

No. 815,626.

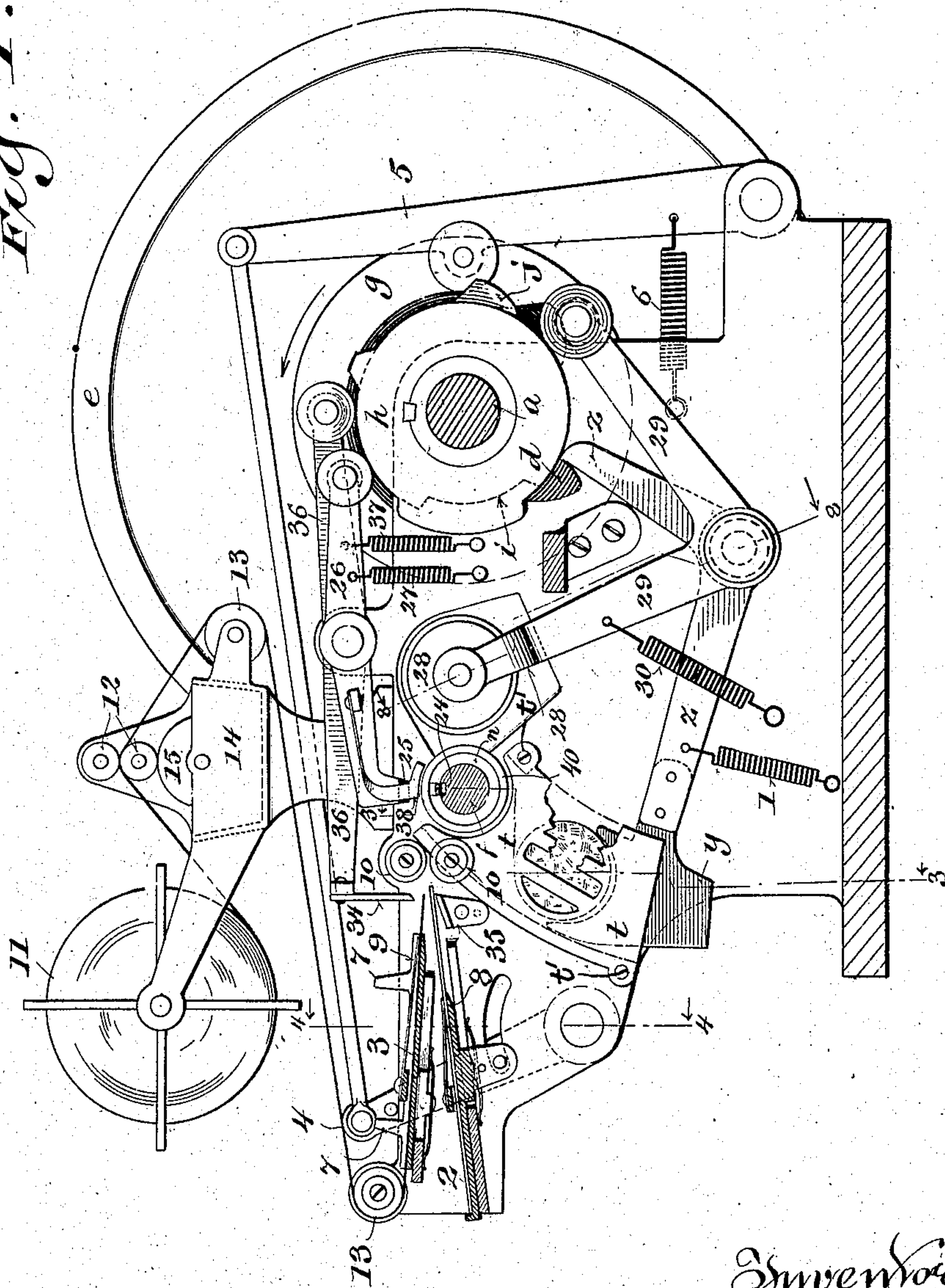
PATENTED MAR. 20, 1906.

