

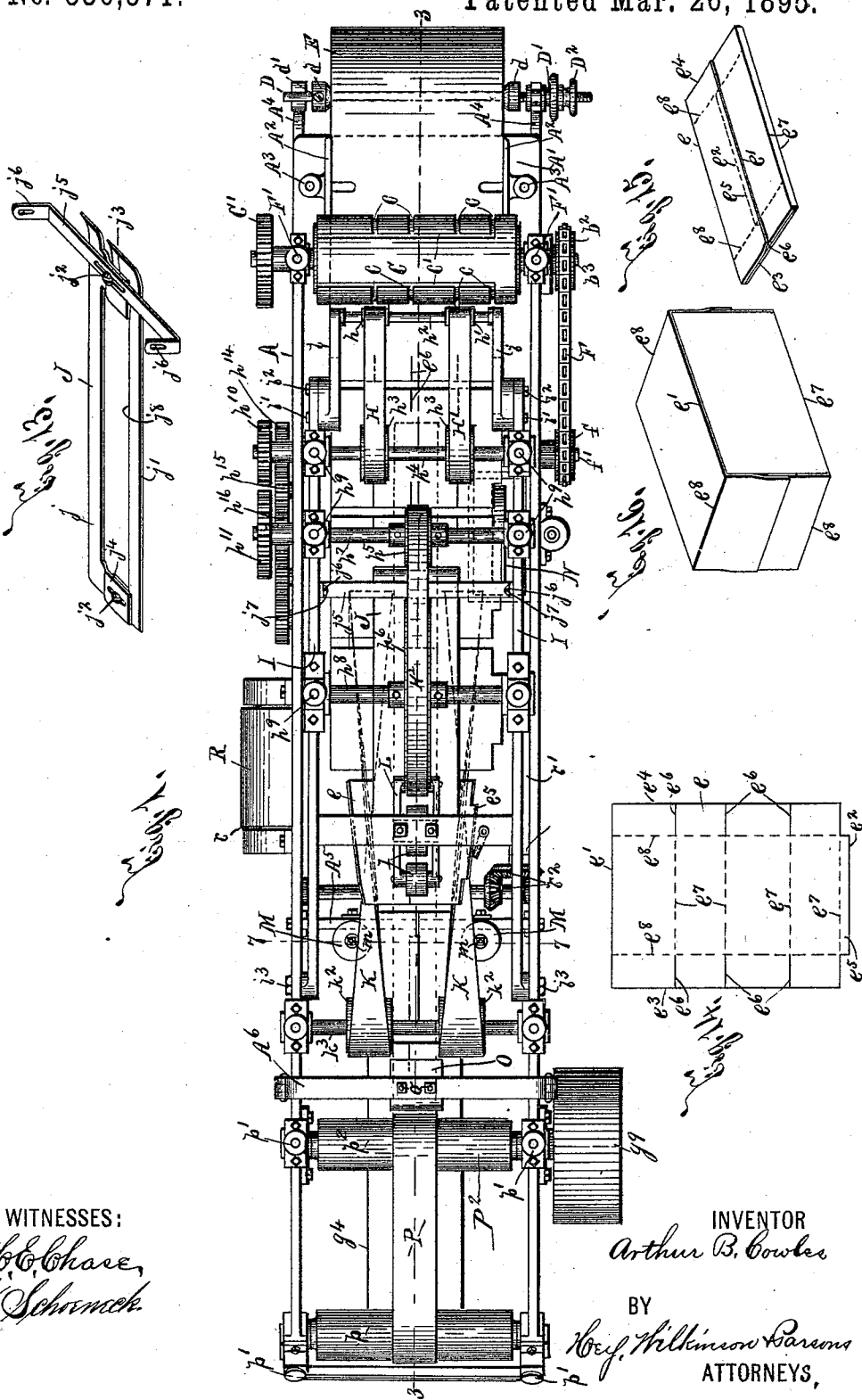
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5 Sheets—Sheet 1.

A. B. COWLES.
PAPER BOX MACHINE.

No. 536,371.

Patented Mar. 26, 1895.



