F. MEISEL.

MACHINE FOR MAKING BOX BLANKS.

APPLICATION FILED MAR. 14, 1904.

958,661.

Patented May 17, 1910.

3 SHEETS—SHEET 1.

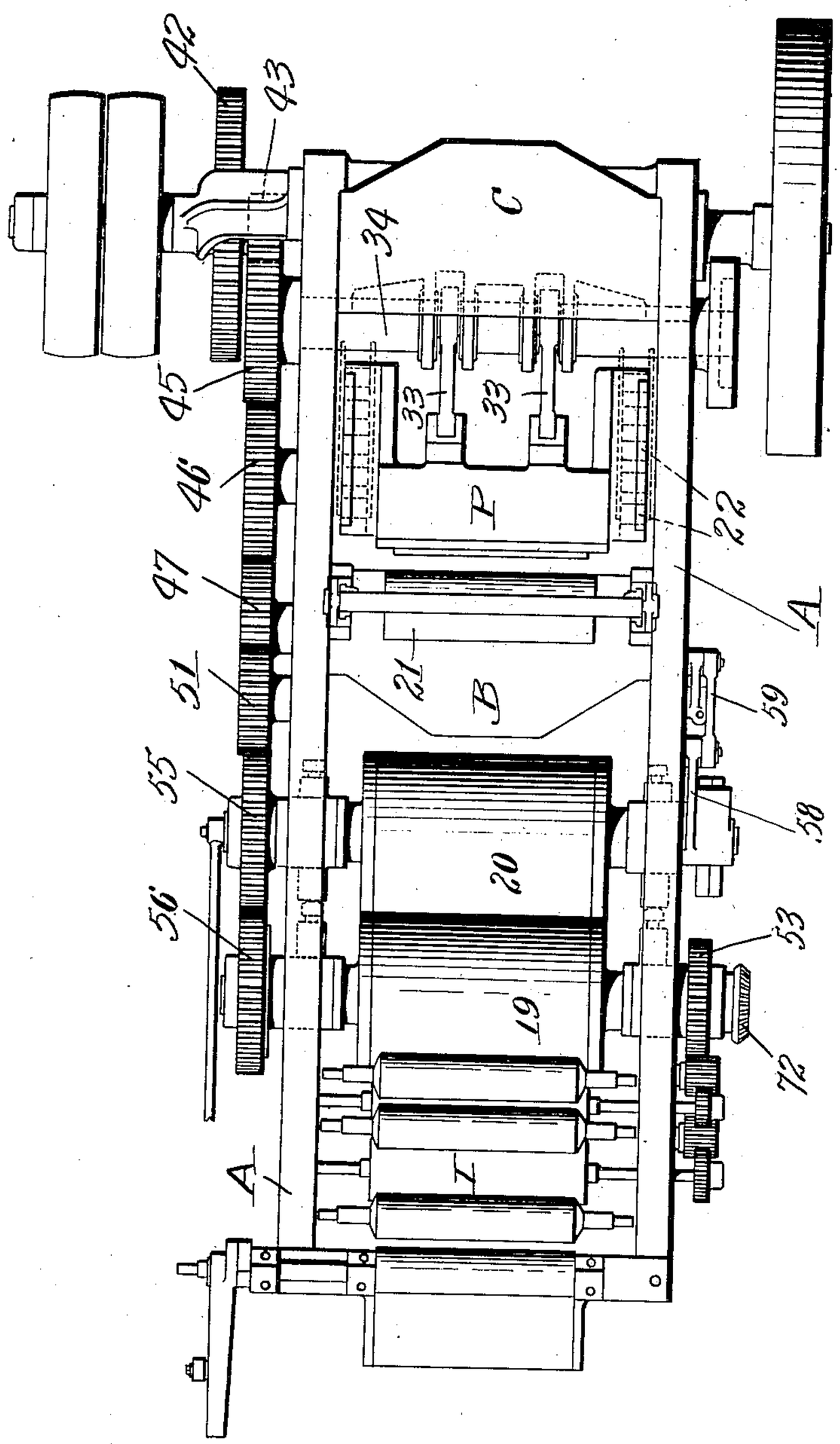

Fig. 1.

Witnesses:
C. F. Wesson.
A. M. Goddard

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3 SHEETS—SHEET 2.