A. OESTERREICH.
PAPER BOX MAKING MACHINE.

APPLICATION FILED NOV. 18, 1901.

5 SHEETS—SHEET 1

Fig. 1.



Witnesses:
Geo. W. Young
Chas. L. Coor.

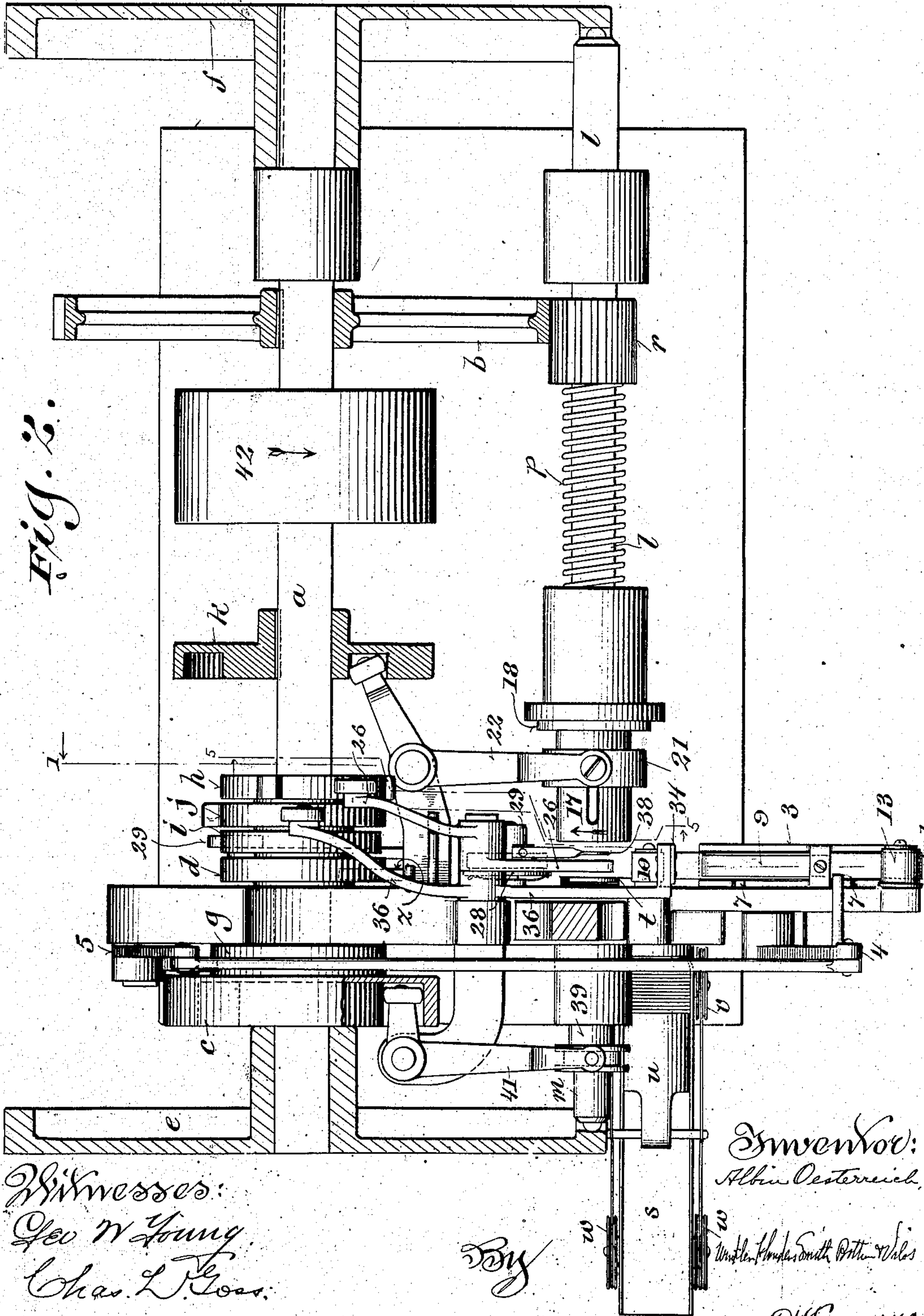
Inventor.
Albin Oesterreich,
By Winkler, Hordes, Smith, Roth & Co.
Attorneys.

