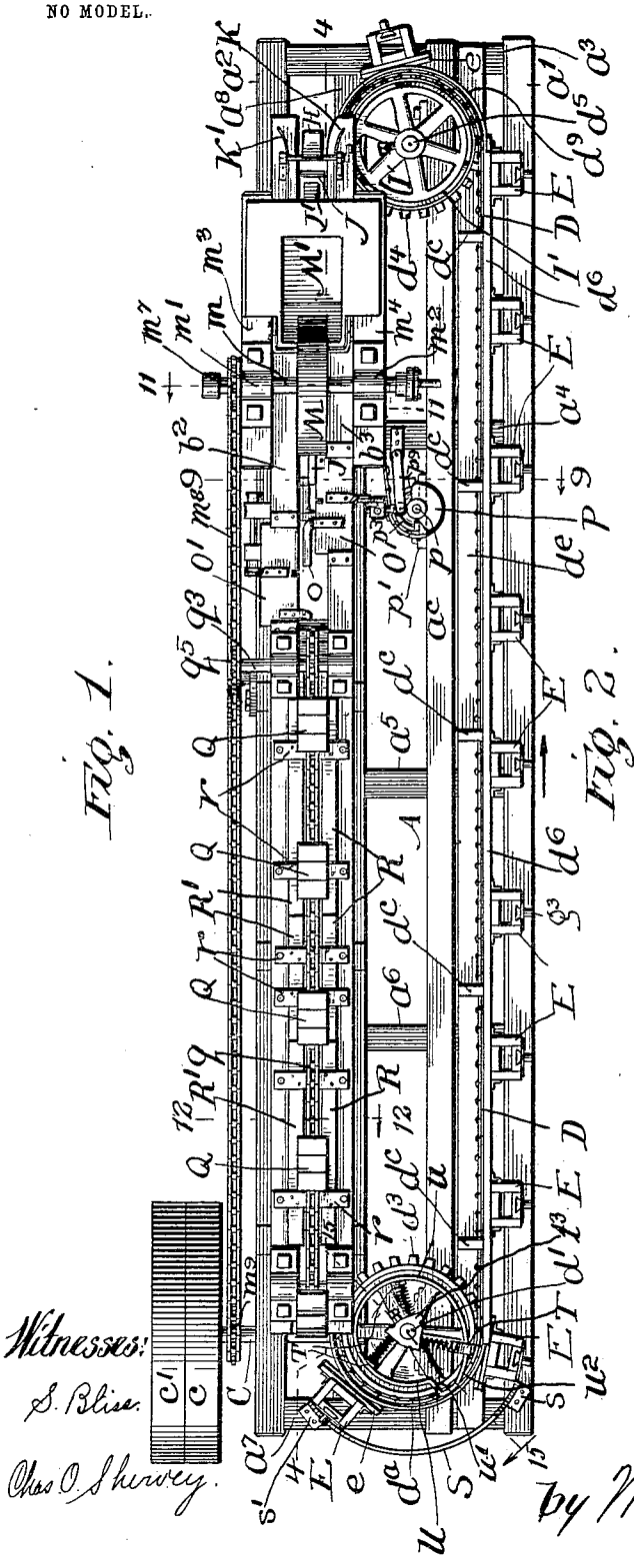


Fig. 1.

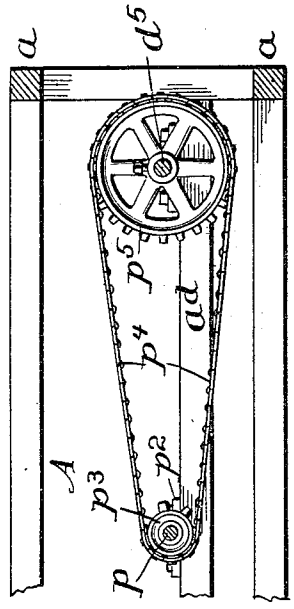


Fig. 2.

Witnesses:
S. Bliss.
Chas. O. Sherwey.

Inventor:
Charlie Redd.
by Miles Marvel & Bitner.
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 7 SHEETS—SHEET 2.