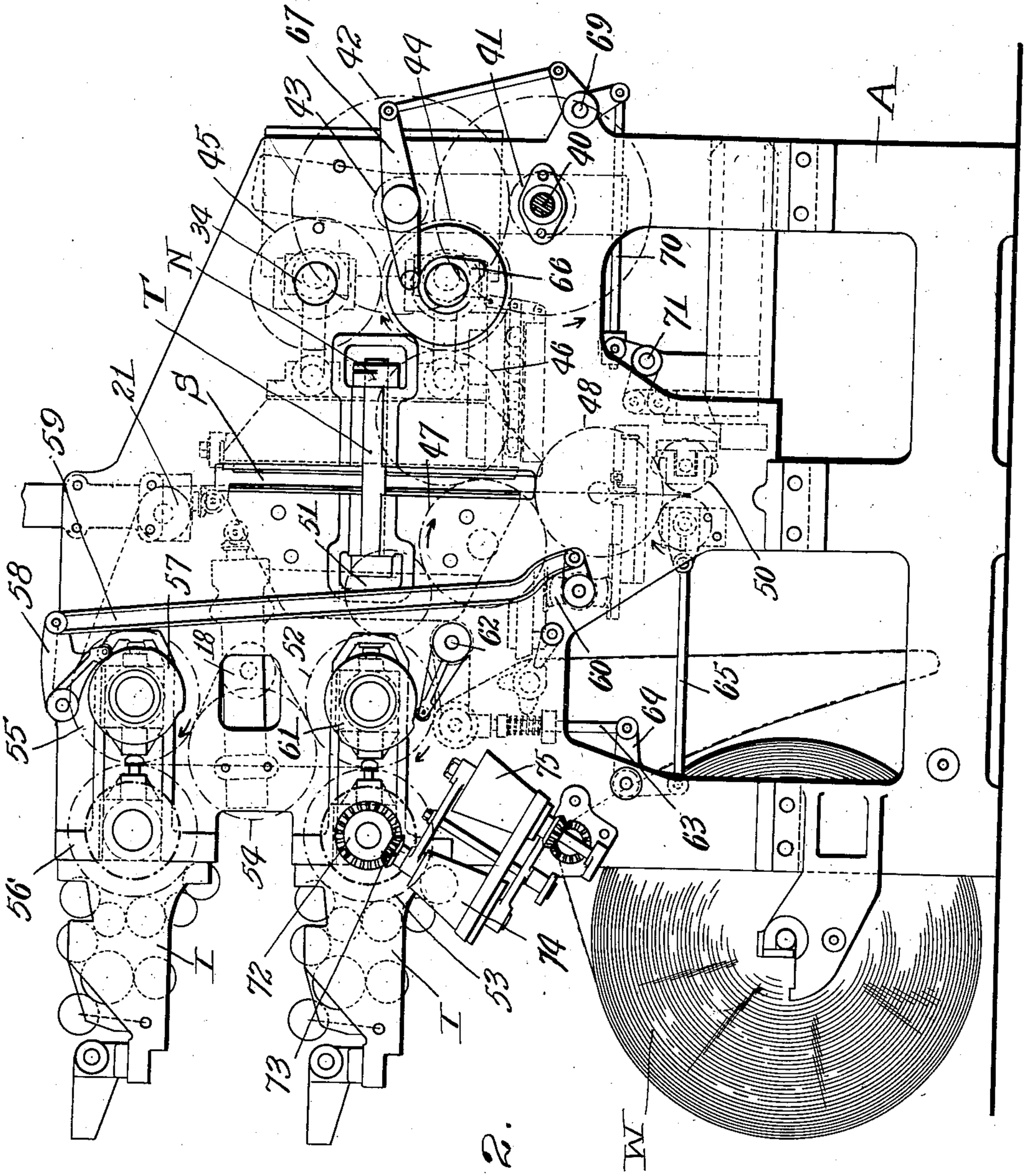

Fig. 2.

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3 SHEETS—SHEET 3.