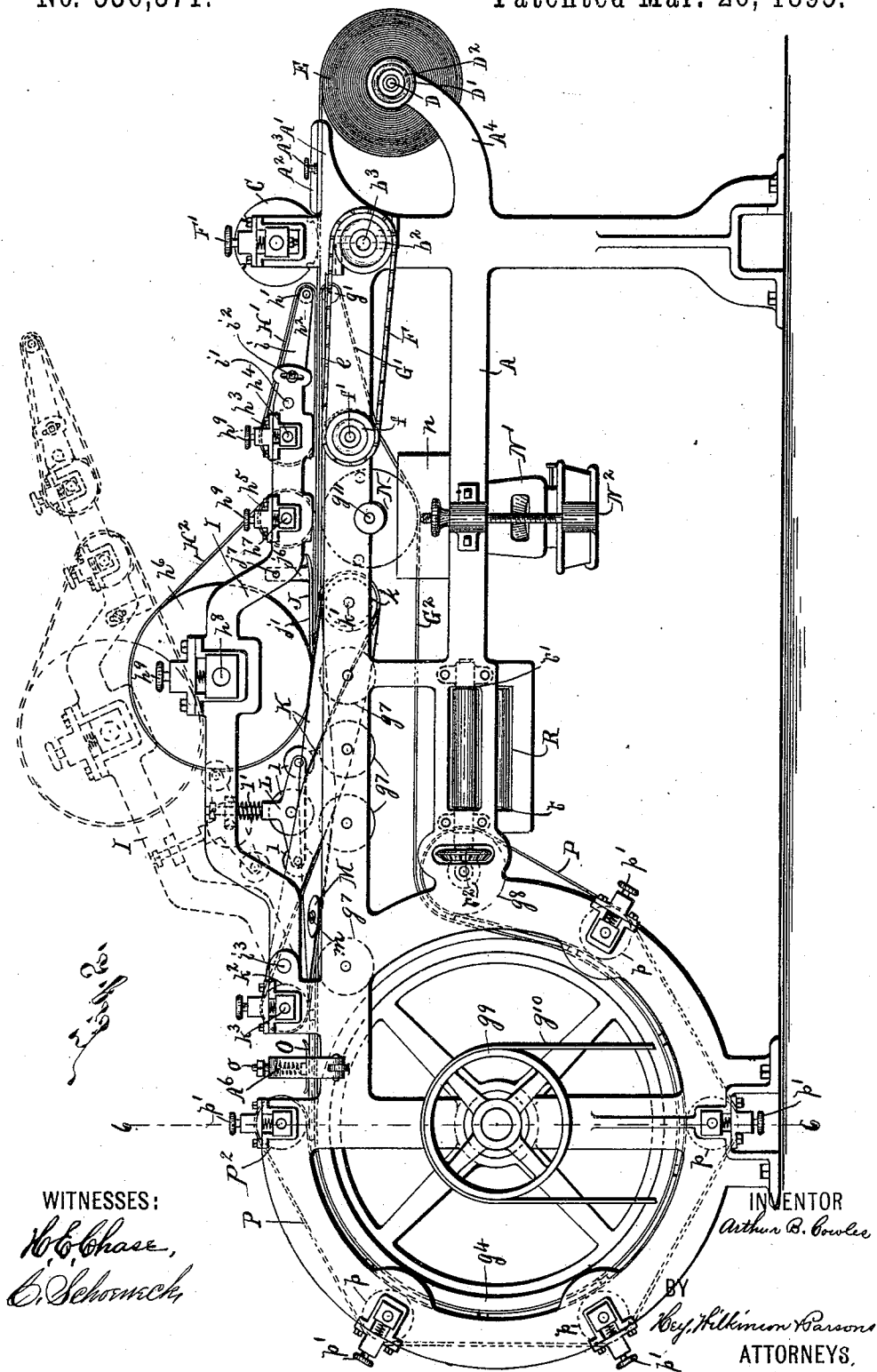
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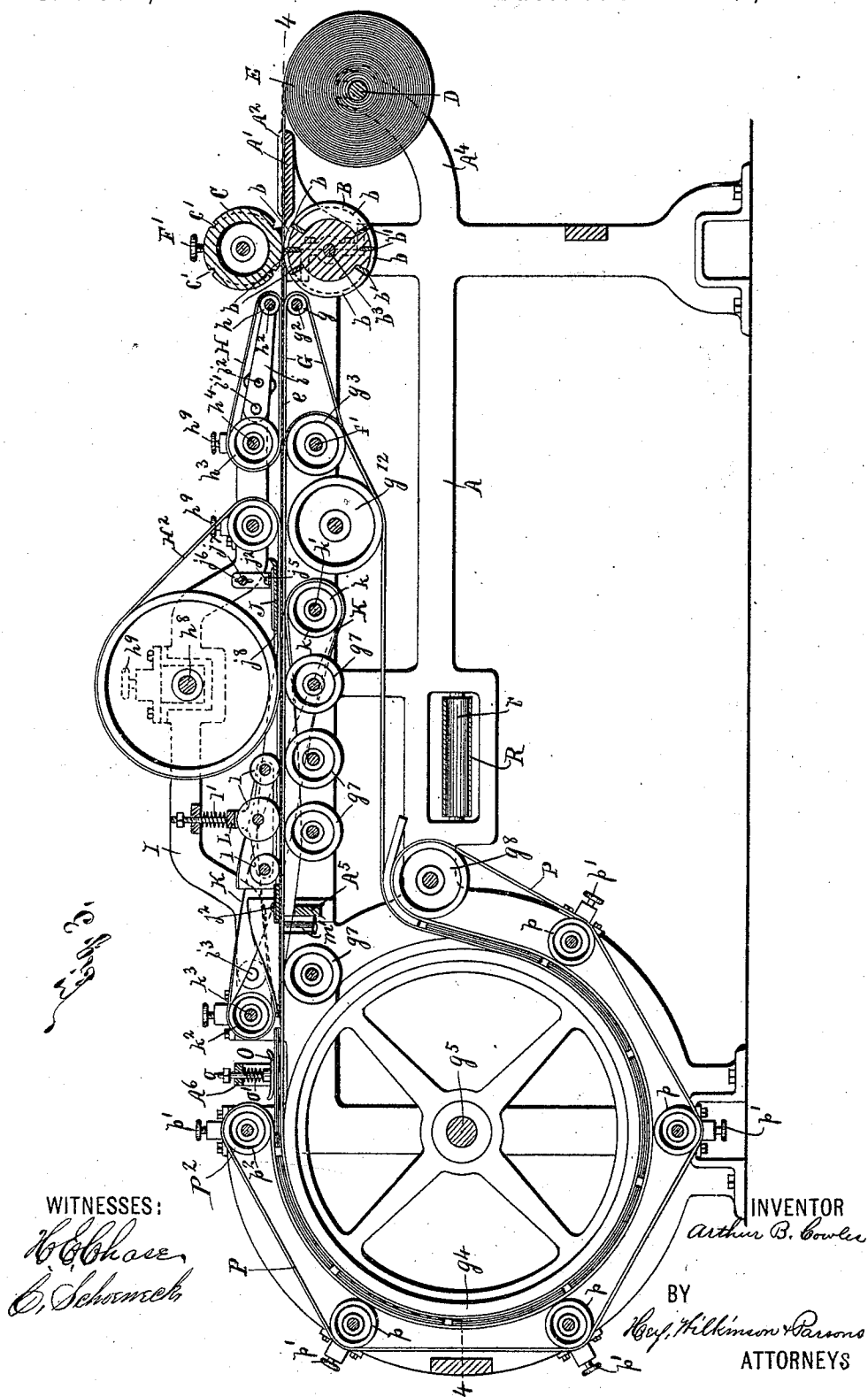
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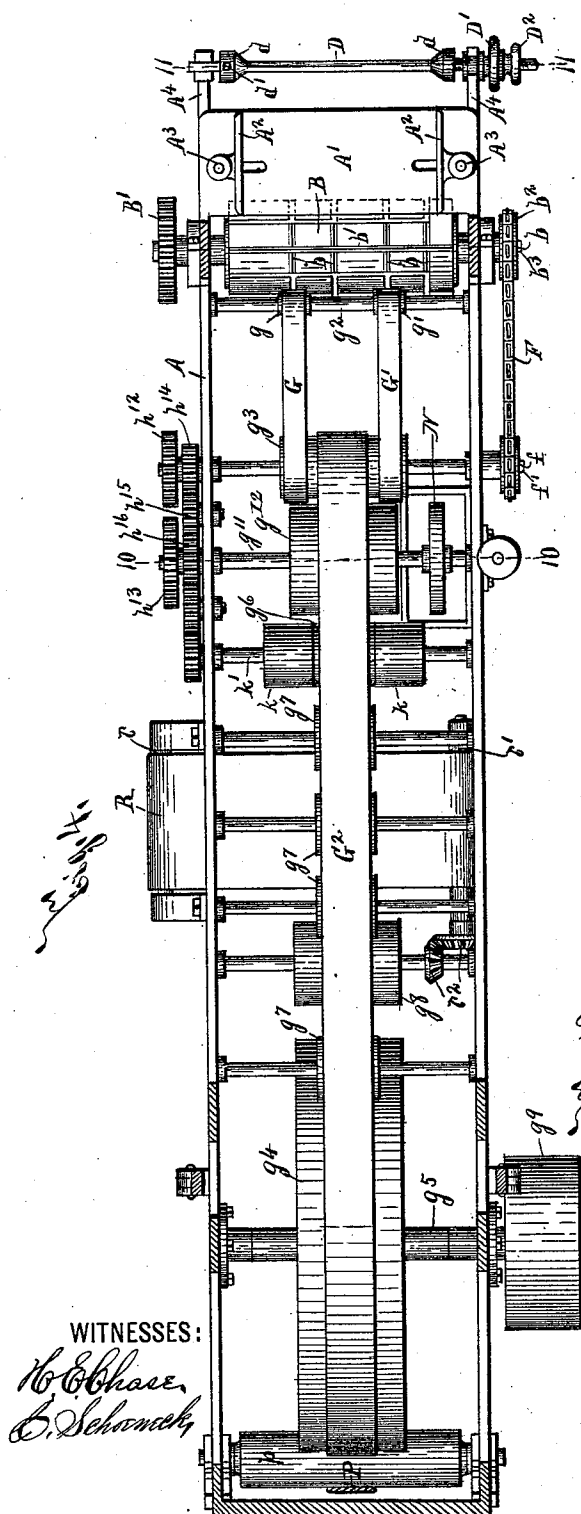
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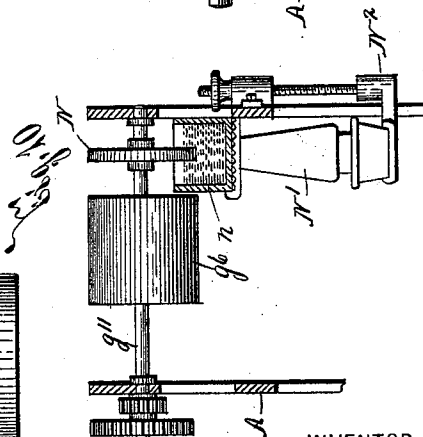