No. 815,626.

PATENTED MAR. 20, 1906.

A. OESTERREICH.
PAPER BOX MAKING MACHINE.
APPLICATION FILED NOV. 18, 1901.

5 SHEETS—SHEET 2.



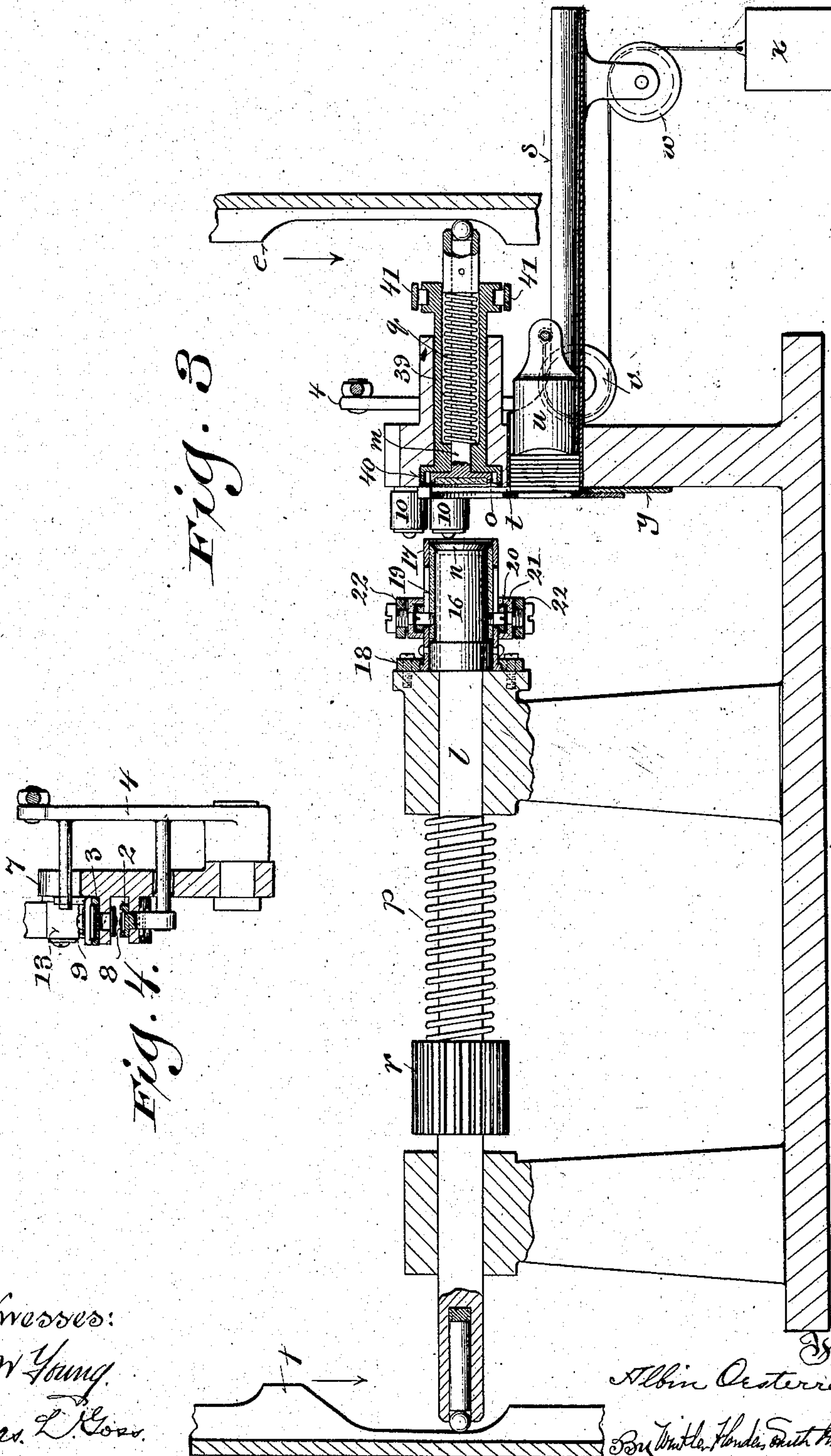
No. 815,626.