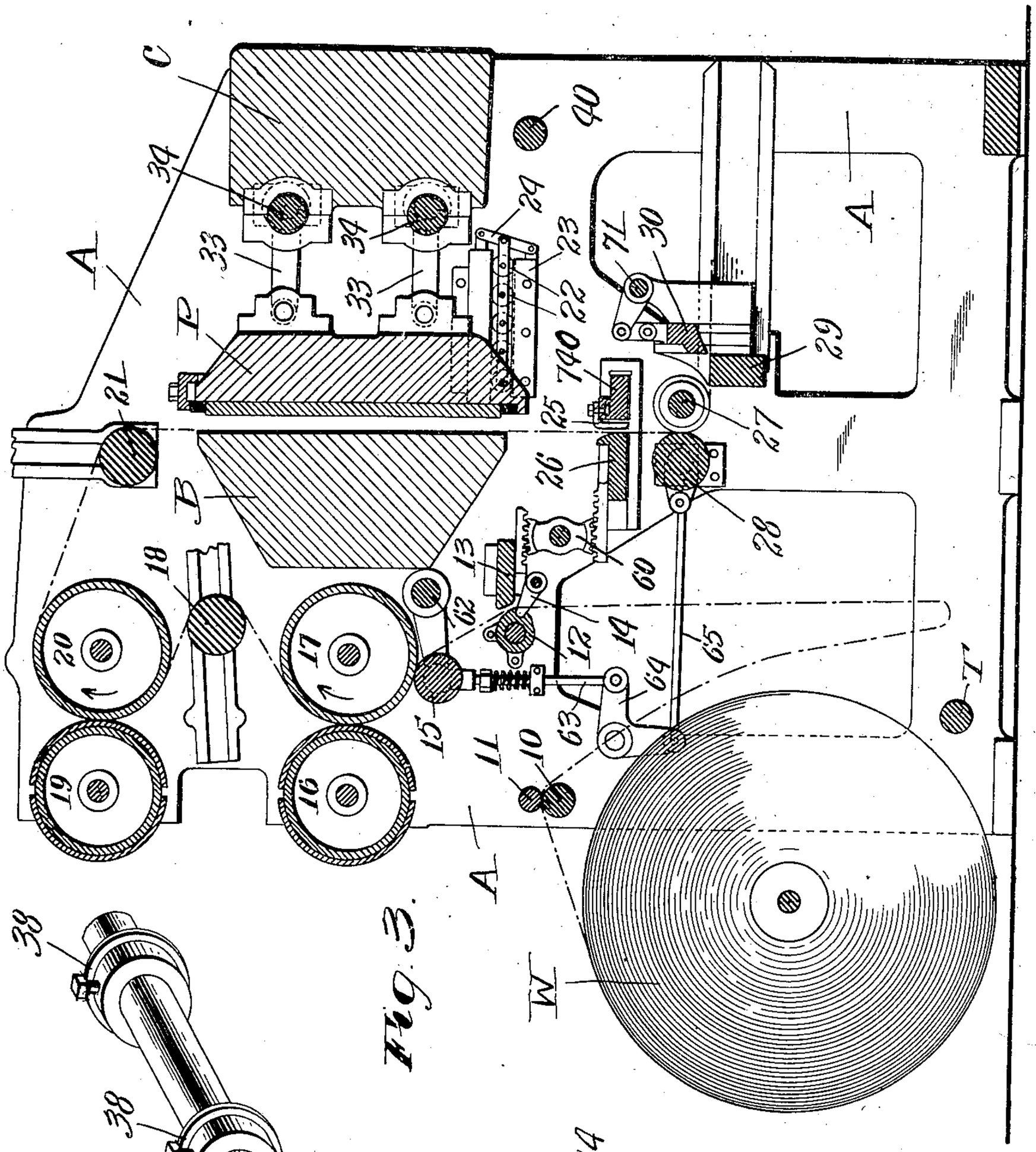

Fig. 3.