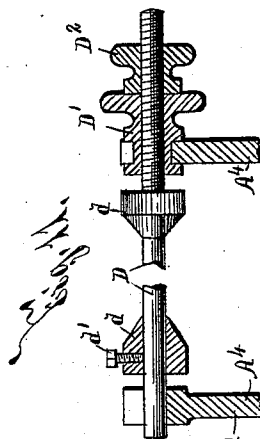
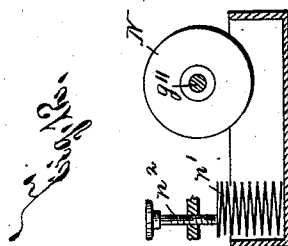
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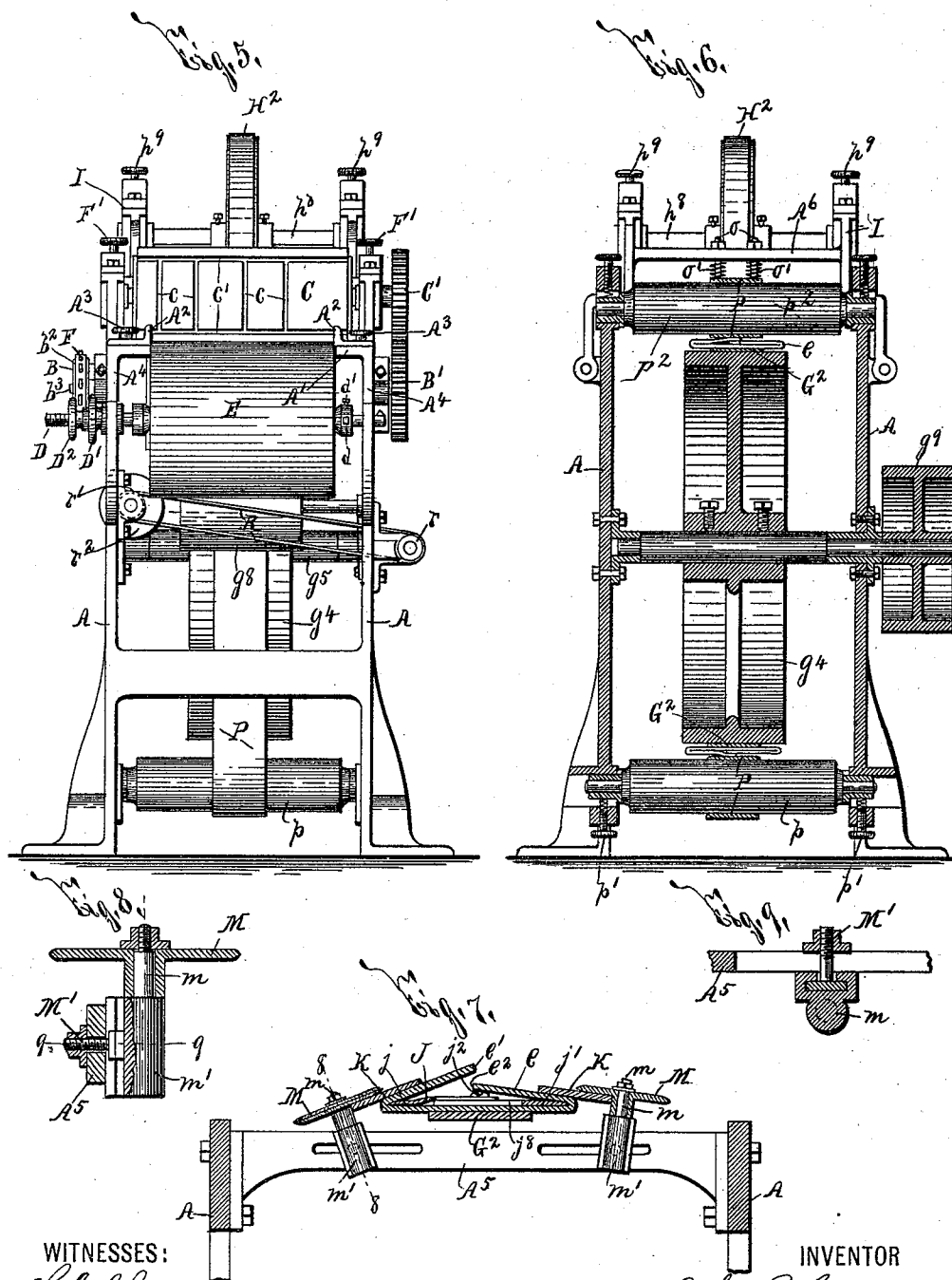
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UNITED STATES PATENT OFFICE.