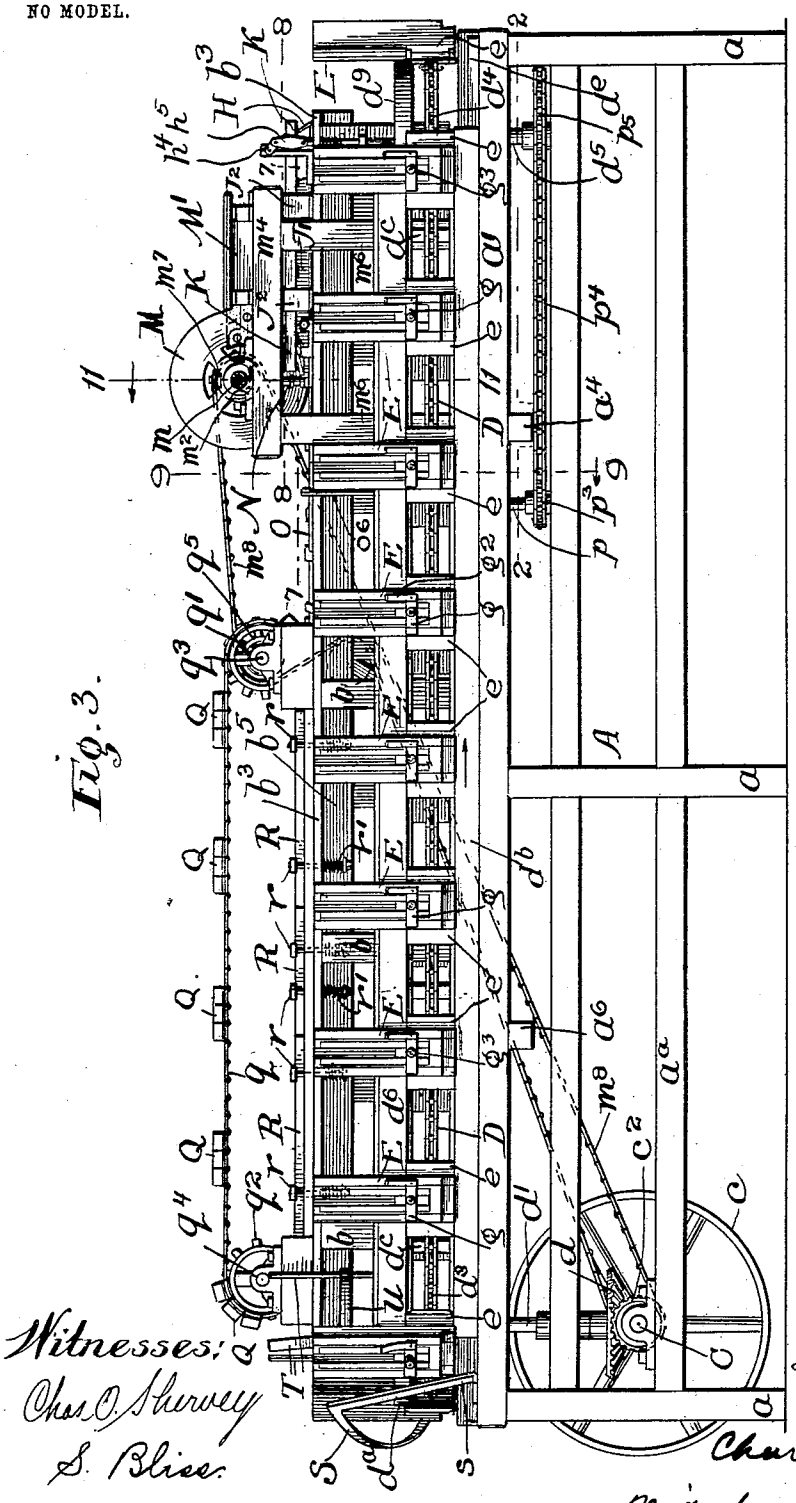


Fig. 3.

Witnesses:
Chas. O. Shervey
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Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 733,507. PATENTED JULY 14, 1903.

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NO MODEL. 7 SHEETS—SHEET 3.

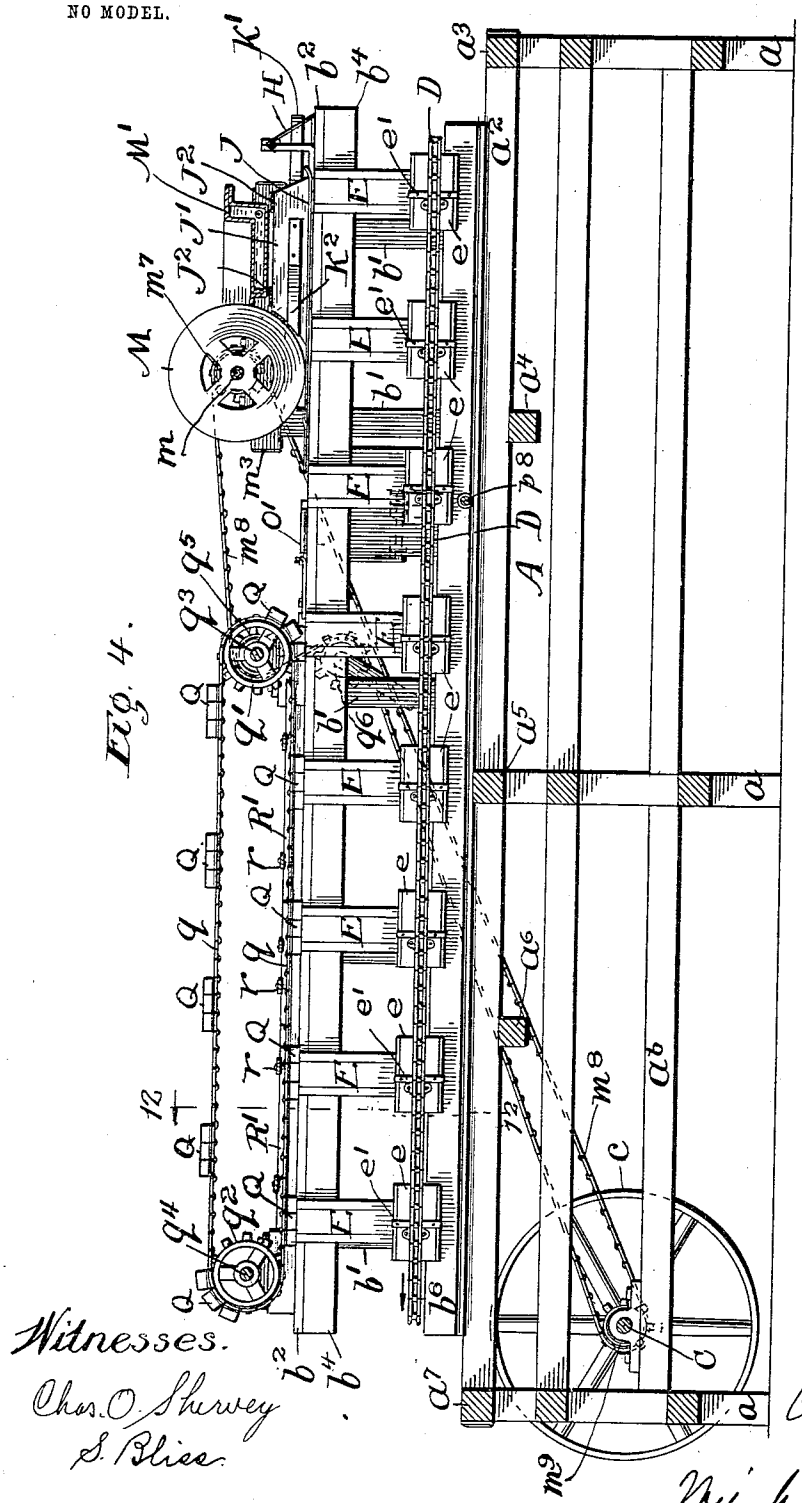


Fig. 4.

Witnesses.
Chas. O. Shervey
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Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 733,507. PATENTED JULY 14, 1903.

C. REDD.

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NO MODEL. 7 SHEETS—SHEET 4.