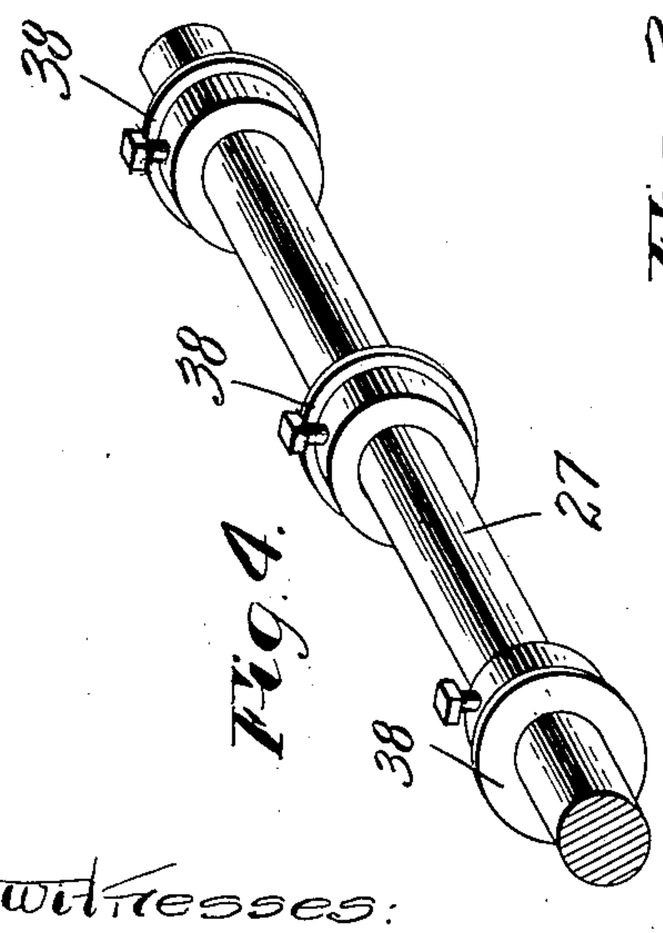

Fig. 4.

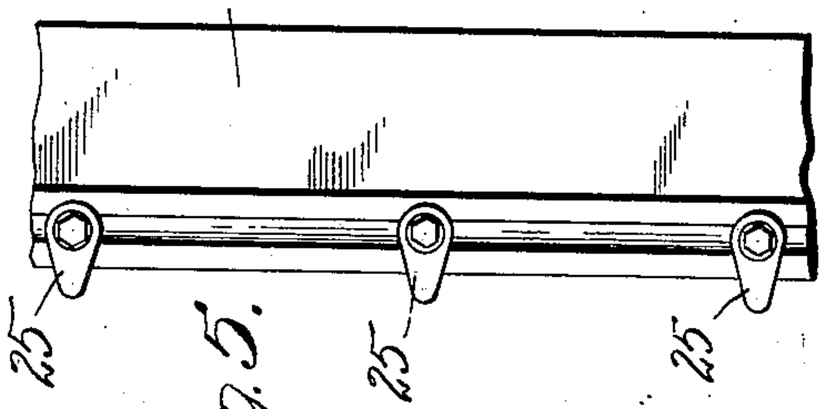

Fig. 5.

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UNITED STATES PATENT OFFICE.

FRANCIS MEISEL, OF DORCHESTER, MASSACHUSETTS.

MACHINE FOR MAKING BOX-BLANKS.

958,661. Specification of Letters Patent. Patented May 17, 1910.

Application filed March 14, 1904. Serial No. 198,032.

To all whom it may concern:

Be it known that I, FRANCIS MEISEL, a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented a new and useful Machine for Making Box-Blanks, of which the following is a specification.

This invention relates to a machine for printing, creasing and cutting box-blanks from a continuous strip or web of pasteboard or similar material.

The general object of this invention is to provide a strong, compact, efficient and simple machine which can be operated at high speed, and which can be readily and quickly adjusted to print, crease and cut off variable length box-blanks.

Especial objects of this invention are to combine one or more rotary printing couples with a bed and platen-creasing mechanism; to provide devices for continuously unwinding the web from the web-roll, and for feeding the same intermittently through one or more rotary printing couples; to provide for adjusting the web feeding mechanism to feed and deliver different lengths of box-blanks; to provide an adjustable cutting mechanism for severing different lengths of box-blanks from the web as it is delivered; and to improve the construction and combinations of parts throughout the machine.

In the accompanying three sheets of drawings, Figure 1 is a plan view of a machine constructed according to this invention. Fig. 2 is a side view thereof. Fig. 3 is a transverse sectional view. Fig. 4 is a fragmentary perspective view of one of the feeding-out rolls, and Fig. 5 is a fragmentary plan view of one of the clamps showing the adjustable clamp-faces which may be set to register with the margins between separate printed impressions.

In a box-blank printing, creasing and cutting off machine constructed according to this invention, as herein illustrated, the web is continuously unwound from the web-roll, and hangs in a slack loop or reservoir of material. From this loop of material the web is fed intermittently through one or more rotary printing couples by means of which it is printed in one or more colors. After being printed, the web passes between a bed and platen which coöperate to form the creases or grooves in the box-blanks. After being creased the web passes out between adjustable cutting knives which sever the web into separate products.

Referring to Fig. 3, the machine as herein illustrated comprises the vertical side-frames A. Connecting the side-frames A are the heavy cross-pieces B and C, and one or more tie-rods T.