ARTHUR B. COWLES, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO
THOMAS R. LEVIS, OF SAME PLACE.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,371, dated March 26, 1895.

Application filed July 6, 1894. Serial No. 516,693. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR B. COWLES, of Rochester, in the county of Monroe, in the State of New York, have invented new and useful Improvements in Paper-Box Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in machines, particularly applicable for gluing or pasting and folding the blanks from which paper or card-board boxes are manufactured, and has for its object a particularly simple, practical, and highly effective device for the desired use; and to this end it consists in the general construction and arrangement of its component parts, all as hereinafter more particularly described and pointed out in the claims.

In describing this invention, reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figures 1 and 2 are, respectively, top plan and side elevation of my improved machine, the frame carrying the upper feed for the article to be folded being illustrated by dotted lines as swung upwardly out of operative position. Fig. 3 is a longitudinal vertical sectional view, taken on line 3—3, Fig. 1. Fig. 4 is a horizontal sectional view, taken on line 4—4, Fig. 3. Fig. 5 is an end elevation of my improved machine. Fig. 6 is a transverse vertical sectional view, taken on line 6—6, Fig. 2. Fig. 7 is a transverse vertical detail sectional view, taken on line 7—7, Fig. 1. Fig. 8 is a vertical sectional view, partly in elevation, taken on line 8—8, Fig. 7. Fig. 9 is a horizontal detail sectional view, taken on line 9—9, Fig. 8. Figs. 10 and 11 are transverse vertical sectional views, taken respectively on lines 10—10 and 11—11, Fig. 4. Fig. 12 is a longitudinal detail sectional view of a modified form of glue or paste feed. Fig. 13 is an isometric perspective of the detached folder of my improved machine. Fig. 14 is a top plan view of the blank from which the boxes are folded. Fig. 15 is an isometric perspective of the folded blank; and Fig. 16 is an isometric perspective of the folded box.

The frame A is of any desirable form, size,

and construction, and is provided at one end with cutting and scoring rollers B C, and a spindle D for supporting a roll E of paper or card board from which the box blank *e*, or the article to be folded, is cut.

The box blank *e* is formed with right angularly arranged side and front and rear edges *e'* *e*² *e*³ *e*⁴ and with a lip *e*⁵ projecting from the edge *e*². The blank *e* is provided with cuts 60 or slits *e*⁶ extending inwardly from its front and rear edges *e*³ *e*⁴ and arranged substantially parallel with its side edges *e'* *e*² and with right angularly arranged scores *e*⁷ *e*⁸ connecting opposite cuts or slits *e*⁶ and extending 65 from the front and rear edges of the lip *e*⁵ in planes substantially parallel with the front and rear edges *e*³ *e*⁴.

The roll B is provided with annular and radial knives *b* *b'* suitably arranged to cut 70 the blank *e* from the feeding end of the roll E, and to form the cuts or slits *e*⁶ and the scores *e*⁷ *e*⁸.

The roll C is provided with a series of annular and radial grooves *c* *c'* arranged to register with the knives *b* *b'* as the blank *e* is 75 formed.

The roller B is driven by a chain F passing over chain wheels *f* *b*² provided, respectively, upon a shaft *f'* and the shaft *b*³ of the roller B, and suitable gears B' C' connect the rollers B C for driving both at uniform speed. Adjusters F' of any desirable construction, here 80 illustrated as headed screws, are utilized to vary the amount of separation of the rollers B C.

The frame A is provided with a support or cross bar A' for the feeding end of the roll E arranged between the rollers B C and the spindle D in a plane above the spindle D and 85 substantially coincident with the contiguous portions of the peripheries of the rollers B C. Suitable shoulders A² are mounted upon the supporting cross bar A', and are adjustable toward and away from each other for properly aligning the feeding end of the roll E 90 with the knives of the cutting and scoring rollers. These shoulders A² may be held in their adjusted position by any suitable form of clamping means, as headed screws A³.

The spindle D is removably mounted in open slots in the ends of separated arms A⁴ A⁴ 95

arranged beneath the plane of the support or cross bar A', and, as clearly seen at Figs. 1, 4, and 11, is provided with annular shoulders d d' , one of which is adjustably held in position by a clamp or screw d' . The front end of the spindle D is screw threaded, and is provided with a stationary adjusting nut D' supported in the slotted end of the adjacent arm A' and a stop nut D². It is thus evident that the spindle D may be adjusted lengthwise for aligning the roll E with the guide shoulders A² A² and the cutting and scoring rollers B C, and that said spindle may be readily removed or placed in operative position.

The blanks e cut from the feeding end of the roll E by the rollers B C are engaged by upper and lower feeds for conveying the same to the gluing or pasting and folding mechanisms of my improved machine. The lower feed preferably consists of a pair of separated belts G G' arranged in proximity to the rollers B C and a second belt G² extending beyond the belts G G' and having one extremity interposed between the adjacent ends of the belts G G'. The uppermost portions of the belts G G' G² extend in planes substantially coincident with the support or cross bar A', previously described, and said belts move slightly faster than the contiguous portions of the rollers B C for separating the adjacent edge of the last severed blank e from the next adjacent blank when engaged by the rollers B C during its formation, as clearly seen at Figs. 1, 2, and 3.

The ends of the belts G G' adjacent to the rollers B C are passed over pulleys g g' upon a shaft g^2 journaled in the frame A, and the opposite ends of said belts are passed over a pulley g^3 formed of less diameter than the rollers B C and mounted on the shaft f' , previously described. The diameter of the pulley g^3 is considerably greater than that of the pulleys g g' , and the pulleys g g' are arranged in close proximity to the cutting and scoring rollers B C. The end of the belt G² interposed between the adjacent ends of the belts G G' is also passed over the pulley g^3 and its opposite end is passed around a drum g^4 of considerable size mounted on a shaft g^5 journaled in the corresponding end of the frame A. The part of the uppermost portion of the belt G² interposed between the pulleys g^3 and the drum g^4 is supported by suitable driving pulleys and idlers g^6 g^7 journaled in the frame A, and the opposite portion of the belt G² is supported by a frictionally driven pulley g^8 and the lower face of a driving pulley g^{12} , which is formed of greater diameter than the idlers g^7 .