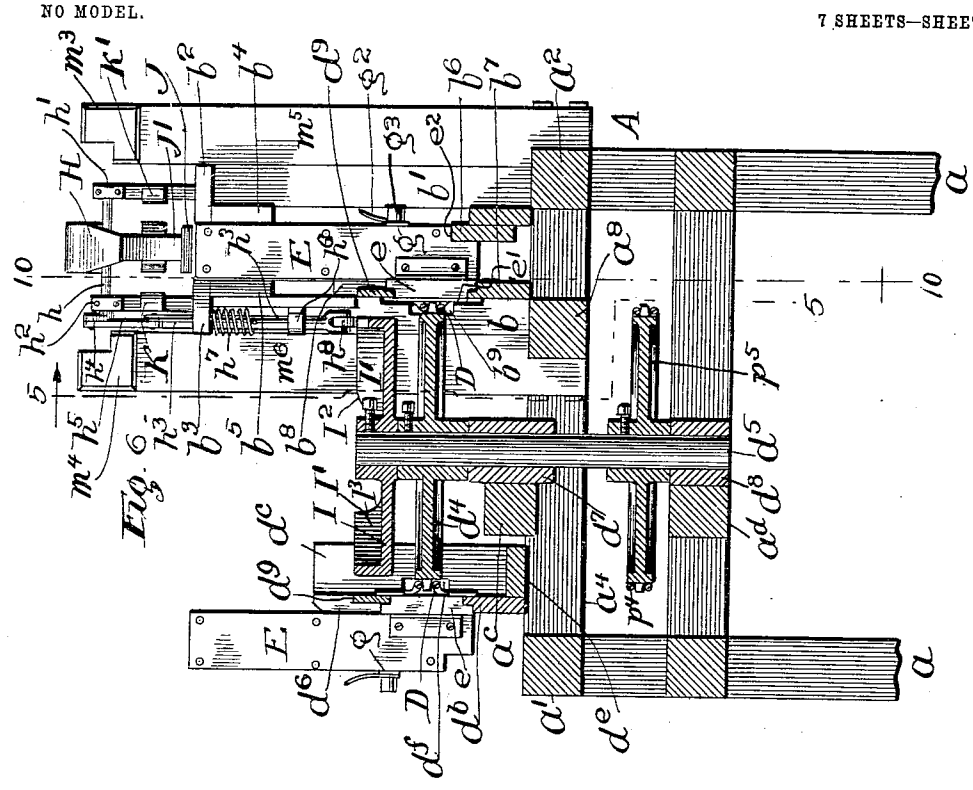


Fig. 6.

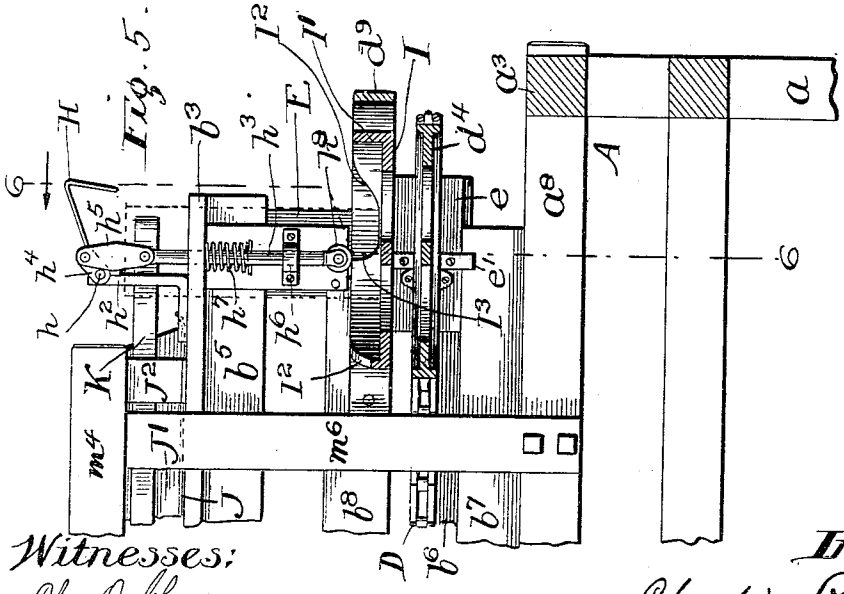


Fig. 5.

Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 733,507. PATENTED JULY 14, 1903.

C. REDD.

END CLOSING MACHINE FOR PAPER BOXES.

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NO MODEL. 7 SHEETS—SHEET 5.

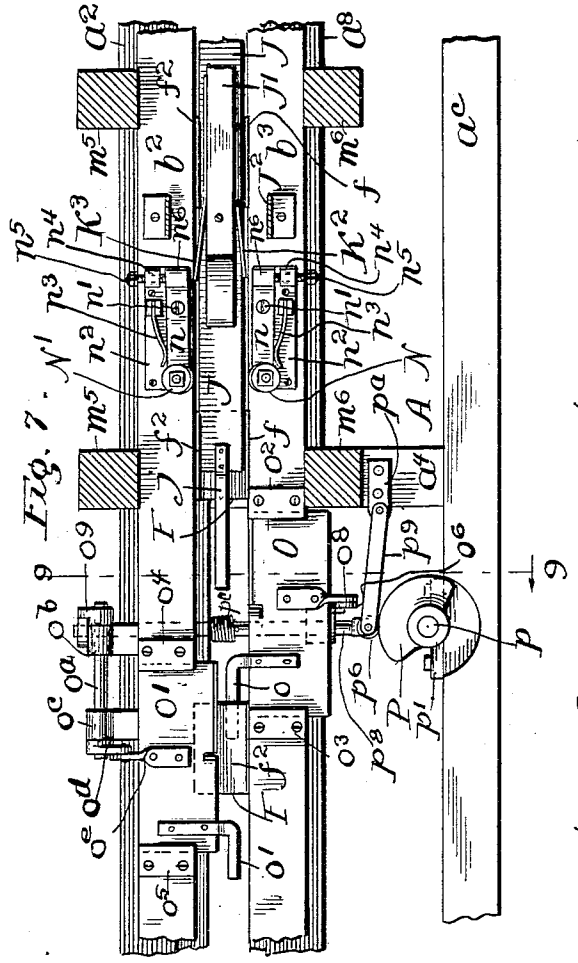


Fig. 7.