The cross-beam B forms the bed which cooperates with a platen P for creasing the blanks, and the cross-beam C forms a support from which the platen P is operated under heavy pressure.

The side-frames A are provided at one side of the machine with bearings for the shaft of a web-roll W. From the web-roll W the material passes through the continuously running feed rolls 10 and 11, and hangs in a slack loop or reservoir of material from which it is drawn intermittently as hereinafter described. From the loop or reservoir of web, the web passes between a pair of clamps consisting of the stationary clamp-jaw 12 and a movable clamp-jaw 13. Coöperating with the clamp-jaw 13 are adjustable fingers or side-guides 14 for preventing the web from wandering or being displaced sidewise. From between the clamps 12 and 13 the web passes around a feed roll 15 and between the cylinders of the first rotary printing couple, consisting of the printing cylinder 16 and impression cylinder 17. The feed-roll 15 is normally out of contact with the impression cylinder 17, but is pressed up into contact therewith to intermittently feed the web through the first printing couple. From the first printing couple the web passes around an adjustable register roll 18 between the cylinders of the second printing couple, consisting of the printing cylinder 19 and impression cylinder 20.

I have illustrated a machine employing two printing couples, one for printing in one color, and the second for printing in a second color, although it is obvious that a greater or less number of printing couples can be used if desired. The printing cylinders are supplied with ink by any of the ordinary inking mechanisms I. From the

last printing couple the web passes around an adjustable register roll 21, and down between the bed B and the platen P.

Secured on the face of the platen P are the usual steel creasing knives for grooving or forming the necessary creases in the box-blanks after they are printed.

One of the side frames A of the machine is provided with an opening or slot for permitting the sidewise insertion of the creasing knives. This is most clearly shown in Fig. 2. Referring to this figure, the side frame A is provided with a vertical slot S. At each side of the slot the frame is provided with suitable lugs or ways for receiving a heavy tie-bolt T, threaded on to which is a split nut N.

By means of the tie-bolt T the frame of the machine will be reinforced to stand the heavy pressure of the bed and platen, while by removing the tie-bolt T free access may be had for securing the creasing knives in place.

The connections for supporting and operating the platen P are most clearly illustrated in Fig. 3. As shown in this figure, the platen is supported at opposite sides upon rollers 22 which run on ways 23. The rollers 22 are journaled in links which are connected to short levers 24. One end of each lever 24 is pivoted to a fixed point, while the upper end of each lever is connected to move back and forth with the platen P. By means of this construction, the rolls 22 will be moved back and forth one-half the travel of the platen P and will form efficient anti-friction bearings for supporting the platen.

The platen P is moved back and forth by means of four eccentric straps 33, which engage eccentrics upon the upper and lower operating shafts 34.

After passing between the bed and platen, the web passes through a pair of clamps comprising a stationary part 740 and a movable clamp-jaw 26.

The stationary part 740 is provided with a T-slot, and adjustably mounted in the T-slot are the bolts for fastening the adjustable clamp pieces 25 in different positions.

The adjustable clamp pieces 25, as most clearly illustrated in Fig. 5, may be set to different positions to register with the margins between the printing impressions upon the web. From the clamps the web passes down between the feeding out rolls 27 and 28. The feeding-out roll 27 is journaled in fixed bearings in the side-frames, and adjustably mounted on this roll are contact wheels 38 which also may be set to register with the margins between the printing impressions, as shown in Fig. 4. The contact wheels may be fastened in adjusted positions in ordinary ways, for example, by set screws. The feed roll 28 is normally out of engagement with the contact wheels 27, but is intermittently forced up into engagement therewith by connections hereinafter described. From the feed rolls 27 and 28 the web passes between the cutting knives 29 and 30. These cutting knives 29 and 30 may be adjusted back and forth so as to be set in proper place for severing variable lengths of product, and the upper knife 30 is moved up and down by connections hereinafter described.

The gearing for driving the machine is most clearly illustrated in Figs. 1 and 2. As shown in these figures, 40 designates the driving shaft to which power may be applied by the ordinary tight and loose pulleys. Secured on the driving shaft 40 is a pinion 41 which meshes with and drives a gear 42. Turning with the gear 42 is a pinion 43 which meshes with and drives a gear 44 upon the lower operating shaft 34. The gear 44 meshes with and drives a gear 45 upon the upper operating shaft 34. Also driven from the gear 44 are intermediates 46 and 47. Driven from the intermediate 47 is an intermediate 48 which meshes with and drives a gear 50 upon the feeding out roll 27. Also meshing with and driven from the gear 47 is a gear 51 which meshes with and drives a gear 52 on the first impression cylinder 17.