The shaft g^5 is provided with a pulley g^9 to which power is communicated by any suitable means as a belt g^{10} , and the belt G² communicates motion to the pulley g^3 , and operates the belts G G', and also rotates the cutting and scoring rollers B C through the medium of the shaft f' and the power transmitting mechanism, previously described, in-

terposed between the shaft f' and the rollers B C.

The upper feed for the blanks e or the articles to be folded consists of separated belts H H' supported directly above the belts G G', previously described, and a belt H² above the end of the belt G² adjacent to the belts G G'. The belts H H' are passed over pulleys h h' arranged above the pulleys g g' , previously described, and mounted, respectively, upon shafts h^2 h^4 . The belt h^2 is passed over pulleys h^5 h^6 upon shafts h^7 h^8 journaled in a frame I.

The shaft h^4 is journaled in the frame I and the shaft h^2 is journaled in the free ends of arms i having their rear ends pivoted at i' to the frame I and their intermediate portions secured in operative position by suitable clamps i^2 . The opposite end of the frame I is hinged at i^3 to the frame A, and said frame is free to be moved or swung upwardly into its position indicated by dotted lines at Fig. 2 for permitting access to the underlying parts. The bearings for the shafts h^4 h^7 and h^8 are all preferably adjusted vertically by suitable adjusters as headed screws h^9 , and the shaft h^2 is adjusted toward and away from the underlying shaft for varying the frictional power of the belts H H', by loosening the clamps i^2 swinging on the pivots i' the arms carrying said shaft, and then forcing the clamps i^2 to operative position.

The belts H H' H² are driven by suitable gears h^{10} h^{11} h^{12} h^{13} connecting the shafts h^4 h^7 and the underlying shafts f' and g^{11} provided respectively with the pulleys g^3 , g^{12} . The shafts f' g^{11} are connected by gears h^{14} h^{15} h^{16} for driving both simultaneously.

The blanks, when engaged by the upper and lower feeds of my invention are passed beneath a suitable folder J secured to the frame I and consisting of opposite longitudinal sections j j' adjustably secured together by clamps j^2 . The folder J is formed with separated longitudinal bars having their opposite ends provided with laterally extending arms detachably secured together and forming front and rear cross bars j^3 j^4 and is provided with a supporting cross bar j^5 having upturned slotted ends j^6 adjustably secured by suitable clamps j^7 to the frame I. The folder J is thus adjustable in width and is also adjustable vertically. Feeding of the blanks e , or the articles to be folded, beneath the folder J is facilitated by passing the lowermost portion of the belt H² beneath the front cross bar j^3 of the folder and upwardly through a central aperture j^8 in the folder.

Arranged at opposite sides of the folder J are twisted belts K K passing over vertically moving pulleys k k mounted on a shaft k' provided with the smaller driving pulley g^6 , and vertically moving pulleys k^2 k^2 mounted on a shaft k^3 journaled in the frame A. The adjacent sides of the pulleys k k are arranged directly beneath the corresponding end of the folder J and the top face of the feeding belt

G^2 and the top faces of the pulleys $k^2 k^2$ are considerably elevated above the opposite end of the folder and said top face of the feeding belt G^2 . The belts K K are then so twisted that, in conjunction with this arrangement of pulleys, they operate to elevate the opposite edges $e' e^2$ of the blanks e .

The described arrangement of the belts G^2 K K makes it necessary for the feeding belt G^2 to pass between the belts K K and consequently the adjacent edges of the belts K K are separated a greater distance than the width of the belt G^2 , and are disposed in proximity to the adjacent portions of the longitudinal edges of the feeding belt G^2 , as clearly seen at Figs. 1 and 7.

The central portions of the blanks e are firmly engaged by suitable pressure rollers l mounted in a movable frame L supported by the frame I and forced into operative position by a spring l' .

M M are revolving disks, Figs. 1, 2, 7, and 8 arranged on opposite sides of the folder and the feeding belt G^2 at an angle with the lengthwise plane of the folder and having their adjacent edges slightly elevated above the top faces of the outer edges of the folder, as best seen at Fig. 7. The lower or engaging faces of the disks M as also seen at Fig. 7 are arranged at dissimilar angles with the engaging faces of the folder and the feeding belt G^2 , for insuring the desired lapping upon each other of the projecting edges of the feeding blanks, and said disks are mounted on spindles $m m$ journaled in bearings m' movable lengthwise of a cross bar A^5 of the frame A. Suitable clamps M' hold the bearings m' in their adjusted position. The belts K K are passed beneath the disks M after the edges $e' e^2$ of the feeding blanks are elevated, and said belts held in operative position by said disks for turning the edges $e' e^2$ inwardly over the interposed portion of the folder J and lapping said edges upon each other and the adjacent portions of the blanks.

As previously stated, the edges $e e'$ of the feeding blanks e are first elevated by the belts K K, and are then lapped upon the folder J by said belts. It is extremely desirable to fasten the edges $e e'$ together, and consequently the lip e^5 is provided with paste or glue, which is applied by a suitable feed before the blank e is engaged by the belts K K. The preferable form of feed consists of a rotary disk N arranged at one side of the advanced end of the belt G^2 and movable in a reservoir n for containing glue or paste. The level of the glue or paste may be adjusted by a spiral spring or folding plate n' , and the adjusting screw n^2 for withdrawing said spring or plate from the reservoir n and forcing the same thereinto, as shown in the modified form of glue or paste feed illustrated at Fig. 12. A suitable heater N' mounted on an adjustable support N^2 may serve to constantly heat the reservoir n . After passing beyond the disks M M the partially folded blanks pass beneath

the rollers $k^2 k^2$, which firmly press or fold their longitudinal edges, which are then substantially coincident with the outermost scores $e^7 e^7$. A suitable yielding pressure plate O then firmly presses the central portion of the folded blanks, and forces the glued or pasted lip e^5 firmly against the underlying portion of the edge e' . The plate O is mounted on a plunger o reciprocally movable in a hinged cross bar A^6 and provided with a spring o' for forcing the plate O toward the underlying portion of the belt G^2 .

I preferably use an auxiliary feeding belt P for squeezing the folded blanks and aiding the belt G^2 to feed the folded blanks beneath the drum g^4 to a second auxiliary feed consisting of a downwardly inclining belt R arranged beneath the folder and the belt G^2 at one side of the drum g^4 and extending transversely across the frame A at substantially right angles with the belt G^2 . The central portion of the belt P is passed around pressure pulleys p arranged concentric with the adjacent portion of the drum g^4 and provided with suitable adjusters p' of any desirable form, size, and construction for forcing the pulleys p toward and away from the belt G^2 . The inner face of the belt P is thus arranged concentric with the drum g^4 , and the opposite ends of said belt are passed around the pulley g^8 and the pressure pulley p^2 , which is arranged above the pulley g^8 and the drum g^4 , and is also provided with a stationary adjuster p^2 .