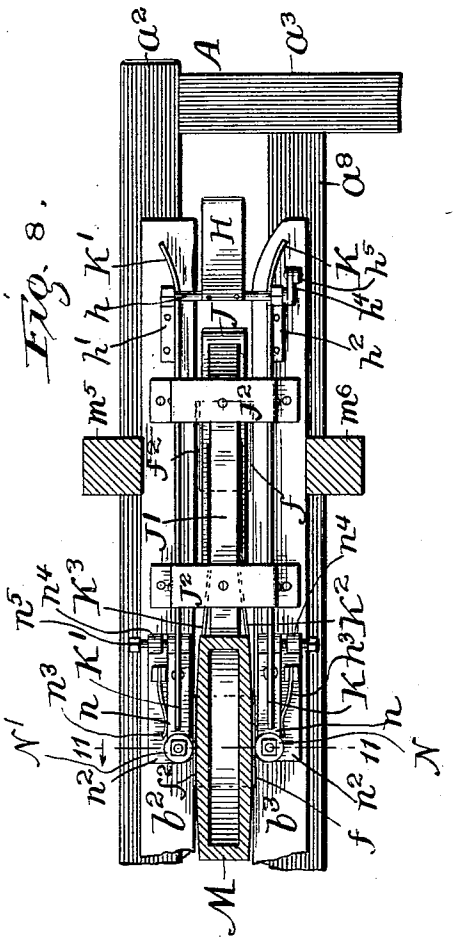


Fig. 8.

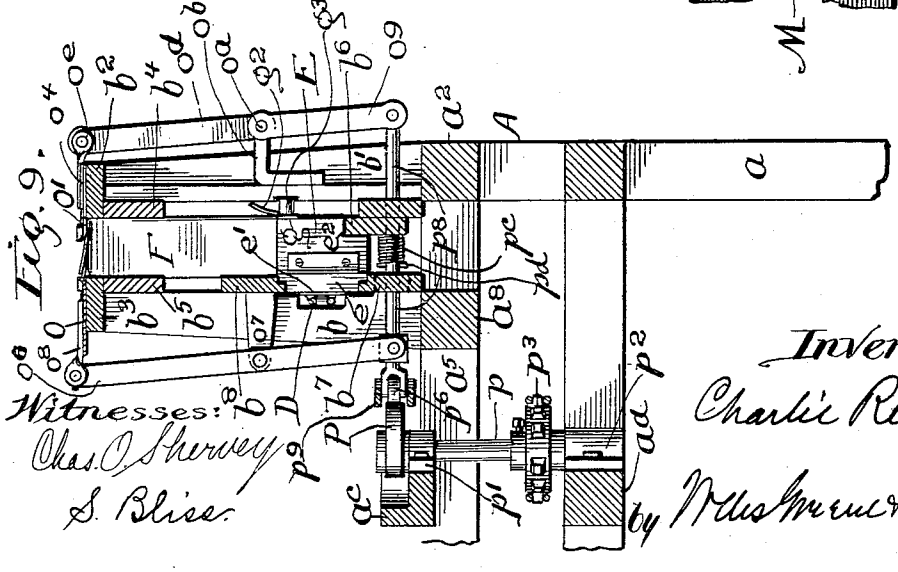


Fig. 9.

Witnesses:
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No. 733,507. PATENTED JULY 14, 1903.

C. REDD.

END CLOSING MACHINE FOR PAPER BOXES.

APPLICATION FILED APR. 12, 1901.

NO MODEL. 7 SHEETS—SHEET 6.

Fig. 10.

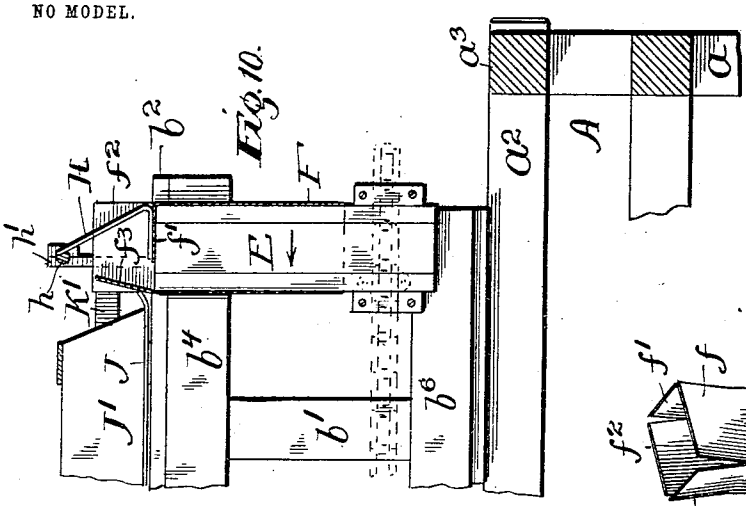


Fig. 14.

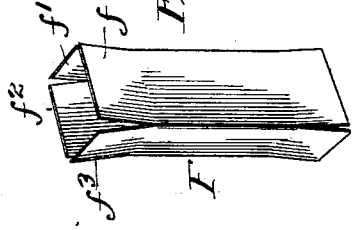


Fig. 11.

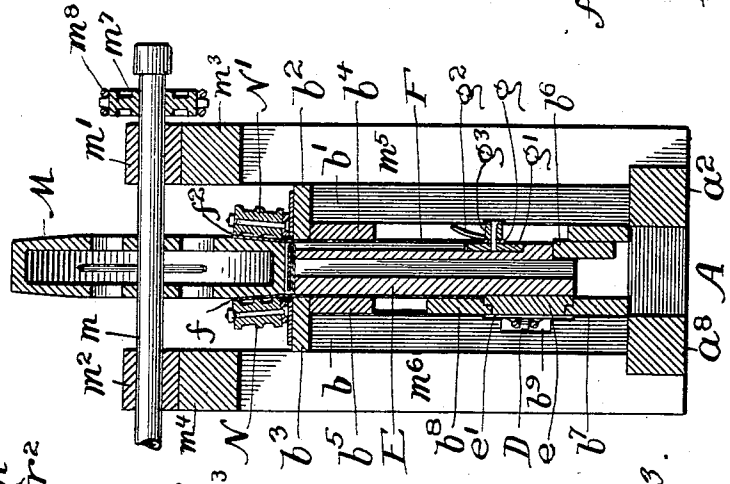


Fig. 12.