PATENTED MAR. 20, 1906.

A. OESTERREICH.
PAPER BOX MAKING MACHINE.

APPLICATION FILED NOV. 18, 1901.

5 SHEETS—SHEET 3.



Witnesses:
Geo W Young
Chas L Ross

Inventor:
Albin Oesterreich
By Wm H. Honda, South Portland, Me.
Attorneys.

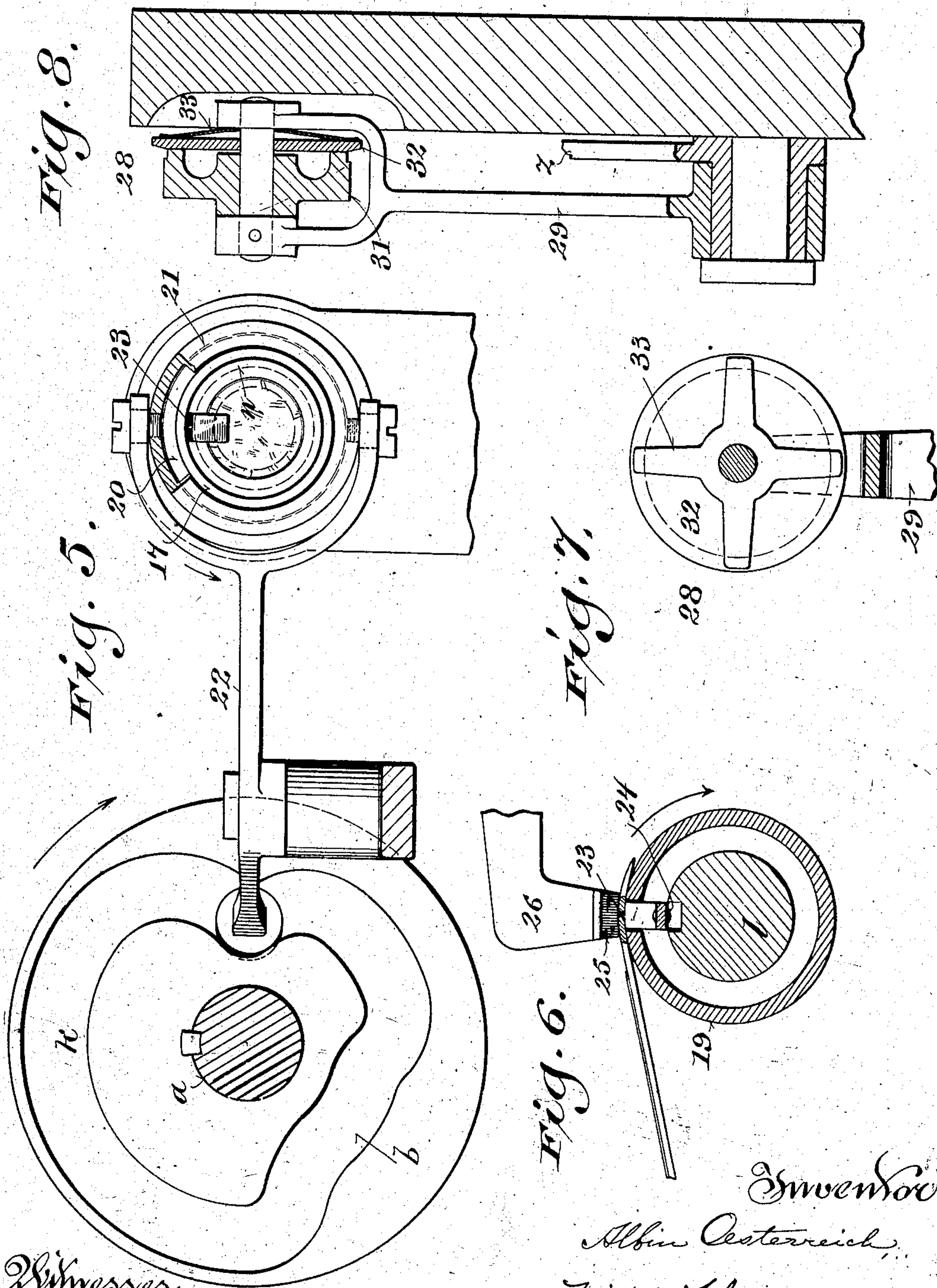
No. 815,626.