The second auxiliary feeding belt R is movable over pulleys $r r'$, and the shaft for the roller r' is connected by miter gears r^2 to the shaft of the drum g^5 , which is frictionally driven by the under portion of the belt G^2 . The blanks, folded as illustrated at Fig. 15, and having their lips e^5 glued or pasted to their edges e' , are fed from this second auxiliary feed, and may then be folded by hand or otherwise to form the complete box, as shown at Fig. 16.

The operation of my invention will be readily perceived upon reference to the foregoing description and the accompanying drawings, and it will be particularly noted that a continuous roll of paper or card-board is cut into a series of blanks, that these blanks are slightly separated from each other and are suitably cut and scored to form paper or card-board boxes; that in their progress through the machine one of the edges of the blanks is provided with glue or paste, and this edge and the opposite edge are folded upon the inclosed portion of the blank, and are firmly secured together.

The construction of the machine is such that it operates automatically and with great rapidity, is highly durable and efficient, and permits ready access to the parts and adjustment of the feeding devices. It is evident, however, that the detail construction and arrangement of my improved machine may be considerably varied without departing from the spirit thereof, and consequently I do not

herein specifically limit myself to such exact detail construction and arrangement.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination, a supporting frame, a pair of rollers journaled in the frame and provided with cutting and scoring knives, a pair of arms projecting from the frame and formed with open slots, a stationary adjusting nut removably supported in the slot in one of said arms, a spindle having one extremity removably supported in the slot in the other arm and its opposite extremity screw threaded and engaged with said stationary nut and projecting beyond the same, and a stop nut arranged upon the projecting extremity of said spindle and movable into engagement with the adjusting nut, substantially as set forth.

2. In combination, a pair of rollers provided with cutting and scoring knives, a stationary support for the article passed between said rollers arranged at one side of the rollers in proximity thereto, a pair of separated feeding belts for supporting and feeding said articles arranged at the other side of the rollers and having their ends adjacent to said rollers arranged in close proximity thereto, and a second feeding belt for supporting and feeding said articles formed of less width than the articles and extending beyond the former belt and having one end arranged between the former belts, substantially as set forth.

3. In combination, a pair of rollers provided with cutting and scoring knives, a support for the article passed between said rollers arranged at one side of the rollers in proximity thereto, a pair of separated feeding belts for said articles arranged at the other side of the rollers and having their engaging faces movable at a greater speed than the periphery of the rollers, and a second feeding belt for said articles extending beyond the former belt and having one end arranged between the former belts, substantially as described.

4. In combination, a pair of rollers provided with cutting and scoring knives, a feed for engaging the under sides of the articles passed between the rollers, a frame arranged above said feed and having its extremity nearest the rollers movable toward and away from the former feed and its opposite extremity hinged, a movable arm projecting from the frame toward the rollers having its free end movable up and down, means for holding said arm in its adjusted position, and a feed supported by said frame and movable arm for engaging the upper sides of the articles passed between the rollers, substantially as described.

5. In combination, a pair of rollers provided with cutting and scoring knives, a support for the article passed between said rollers arranged at one side of the rollers in proximity thereto, a pair of separated feeding belts for said articles arranged at the other side of the rollers, a second feeding belt extending beyond the former belts and disposed in a plane

interposed between the planes of the former belts, a frame arranged above said feeding belts and having its extremity nearest the rollers movable toward and away from said belts and its opposite extremity hinged, a pair of separated belts supported by the hinged frame and arranged above the former separated belts, a second belt supported by said frame and extending beyond the feeding belts supported by the frame and arranged above the corresponding belt beneath said frame, and a vertically adjustable roller in proximity to said pair of rollers for supporting the adjacent ends of the separated belts supported by said frame, substantially as and for the purpose set forth.

6. In combination, a pair of rollers provided with cutting and scoring knives, a feed for engaging corresponding faces of the articles passed between the rollers, a second feed for engaging the opposite faces of said articles, a frame for supporting the second feed having its extremity nearest the rollers movable toward and away from the former feed and having its opposite extremity hinged, and pressure rollers supported by the frame for engaging the adjacent faces of the articles passed between said feeds, substantially as and for the purpose described.

7. In combination, a pair of rollers provided with cutting and scoring knives, a feed for engaging corresponding faces of the articles passed between the rollers, a movable frame arranged above said feed, a second feed supported by the frame for engaging the opposite faces of the articles, and pressure rollers supported by the frame for engaging the adjacent faces of the articles passed between said feeds, substantially as and for the purpose specified.

8. The herein described feeding mechanism, the same consisting of a feed for engaging the under faces of the passing articles, a frame having one extremity hinged and its opposite extremity arranged above said feed and movable toward and away from the same, a movable arm projecting from said opposite extremity of the frame, means for holding said arm in its adjusted position, and a feed supported by said frame and movable arm for engaging the opposite sides of the passing articles, substantially as and for the purpose set forth.

9. The combination of a feed for the articles to be folded, a supporting frame, having one extremity hinged and its opposite extremity arranged above said feed and movable toward and away from the same and a stationary folder for engaging the articles to be folded fixed to the supporting frame and consisting of opposite sections detachably secured to each other and adjustable toward and away from each other, substantially as and for the purpose described.

10. The combination of a feed for the articles to be folded, a supporting frame, having one extremity hinged and its opposite ex-

5 tremity arranged above said feed and movable toward and away from the same a stationary folder for engaging the articles to be folded fixed to the supporting frame and
10 formed with separated longitudinal bars having their opposite ends provided with laterally extending arms detachably secured together and forming front and rear cross bars, said longitudinal and cross bars inclosing a
15 central aperture, and means for engaging the articles to be folded projecting through said aperture, substantially as and for the purpose specified.

11. In combination, a pair of rollers provided with cutting and scoring knives, a feed for engaging corresponding faces of the articles passed between the rollers, a second feed for engaging the opposite faces of said articles, a frame for supporting the second feed
20 having its extremity nearest the rollers movable toward and away from the former feed and having its opposite extremity hinged, and a folder adjustably supported on the frame and movable toward and away from
25 the former feed for engaging the articles to be folded, substantially as and for the purpose described.