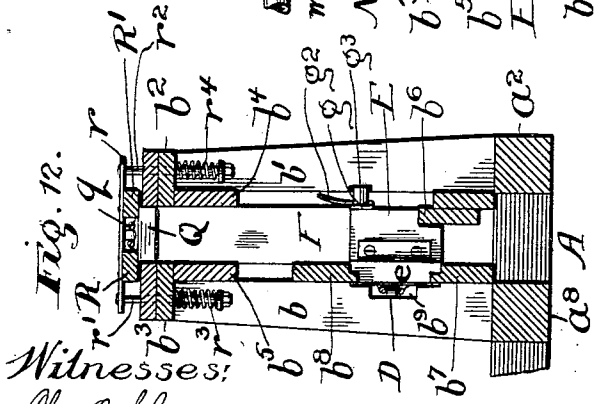
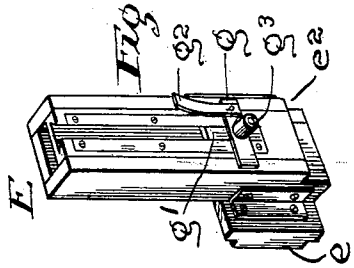


Fig. 13.



Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 733,507. PATENTED JULY 14, 1903.

C. REDD.

END CLOSING MACHINE FOR PAPER BOXES.

APPLICATION FILED APR. 12, 1901.

NO MODEL. 7 SHEETS—SHEET 7.

Fig. 16.

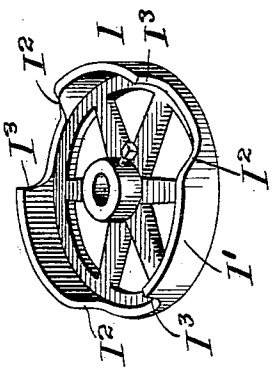


Fig. 17.

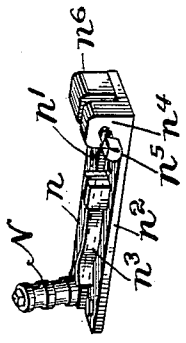
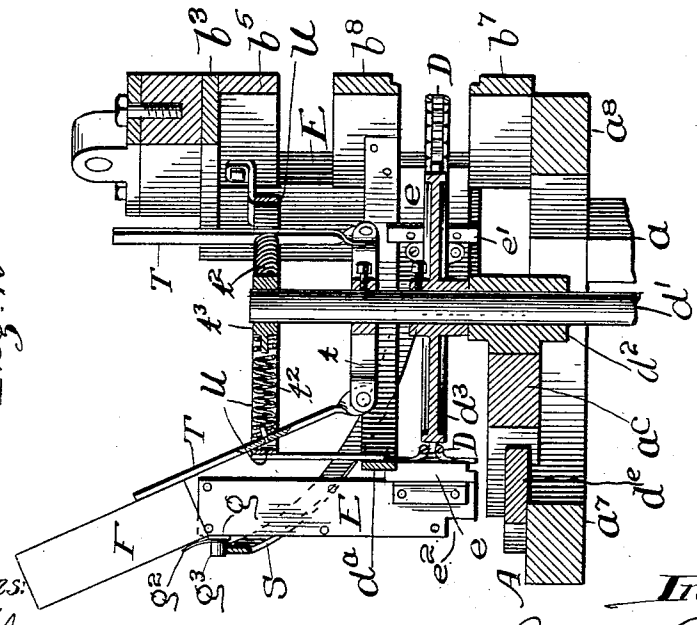


Fig. 15



Witnesses:
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S. Bliss.

Inventor:
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by Williamson & Pitney.
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 733,507. Patented July 14, 1903.

UNITED STATES PATENT OFFICE.

CHARLIE REDD, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHARLES GEORGE LIVINGSTON AND ISAAC PIESER, OF CHICAGO, ILLINOIS.

END-CLOSING MACHINE FOR PAPER BOXES.

SPECIFICATION forming part of Letters Patent No. 733,507, dated July 14, 1903.

Application filed April 12, 1901. Serial No. 55,457. (No model.)

To all whom it may concern:

Be it known that I, CHARLIE REDD, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in End-Closing Machines for Paper Boxes, of which the following is a specification.

My invention relates to certain improvements in a machine designed to close up and paste the end flaps of an ordinary carton, the machine being adapted to operate upon the first end, which is closed, the other end being open.

The purpose of the invention is to improve the efficiency of the machine, better the condition of the box after it has been operated upon, and render the manipulation and operation more satisfactory in many other important particulars.

To these ends the invention consists in a number of novel features or characteristics, which will fully appear below and will be pointed out definitely in the claims.

In the drawings illustrating the preferred form of the invention, Figure 1 is a plan view of an entire machine; Fig. 2, a detail horizontal section in the plane 2 2 of Fig. 3. Fig. 3 is a side elevation looking at the machine from the lower side of Fig. 1 as it appears on the sheet. Fig. 4 is a vertical longitudinal section in the crooked line 4 4 of Fig. 1. Fig. 5 is a vertical section in the crooked line 5 5 of Fig. 6. Fig. 6 is a detail section in the crooked line 6 6 of Fig. 5. Fig. 7 is a horizontal section in line 7 7 of Fig. 3. Fig. 8 is a horizontal section in the line 8 8 of Fig. 3. Fig. 9 is a detail vertical section in the line 9 9 of Figs. 1 and 7. Fig. 10 is a vertical detail section in the line 10 10 of Fig. 6. Fig. 11 is a vertical detail section in the lines 11 11 of Figs. 1, 3, and 8. Fig. 12 is a vertical detail section in line 12 12 of Figs. 1 and 4. Fig. 13 is a perspective of a block-supporting slide and box-holding block secured thereto. Fig. 14 is a perspective view of the sort of paper or pasteboard box or carton upon which the preferred machine here shown is intended to operate. Fig. 15 is a vertical section in the oblique line 15 15 of Fig. 1. Fig. 16 is a perspective of a cam-bearing wheel; and Fig. 17 is a perspective of a spring-actuated holding device, the direction of view in the various sections being indicated by the arrows adjacent to the respective numbers of the section-lines.