PATENTED MAR. 20, 1906

A. OESTERREICH.
PAPER BOX MAKING MACHINE.

APPLICATION FILED NOV. 18, 1901.

5 SHEETS—SHEET 4.



Witnesses:
Geo. W. Young,
Chas. L. Goss.

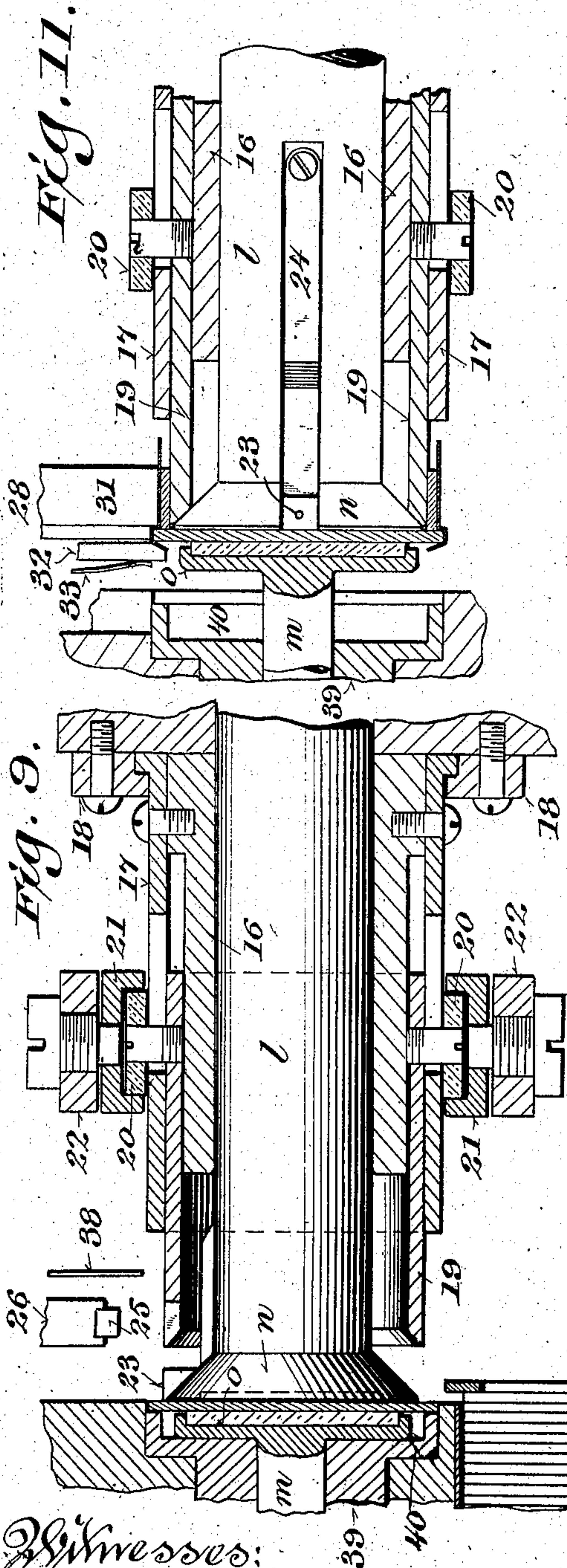
Inventor:
Albin Oesterreich,
By Walter H. Fisher, Atty. in L.
W. H. H. H.