The gear 52 of the first impression cylinder meshes with a gear 53 of the coöperating printing cylinder 16. Also meshing with and driven from the gear 52 is an intermediate 54 which meshes with and drives a gear 55 of the second impression cylinder 20. Meshing with the gear 55 is the gear 56 of the second printing cylinder 19.

In the machine herein illustrated, the feed rolls for intermittently feeding the web through the press are held out of engagement by a cam 61 on the shaft of the first impression cylinder 17, and are forced up into engagement by spring pressure.

As shown most clearly in Fig. 2, the cam 61 through an arm operates a rock shaft 62. Extending from the rock shaft 62 are the arms in which the feed roll 15 is mounted. Extending down from the feed roll 15 are links 63 having springs mounted thereon for raising the feed roll 15 up into engagement with the impression cylinder 17 when the web is to be fed through the press. The links 63 are connected at their lower ends to turn the rock shaft 64. Extending from the rock shaft 64 are the links 65 for operating the feed roll 28 simultaneously with the feed roll 15. By means of this construction the single cam 61 controls the operation of the feed rolls, and by substituting different cams on the shaft of the first impression cylinder, or by changing the operative length

of the cam, the length of the web fed forward by the feed-rolls may be varied as required.

The clamps for holding the web stationary except at the time that it is being intermittently advanced by the feed-rolls in the machine, herein illustrated, are operated by a cam on the shaft of the second impression cylinder.

As shown in Fig. 2, the cam 57 operates a bell-crank lever 58. Extending from the bell-crank lever 58 is a link 59 which is connected through an arm to operate a rock shaft, mounted on which is a double sector 60. The upper section of the double sector 60 meshes with and engages a rack upon the movable clamp-jaw 13, while the lower section of the double sector 60 meshes with a rack carried by the movable clamp-jaw 26. By means of this construction the single cam 57 controls the operation of both sets of clamps, and by substituting different cams on the shaft of the second impression cylinder, or by changing the operative length of the cam 57, the clamps may be opened and closed as required for variable lengths of box-blanks.

The cutting knives for severing the box-blanks from the web as they run out of the machine are operated in the construction herein illustrated by a cam on the lower operative shaft 34.

As shown in Fig. 2, the cam 66 operates a lever 67 which is connected by a link to an arm extending from a rock shaft 69. Extending down from the rock shaft 69 is an arm operating a horizontal link 70. The horizontal link 70 is adjustably connected to an arm for operating a rock-shaft 71. Extending rearwardly from the rock shaft 71 are arms connected by links to operate the vertically movable knife 30. By means of the adjustable connection with the horizontal link 70 the cutting off knives may be set to different positions according to the character of the product which is being produced. The constantly running feed rolls for unwinding the web from the web-roll are driven by variable speed connections.

As shown in Fig. 2, the first printing cylinder 16 is provided with a bevel gear 72 which meshes with and drives a bevel pinion 73 turning with a cone-pulley 74. The cone-pulley 74 is connected by belt to a second cone-pulley 75, and the second cone-pulley 75 is connected by bevel gears to the shaft of the feed roll 10. By moving the belt on the cone-pulleys 74 and 75 the amount of web slacked off from the web roll can be regulated so that the supply of web will be equal to that required by the machine.

The operation of the several parts of the machine have been so fully explained in connection with the detailed description of the machine as to render a description of the operation of the machine, as a whole, unnecessary.

I am aware that many changes may be made in my machine for printing, creasing and cutting off variable length box-blanks without departing from the scope of my invention as expressed in the claims, and that many features of this machine may be used in other locations and in different combinations. I do not wish, therefore, to be limited to the construction I have herein shown and described, but

What I do claim and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, the combination of a source of web supply, a rotary printing couple for printing box blanks in web form, a bed and platen for creasing the box blanks after they are printed, and a registering mechanism between the printing couple and creasing mechanism.

2. In a machine of the class described, the combination of a source of web supply, a rotary printing couple for printing box blanks in web form, a bed and platen for creasing the box-blanks after they are printed, a registering mechanism interposed between the rotary printing couple and creasing mechanism, and an intermittently acting web-feeding mechanism.