Referring to the drawings, A is a supporting-framework, shown here as resting upon legs a, braced by suitable longitudinal and transverse bars and supporting a top or framework made up of longitudinal bars a' a^2 and transverse members a^3 a^4 a^5 a^6 a^7, Fig. 4. A third longitudinal bar a^8, Fig. 6, is supported by the tranverse bars, and upon this bar a^8 and the bar a^2 are secured a series of standards b b', respectively, on the upper ends of which are fastened top boards b^2 b^3 and inner side boards b^4 b^5, Fig. 6. Between the lower portions of the uprights are longitudinal guides b^6 b^7 b^8, the use of which will be hereinafter described, and the uprights b are notched at b^9 to accommodate a conveyer-chain, which will also be referred to below. Upon the lower two longitudinal bars of the frame, which are lettered a^a a^b, is journaled a transverse shaft C, Figs. 1, 3, and 4, having an ordinary driving-pulley c', a loose pulley c, and also provided with a bevel-pinion c^2, which meshes with a bevel-gear d upon a vertically-journaled shaft d', the lower end of which is shown in Fig. 3 and the upper end of which in Fig. 15, said shaft turning in a bearing d^2, secured to a longitudinal bar a^c, Figs. 15 and 1, supported by the frame. On the shaft d' above this bearing is a sprocket-wheel d^3, upon which runs a chain D, Fig. 1, extending longitudinally of the machine and running upon another sprocket d^4, mounted upon a vertical shaft d^5, Fig. 6, turning in bearings d^7 d^8, supported, respectively, upon the longitudinal bar a^c and a second longitudinal bar directly beneath the same and lettered a^d. At intervals along this chain, Figs. 3 and 4, are secured a series of slides e, rabbeted to receive the edges of the guides b^7 b^8, (shown in Figs. 9 and 11,) and said slides are provided with vertical plates e', adapted to embrace the opposite sides of the guides and hold the slides laterally with respect thereto. The guide b^8 is continued in the shape of an arc, as seen in Fig. 1 at d^9, about the sprocket-wheel d^4, and in similar form, as seen in d^a,

about the sprocket-wheel d^3. Furthermore, these arc-shaped extensions are connected along the other side of the sprockets by guides d^6 d^b, corresponding to the guides b^7 b^8, the guides d^6 d^b being supported by standards d^c, themselves supported by a longitudinal bar d^e, secured to the top of the frame. The standards are cut away at d^f to accommodate the chain. By means of these guides the slides e are kept in a vertical position as they are carried around by the chain, and they themselves serve to support a series of vertical carriers or blocks E, secured to the faces of the slides opposite the chain and rabbeted at e^2 to receive the corner of the guides b^6, Fig. 6. These blocks are intended to receive cartons such as are represented in Fig. 14 and lettered F, the same being made by folding a piece of light cardboard or paper and gluing the edges together, with the exception of the end portions, the said end portions being slit to form loose flaps f f' f^2 f^3 at each end adapted to fold in and close that end of the carton. The blocks E are fitted to the particular carton desired, and these cartons are slipped upon the blocks as the latter pass along the lower side of the machine as it appears in the plan view in Fig. 1 until the lower edges of the carton come in contact with a suitable stop, which in the particular instance shown is afforded both by the upper edge of the slide e and by a plate g, secured to a vertical slide g', guided vertically in the block, said plate being provided with an outwardly-turned finger g^2 to guide the flap to the plate and with a roller g^3, employed to crowd the carton off of the block, as will be described below. The direction of movement of the chain is indicated by the arrows, and such movement brings the block and the carton thereon around the sprocket-wheel d^4 between the guides b^7 b^6 at the end of the frame and also brings the top of the block between the side boards b^4 b^5, Fig. 6. The carton is first brought into range of an oscillating folder H, Figs. 5, 6, and 10, said folder being fast upon a shaft h, journaled in brackets h' h^2, secured to the adjacent framework, said shaft having fast upon it a crank-arm h^4, Fig. 5, outside of the brackets, which arm is connected by a link h^5 with a rod h^3, vertically guided by means of a clip h^6 and a perforation in the top board b^3, and pressed downward by a spring h^7, confined between a pin in the rod and the top board b^3. In the lower end of the rod is journaled a roller h^8, and the shaft d^5 carries a cam-wheel I above the sprocket-wheel d^4, which has a vertical marginal flange I', provided upon its upper edge with two series of cam-surfaces I^2 I^3, the intermediate portions of the top of the flange being preferably horizontal. As the cam-wheel rotates along with the sprocket one of the surfaces I^2 raises the rod and the folding-finger to permit the upwardly-projecting flaps of the carton to pass beneath the finger, and one of the horizontal portions of the upper edge of the flange of the cam-wheel holds the finger in this position until the carton has sufficiently advanced, when the arrival of one of the cams I^3 permits the spring h^7 to bring the finger down into the position seen in Fig. 10 and fold in the rear flap f' of the carton. At about the same time the forward flap f^3 reaches the forward upturned end of a stationary folding-plate J, Fig. 10, fastened to the lower edge of a board J', supported by inverted-U-shaped brackets J^2, fastened to the top of the board and extending downward upon both sides at a slight distance therefrom to the top boards b^2 b^3 and attached to said top boards, as shown in Fig. 8. This folding-plate serves to fold in the forward flap of the carton, and the side flaps in the meantime pass between two lateral plates K K', fastened to the said U-shaped brackets, Figs. 1 and 8, which serve to keep said side flaps from spreading apart and catching the adjacent parts of the machine. Two laterally-diverging plates K^2 K^3, Figs. 7 and 8, engage the inner sides of said side flaps as they pass onward and guide them between the sides of a gluing-wheel M and pressing-rollers N N'. The gluing-wheel is mounted on a shaft m, (shown in Fig. 11,) journaled in bearings m' m^2, supported upon bars m^3 m^4, which are themselves secured to the upper ends of standards m^5 m^6, suitably supported upon the framework of the machine. One of the outer ends of the shaft has fast upon it a sprocket m^7, connected, by means of a chain m^8, with a sprocket m^9 upon the main driving-shaft C and serving to rotate the gluing-wheel. Said wheel runs in a glue-pot M', from which its sides receive sufficient glue for the purpose, and the inner surfaces of the side flaps of the cartons coming in contact with said wheel are supplied with sufficient glue to fasten and hold them in position when the end of the carton is closed. The pressure-rollers are ribbed or provided with alternating prominences and depressions, thereby securing certain important results. If passing flaps are simply held in position for contact with a gummed surface without being positively pressed against the latter, they do not invariably receive an uninterrupted and perfectly-adhering coating of glue, and consequently imperfectly-sealed packages are not uncommon. If plain pressing-rollers are used, an even perfectly-adhering coating is obtained; but it is so thin that partly from instant setting, partly from the quantity being insufficient to fill the pores of the surface upon which the flap is afterward pressed, there is sometimes failure to properly secure the folded flap. When, however, the rollers are provided with circumferential ribs or the like, the flap leaves the rollers with portions of its surface provided with a thin coating of perfectly-adhering glue and with other portions bearing a much thicker coating, and thereby perfect sealing of every package is secured. If the best arrangement of prominences and depressions be chosen,