12. In combination, a pair of rollers provided with cutting and scoring knives, a feed for engaging corresponding faces of the articles passed between the rollers, a movable frame arranged above said feed, a second feed supported by the frame for engaging the opposite faces of the articles, a folder supported
30 on the frame for engaging the articles passed between said feeds, and pressure rollers supported by the frame for engaging the adjacent faces of said articles, substantially as set forth.

13. The combination of a feed for the articles to be folded, a supporting frame, having one extremity hinged and its opposite extremity arranged above said feed and movable toward and away from the same a stationary folder for engaging the articles to be folded fixed to the supporting frame and
45 formed with separated longitudinal bars having their opposite ends provided with laterally extending arms detachably secured together and forming front and rear cross bars, said longitudinal and cross bars inclosing a central aperture, a roller for engaging the articles being folded, projecting through said aperture, and a spring for forcing the roller
50 to operative position, substantially as and for the purpose set forth.

14. The combination with a feed for the articles to be folded; of a folder arranged above the feed for engaging the articles to be folded and provided with front and rear cross bars, and a feeding belt passed between said feed and the front cross bar of the folder, substantially as and for the purpose specified.

15. The combination with a feed for the articles to be folded; of a folder arranged above the feed for engaging the articles to be folded and provided with front and rear cross bars

and an interposed aperture, a feeding belt passed between said feed and the front cross bar of the folder through the aperture thereof, 70 and a pressure roller registered with the aperture of the folder for engaging the articles upon the feed, substantially as and for the purpose described.

16. The combination of a feeding belt for 75 the articles to be folded formed of less width than said articles whereby the edges of the articles project beyond the feeding belt, a folder arranged above the feeding belt for engaging the articles to be folded, and twisted 80 belts arranged at opposite sides of the feeding belt and having their adjacent edges separated a greater distance than the width of said feeding belt and disposed in proximity to its longitudinal edges for engaging the project- 85 ing edges of the articles and lapping said edges upon the adjacent portions of said articles, substantially as and for the purpose described.

17. The combination of a feeding belt for 90 the articles to be folded formed of less width than said articles whereby the edges of the articles project beyond the feeding belt, a folder arranged above the feeding belt for engaging the articles to be folded and provided with a central aperture, a pressure 95 roller projecting through the aperture in the folder for engaging said articles, and separated twisted belts arranged at opposite sides of said feeding belt and folder, and having their adjacent edges separated a greater distance than the width of said feeding belt and disposed in proximity to its longitudinal edges for engaging the projecting edges of the articles and lapping said edges upon the 100 adjacent portions of said articles, substantially as and for the purpose specified.

18. The combination with a feed for the articles to be folded; of a folder arranged above the feed for engaging the central portions of 110 the articles to be folded, twisted belts arranged at opposite sides of the folder for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of the articles, and rotary disks having their axes arranged at opposite sides of the folder and the twisted belts, and their engaging faces arranged at an angle with the engaging face of the folder and engaged with the upper faces of the twisted belts for holding the same in operative position to lap said edges upon the folder, substantially as and for the purpose specified. 120

19. The combination of a feed for the articles to be folded formed of less width than 125 said articles, whereby the edges of the articles project beyond the feed, a folder arranged above the feed for engaging the articles to be folded, separated twisted belts arranged at opposite sides of the folder for engaging and 130 elevating the projecting edges of said articles and lapping the edges upon the adjacent portions of the articles, and rotary disks having their axes arranged at opposite sides of the

feed and the twisted belts, and their engaging faces arranged at dissimilar angles with the engaging face of said folder and engaged with the upper face of the twisted belts for holding the same in operative position to lap said edges upon the adjacent portions of said articles, substantially as set forth.

20. The combination with a feed for the articles to be folded; of a folder arranged above the feed for engaging the central portions of the articles to be folded and formed with a front and a rear cross bar and an interposed aperture and consisting of opposite sections adjustable toward and away from each other, a feeding belt passed through the aperture of the folder beneath the front bar thereof, a pressure roller registered with the aperture of the folder for engaging the articles upon the feed, and twisted belts arranged at the longitudinal edges of the folder for elevating the edges of said articles, substantially as described.

21. The combination of a feed for the articles to be folded; of a folder arranged above the feed for engaging the articles to be folded and consisting of opposite sections adjustable toward and away from each other, separated twisted belts arranged at opposite sides of the folder for engaging the projecting edges of the articles and lapping said edges upon the adjacent portions of the articles, rotary disks having their axes arranged at opposite sides of the twisted belts and their engaging faces arranged at an angle with the engaging face of the folder and engaged with the upper faces of the twisted belts for holding the same in operative position to lap said edges upon the folder, substantially as and for the purpose described.

22. The combination with a feed for the articles to be folded; of a folder arranged above the feed for engaging the articles being folded and consisting of opposite sections detachably secured to each other and adjustable toward and away from each other, separated twisted belts arranged at opposite sides of the folder for engaging the projecting edges of said articles and lapping the edges upon the adjacent portions of the articles, and rotary disks having their axes arranged at opposite sides of the feed and the twisted belts, and their engaging faces arranged at dissimilar angles with the engaging face of said folder and engaged with the upper faces of the twisted belts for holding the same in operative position to lap said edges upon the adjacent portions of said articles, substantially as and for the purpose set forth.

23. The combination with a feed for the articles to be folded, a folder arranged above the feed for engaging the articles to be folded and provided with front and rear cross bars and an interposed aperture, a feeding belt passed between said feed and the front cross bar of the folder through the aperture thereof, a pressure roller registered with the aperture of the folder for engaging the articles upon

the feed, and a pressure plate for engaging said articles when passed beyond the pressure roller, substantially as described.

24. The combination of a drum, a series of pulleys arranged concentric with a portion of the drum, a feeding belt passed around the drum for feeding the articles between said drum and pulleys, an endless auxiliary feeding belt passed around the pulleys and having its inner portion arranged concentric with the drum and engaged with the adjacent faces of the pulleys and its outer portion engaged with the outer faces of the pulleys, and adjusters for forcing said pulleys toward the drum and thereby squeezing the articles interposed between said feeding belts, substantially as specified.

25. The combination of a drum, a pair of pulleys $p^2 g^8$ arranged one above the other in close proximity to the drum, a feeding belt passed around the drum for feeding articles between said drum and pulleys, an endless auxiliary feeding belt having its opposite ends passed around said pulleys and its inner face arranged concentric with the drum, pressure pulleys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, and adjusters for forcing said pressure pulleys toward the drum and thereby squeezing the articles interposed between said belts, substantially as described.