3. In a machine of the class described, the combination of a printing couple, a creasing device, a shaft, means controlled by said shaft for drawing the web from the creasing device and for feeding the web to the printing couple, a second shaft, and means controlled by the second shaft for clamping the web on the delivery side of the creasing device and for simultaneously clamping the web on the receiving side of the printing couple.

4. In a machine of the class described, the combination of a printing couple, a creasing device, means for guiding a web first through the printing couple and then through the creasing device, a shaft, means controlled by said shaft for drawing the web from the creasing device and for feeding the web to the printing couple, a second shaft, and means controlled by the second shaft for clamping the web between the creasing device and the first mentioned feeding device, and for simultaneously clamping the web before it enters the printing couple.

5. In a machine of the class described, the combination of a printing device, a creasing device, means for leading a web through the printing device and then through the creasing device, a feeding device arranged adjacent to the discharge end of the creasing device, a feeding device arranged adjacent to the receiving side of the printing device, means for simultaneously and intermittently oper-

ating said feeding devices, a pair of stationary jaws, one arranged between the creasing device and the first named feeding device, and the other arranged on the discharge side of the printing device, a pair of movable jaws coöperating with the stationary jaws to clamp the web in both places, and means for simultaneously operating both of said movable jaws.

6. In a machine of the class described, the combination of a printing device, a creasing device, means for leading a web first through the printing device and thereafter through the creasing device, a stationary jaw adjacent to the discharge end of the creasing device, a stationary jaw adjacent to the receiving side of the printing device, a pair of movable jaws arranged to coöperate with the stationary jaws, and means for simultaneously operating said movable jaws.

7. In a machine of the class described, the combination of a printing couple having an impression cylinder, means for leading the web over the impression cylinder, a feed roll normally out of engagement with the web on said impression cylinder, means for intermittently pressing the feed roll into engagement with the web on said impression cylinder, a clamp, and means for automatically moving the clamp to positively clamp the web when the feed roll moves out of engagement with the web, whereby the feeding of the web by the rotation of the impression cylinder will be positively prevented.

8. In a machine of the class described, the combination of a rotary printing couple, means for guiding a web between the members of the printing couple, and a web-feeding mechanism comprising a feed roll normally out of engagement with the impression cylinder, means for pressing the feed roll into engagement with the impression cylinder to intermittently feed the web, and a clamp for holding the web stationary when the feed roll is out of engagement with the impression cylinder.

9. In a machine of the class described, the combination of a rotary printing couple, means for guiding a web between the members of the printing couple, means for constantly unwinding the web from the web-roll, and a web-feeding mechanism comprising a feed-roll normally out of engagement with the impression cylinder, and means for pressing the feed-roll into engagement with the impression cylinder to intermittently feed the web.

10. In a machine of the class described, the combination of a rotary printing couple, means for guiding a web between the members of the printing couple, means for constantly unwinding the web from the web-roll, and a feeding mechanism comprising a feed-roll normally out of engagement with the impression cylinder, means for pressing the feed roll into engagement with the impression cylinder to feed the web, and means for clamping the web to hold the same stationary when the feed-roll is out of engagement with the impression cylinder.

11. In a machine of the class described, the combination of the side frames, a bed and platen mounted between the side frames, one of said side-frames being slotted to permit access to the face of the platen, and a removable tie-bolt extending across the slot in the frame to withstand the strain of impression.

12. In a machine of the class described, the combination of a vertical bed, a horizontally movable platen, and an anti-friction support for said platen comprising a frame carrying friction rolls, and a lever connected at its ends to a stationary support and the platen respectively, and connected at its center to the roll frame, whereby the rollers will move one-half the distance traveled by the platen.

13. In a machine of the class described, the combination of side-frames, two tie-beams connecting the side frames, one of said tie-beams forming a stationary bed, a horizontally movable platen coöperating with the stationary bed, and means for operating the platen from the other tie-beam, comprising upper and lower operating shafts, eccentrics mounted on the shafts, and eccentric-rods for operating the platen from said eccentrics.

14. In a machine of the class described, the combination of a pair of side frames, a bed and platen mounted between said side frames, one of the side frames having a slot to permit access to the face of the platen, and a removable tie-bolt for connecting the two portions of said slotted side frame together to compensate for the weakening effect of the slot.

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

FRANCIS MEISEL.

Witnesses:
D. J. Crowley,
Patrick O'Hearn.