pressing down the glued flap spreads the glue of the thicker portions evenly over the whole surface, including those parts thinly coated, under pressure. The rollers are journaled upon the free ends of levers n, pivoted between their ends at n' upon plates n^2, secured to the respective top boards b^2 b^3 of what I will call the "operating-trough," and springs n^3 are secured upon said plates, bearing upon the free ends of the levers to crowd the rollers toward the gluing-wheel. A lug n^4, rising from the plate, is provided with a screw n^5, bearing upon the enlarged end n^6 of the lever n, said screw providing means for holding the respective roller away from the gluing-wheel and also for adjusting its limit of movement toward said wheel. By these devices the rollers can be kept far enough from the wheel to prevent their becoming covered with glue, and yet they are permitted to yield to accommodate different thicknesses of material. A finger j, Fig. 7, projecting from the rear end of the plate J, serves to hold down the end flaps of the carton until the first side-folding plate O is reached, which serves to fold down the flap f and hold it down until the second side-folding plate O' is reached, which folds in the flap f^2 upon the others. Bent fingers o o' assist in holding down the flaps. The plate O is guided so as to move laterally by means of plates o^2 o^3, and corresponding plates o^4 o^5 guide the folding-plate O'. These side-folding plates are reciprocated laterally and oppositely through suitable connections by means of a cam P on the upper end of a shaft p, journaled in brackets p' p^2, Fig. 9, secured to the framework, said shaft being provided with a sprocket-wheel p^3, geared by means of a chain p^4, Fig. 2, to a sprocket p^5 upon the lower end of the shaft d^5, Fig. 6. Upon this cam runs a roller p^6, Figs. 7 and 9, on the end of a laterally-reciprocating rod p^8, guided at the end bearing the roller by means of links p^9, pivoted to a bracket p^a, fastened to the frame and guided at the other end in the trough, so as to move in a substantially transverse direction as to the trough. A spring p^c, confined between the guide b^6 and a pin p^d on the rod, keeps the roller p^6 in contact with the cam P. To the roller end of the rod is pivoted a lever o^6, pivoted between its ends to a bracket o^7, supported by the trough, and at its other end to a bracket o^8, secured to the plate O. The other end of the rod p^8 is pivoted to a crank-arm o^9, fast upon one end of a shaft o^a, Fig. 7, journaled in brackets o^b o^c, supported by the trough and carrying in its opposite end a crank-arm o^d, pivoted to a bracket o^e, fastened to the plate O'. By the proper angular adjustment of the cam the movement of the side-folding plates is so timed as to cause said plates to operate upon the respective side flaps as the latter are brought in front of them by the movement of the carrier-chain. After the cartons pass the side-folding plate O', with their end flaps folded down tightly upon the ends of the carrier-blocks E, said folded ends pass beneath pressing-blocks Q, Fig. 4, fast upon a chain q, running over sprockets q' q^2, fast upon shafts q^3 q^4, journaled in suitable bearings carried by the top boards of the trough, the shaft q^3 extending beyond one of these bearings and having fast upon it a sprocket q^5, over which runs the chain m^8, before referred to, and upon which it is held by means of an idler q^6. (Shown in dotted lines in Fig. 4.) This sprocket serves to drive the chain q, so as to bring the pressing-blocks into the proper position as the cartons pass beneath them, and said blocks are held down with the desired pressure on the folded ends by means of bars R R', Fig. 12. These bars are secured together by transverse plates r, drawn downward by means of bolts r' r^2 at their opposite ends, said bolts being vertically guided in the top boards of the trough and bearing upon their lower ends springs r^3 r^4, confined between said top boards and nuts upon the ends of the bolts. By means of these nuts the tension can be adjusted and the desired degree of pressure upon the folded ends maintained. The length of the chain q and the portion of the trough which it occupies should be sufficient to set the glue, so that when the cartons emerge from beneath the pressing-blocks they are ready to be ejected from the machine. For the latter purpose I have provided an upwardly-inclined curved plate S, Figs. 1 and 15, secured to the frame at its opposite ends by means of standards s s' and in the path of the rollers g^3, hereinbefore referred to in connection with the description of the carrier-blocks E. As these blocks pass around the sprocket-wheel at this end of the machine the rollers ride up the inclined plate and raise the cartons off of said carrier-blocks.

It is desirable that the cartons should be ejected from the machine, so as to remove any possibility of their falling into the moving portions thereof, and for this purpose I have provided a series of ejecting-fingers T, Figs. 15 and 1. The lower ends of these fingers are pivoted to a spider t, fast upon the shaft d', and the middle portions are pressed outward by means of springs t^2, confined between the fingers and a second spider t^3, fast to the top of said shaft. The outward movement of the fingers is limited by means of an approximately annular plate U, having a portion u along the path of the carrier-blocks concentric with the shaft d' and near enough to the latter to hold the ejecting-fingers out of contact with the cartons, a preferably approximately radial portion u', adapted to permit the fingers to snap outward and knock the cartons laterally from the machine when they have been raised from the carrier-blocks, and an eccentric portion u^2, adapted to gradually bring the fingers back to their former radial distance from the shaft.