26. The combination of a drum, a driving pulley, a pair of pulleys $p^2 g^8$ arranged one above the other in close proximity to said drum, a feeding belt passed over the drum and driving pulley and arranged in close proximity to the pair of pulleys, an endless auxiliary feeding belt having its opposite ends passed around the pair of pulleys and its inner face arranged concentric with the drum, and pressure pulleys interposed between the former pair of pulleys and the opposite portions of the latter belt, substantially as specified.

27. The combination of a drum, a driving pulley, a pair of pulleys $p^2 g^8$ arranged one above the other in close proximity to said drum, a feeding belt passed over the drum and driving pulley and arranged in close proximity to the pair of pulleys, an endless auxiliary feeding belt having its opposite ends passed around the pair of pulleys and its inner face arranged concentric with the drum, pressure pulleys interposed between the former pulleys and the inner and outer portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, and adjusters for forcing said pressure pulleys toward the drum and thereby squeezing the articles interposed between said belts, substantially as and for the purpose described.

28. The combination with a feeding belt and a folder for the articles to be folded; of a drum over which said belt is passed, separated

twisted belts arranged at one side of the drum at opposite sides of the feeding belt for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of said articles, a series of pulleys arranged concentric with a portion of the drum, and an auxiliary feeding belt passed around said pulleys, substantially as and for the purpose set forth.

29. The combination with a feeding belt and a folder for the articles to be folded; of a drum over which the belt is passed, separated twisted belts arranged at one side of the drum at opposite sides of the feeding belt for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of said articles, a pair of pulleys $p^2 g^8$ arranged above and below the feeding belt in proximity to the drum, an endless auxiliary feeding belt having its opposite ends passed around said pair of pulleys and its inner face arranged concentric with the drum, and pressure pulleys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, substantially as described.

30. The combination with a feeding belt for the articles to be folded, a drum over which the belt is passed, a folder arranged at one side of the drum above the feeding belt for engaging the central portions of the articles to be folded, twisted belts arranged at one side of the drum at opposite sides of the feeding belt for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of the articles, rotary disks having their axes arranged at opposite sides of the folder and the twisted belts and having their engaging faces arranged at an angle with the engaging face of the folder and engaged with the upper faces of the twisted belts for holding the same in operative position to lap said edges upon the folder, a pair of pulleys $p^2 g^8$ arranged above and below the feeding belt in close proximity to the drum, an endless auxiliary feeding belt having its opposite ends passed around said pulleys and its inner face arranged concentric with the drum, and pressure pulleys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, substantially as described.

31. The combination with a feeding belt for the articles to be folded, a drum over which the belt is passed, a folder arranged above the feeding belt at one side of the drum for engaging the articles to be folded and provided with a central aperture, a pressure roller projecting through the aperture for engaging said articles, a pair of pulleys $p^2 g^8$ arranged above and below the feeding belt in proximity to the drum, an endless auxiliary feeding belt having its opposite ends passed around said pair of pulleys and its inner face arranged concentric with the drum, and pressure pul-

leys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, substantially as specified.

32. The combination of a feeding belt for the articles to be folded, a drum over which the belt is passed, a folder arranged above the feeding belt at one side of the drum for engaging the articles to be folded and provided with a central aperture, a pressure roller projecting through the aperture for engaging said articles, separated twisted belts arranged at one side of the drum at opposite sides of the feeding belt for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of said articles, a series of pulleys arranged concentric with a portion of the drum, and an auxiliary feeding belt passing around said pulleys, substantially as described.

33. The combination of a drum, a series of pulleys arranged concentric with a portion of the drum, a main feeding belt passed around the drum for feeding the articles between said drum and pulleys, an endless auxiliary feeding belt passed around the pulleys and having its inner portion arranged concentric with the drum and engaged with the adjacent faces of the pulleys and its outer portion engaged with the outer faces of the pulleys, adjusters for forcing said pulleys toward the drum and thereby squeezing the articles interposed between said feeding belts, and an auxiliary feed supported beneath the main feeding belt and the discharge end of the auxiliary feeding belt and arranged at substantially right angles with the main feeding belt, substantially as specified.

34. The combination with a feeding belt and a folder for the articles to be folded; of a drum over which the belt is passed, separated twisted belts arranged at one side of the drum at opposite sides of the feeding belt for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of said articles, a pair of pulleys $p^2 g^8$ arranged above and below the feeding belt in proximity to the drum, an endless auxiliary feeding belt having its opposite ends passed around said pair of pulleys and its inner face arranged concentric with the drum, pressure pulleys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, and an auxiliary feed supported beneath the main feeding belt and the discharge end of the auxiliary feeding belt and arranged in proximity to the lower one of said pair of pulleys at an angle with the main feeding belt, substantially as described.

35. The combination of a feeding belt for the articles to be folded, a drum over which the belt is passed, a folder arranged at one side of the drum above the feeding belt for engaging the central portions of the articles to

be folded, twisted belts arranged at opposite sides of the folder for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of the articles, a pair of pulleys $p^2 g^8$ arranged above and below the feeding belt in close proximity to the drum, an endless auxiliary feeding belt having its opposite ends passed around said pair of pulleys and its inner face arranged concentric with the drum, pressure pulleys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, and an auxiliary feed supported beneath the main feeding belt and the discharge end of the auxiliary feeding belt and arranged in proximity to the lower one of said pair of pulleys at an angle with the main feeding belt, substantially as described.

36. The combination with a feeding belt and a folder for the articles to be folded; of a drum over which the belt is passed, separated twisted belts arranged at one side of the drum at opposite sides of the feeding belt for engaging the projecting edges of said articles and lapping said edges upon the adjacent portions of said articles, a pair of pulleys $p^2 g^8$

arranged above and below the feeding belt in proximity to the drum, an endless auxiliary feeding belt having its opposite ends passed around said pair of pulleys and its inner face arranged concentric with the drum, pressure pulleys interposed between the former pulleys and the opposite portions of the latter belt and having their opposite faces engaged with the adjacent faces of the latter belt, adjusters for forcing said pressure pulleys toward the drum and thereby squeezing the articles interposed between said belts, a downwardly inclining feeding belt arranged beneath the main feeding belt and the discharge end of the auxiliary feeding belt in proximity to the lower one of said pair of pulleys and at substantially right angles with the main feeding belt, substantially as and for the purpose described.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Rochester, in the county of Monroe, in the State of New York, this 10th day of May, 1894.

ARTHUR B. COWLES.

Witnesses:

H. E. CHASE,
HAMPDEN HYDE.