In describing the various parts of the pre-

ferred form of apparatus herein shown I have aimed to follow the specific construction of the same in order to make the description as clear and accurate as possible. I fully recognize, however, the possibility of great variation as to form, arrangement, and details, and for that reason I consider that my invention is not limited to the exact form, arrangement, and details herein shown and described.

I claim as new and desire to secure by Letters Patent—

1. In a machine for closing the ends of cartons, the combination with a frame, a moving carrier supported thereon provided with means for sustaining and advancing the cartons, means for applying glue to the proper portions thereof, and means for folding in the end flaps, one upon another, of a pressing device mounted upon the frame comprising a pair of sprocket-wheels provided with means for their rotation and a chain running over said sprocket-wheels, a series of pressing-blocks fastened to and carried by the chain, and spring-pressed guides engaging the blocks upon the side opposite the cartons, said pressing device being arranged and timed to bring the pressing-blocks upon the glued end of the carton and exert pressure thereon till the glue has time to set; substantially as described.

2. In a machine of the class described, the combination with a frame and means for supporting cartons therein and advancing them through a path of suitable length, of gluing and folding mechanisms arranged in succession along the first portion of said path, a pressing-belt having its working fold parallel to a succeeding portion of said path, timed to move with the cartons, and provided upon its working face with sets of narrow transverse blocks in position to fall in succession, as they pass to the working fold of the belt, upon the folded flaps of corresponding cartons and travel on therewith, and means for pressing the blocks yieldingly toward the flaps during such travel.

3. In a machine for closing and gluing the ends of cartons, the combination with a frame and driving devices, of a pair of horizontal driven sprocket-wheels arranged at opposite ends of the frame, a chain running around said sprocket-wheels, guides arranged parallel with the chain, a series of slides attached to the chain guided against lateral movement in said guides and moving longitudinally therein, a series of vertical blocks secured to said slides adapted to receive and hold the cartons, means for folding in the end flaps of the cartons, one upon another, means for applying glue to the proper surfaces thereof and means for pressing and holding said flaps in contact until the glue has time to set; substantially as described.

4. In a machine for closing the ends of cartons, the combination with the frame and driving-gear, of a pair of horizontal driven sprockets at opposite ends of the frame, a chain running around said sprockets, a series of slides secured to said chain, guides therefor adapted to hold the slides against lateral movement and to permit them to move longitudinally with the chain, a series of vertical carton-holding blocks secured respectively to the slides, devices in the path of the carrier-blocks adapted to fold, glue and hold the flaps in contact until the glue sets, devices supported and vertically guided in the carrier-blocks and adapted to raise the cartons therefrom, and suitably-supported devices relatively stationary as to the chain adapted to engage and actuate said raising devices; substantially as described.

5. In a device of the class described, the combination with suitable carton-blocks and means for advancing them in a predetermined path, of means for crowding each carton from its block as it reaches a succeeding point in its path, a spring-pressed arm normally held out of the path of the advancing carton and means for releasing said arm at the instant when the carton pushed from its block is in position to receive from the arm a spring-impelled blow, substantially as described.

6. In a machine of the class described, the combination with a suitable frame and driving devices of a longitudinally-moving carrier, carton-blocks fixed to the carrier and perpendicular to its line of advance, rigid guides permitting to the blocks movement in said line only, gluing, folding and pressing devices arranged in succession along the first part of the path followed by the blocks, automatic means for crowding each advancing carton from its block as it reaches a succeeding point in its path, a spring-pressed arm normally held out of the path of the advancing carton, and means for releasing said arm at the instant when the carton pushed from its block is in position to receive from the arm a spring-impelled blow.

7. In a machine for closing the ends of cartons, the combination with a frame and driving devices, of a pair of vertical driven shafts at the end of the frame, horizontal sprockets upon said shafts, a chain running around said sprockets, guides parallel with the chain, slides moving in and guided by the guides and connected to the chain, vertical carton-supporting blocks secured to the slides, means in the path of the blocks for folding, gluing and pressing the end flaps one upon another to close the end of a carton, means for automatically raising the cartons from the blocks as said blocks are passing around over the said sprockets, a spider secured to the shaft of the last-mentioned sprocket, above said sprocket, a series of substantially radially-oscillating fingers pivoted to the arms of the said spider, and corresponding in position to the blocks as the latter pass around the sprocket, suitably-supported springs crowding the fingers toward the blocks and a suitable guide surrounding said fingers adapted to withdraw the latter from the path of the

blocks and to permit them to fly outward at a point corresponding to that at which the cartons are raised from said blocks; substantially as described.

8. The combination with a gluing-wheel and means for supplying its working surface with glue, of a pressure-roller coacting with the wheel, normally beyond the path of the glue thereon, means for exerting a yielding pressure upon said pressure-roller toward said wheel, means for regulating the normal distance of the roller from the wheel, and means for passing sheets to be glued between the roller and wheel.

9. In a machine for gluing the end flaps of cartons, the combination with devices for suitably supporting and moving the cartons, of a gluing-wheel arranged in the path of the cartons, and provided with means for supplying its opposite side faces with glue, means for guiding and bringing the side flaps of the cartons into contact with the side faces of the gluing-wheel and circumferentially-ribbed pressing-rollers adapted to bear upon said side flaps and press them against the wheel; substantially as described.

10. In a machine for gluing the ends of cartons, the combination with suitable means for holding, moving and guiding the cartons, of a gluing-wheel extending between the paths of the opposite flaps, means for supplying glue to the side faces of said wheel, pressing-rollers arranged upon the opposite sides of said paths substantially parallel with the side faces of the wheel, and means for supporting said pressing-rollers, consisting of levers pivoted between their ends, springs for pressing the roller ends of the levers toward the gluing-wheel and suitably-supported adjusting-screws bearing upon the opposite ends of the levers and adjustable toward or from the same to limit the inward movement of the rollers toward the wheel; substantially as described.

In witness whereof I have hereunto set my hand at Chicago, in the county of Cook and State of Illinois, this 26th day of March, A. D. 1901.

CHARLIE REDD.

Witnesses:
CHAS. O. SHERVEY,
S. BLISS.