No. 815,626.

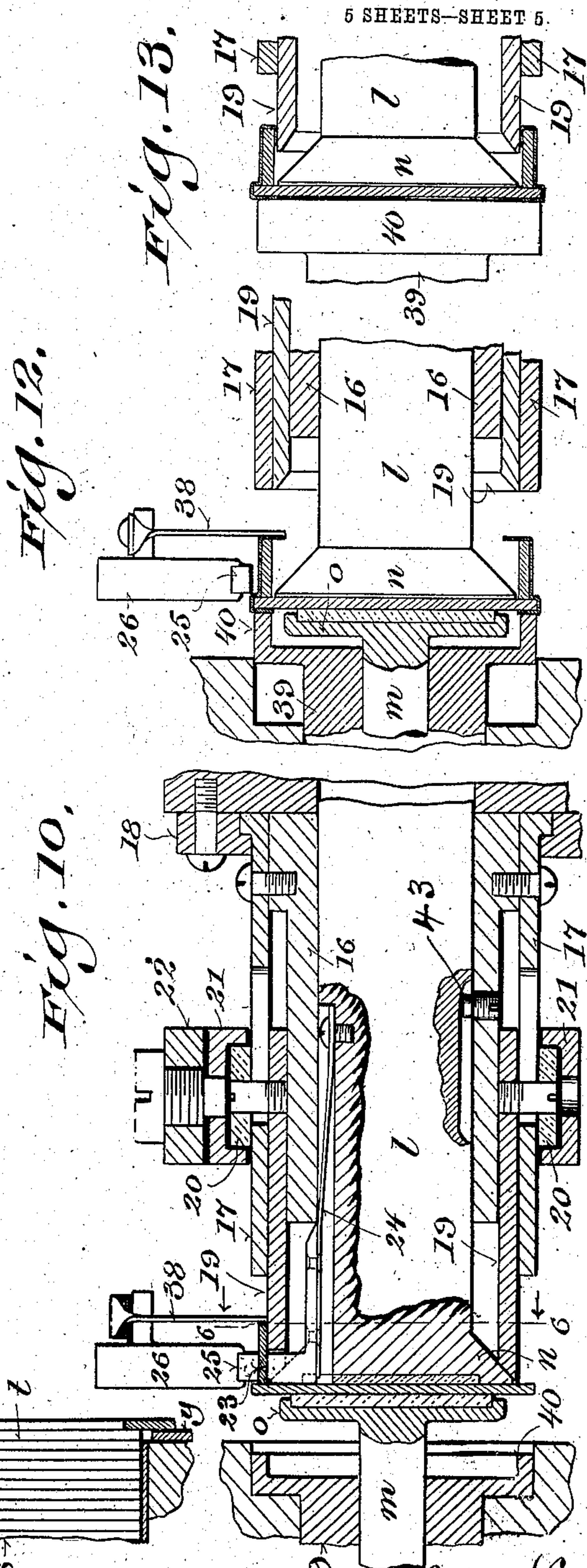
PATENTED MAR. 20, 1906.

A. OESTERREICH.
PAPER BOX MAKING MACHINE.

APPLICATION FILED NOV. 18, 1901.



Witnesses:
Geo W. Young,
Chas. L. Goss.



Albin Oesterreich
By Wm. H. Smith & Co.
Attorneys

UNITED STATES PATENT OFFICE.

ALBIN OESTERREICH, OF HANOVER, GERMANY, ASSIGNOR TO GEORGE WEINHAGEN, OF MILWAUKEE, WISCONSIN.

PAPER-BOX-MAKING MACHINE.

No. 815,626.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed November 18, 1901. Serial No. 82,669.

To all whom it may concern:

Be it known that I, ALBIN OESTERREICH, a citizen of the German Empire, residing at Hanover, in the Province of Hanover and Empire of Germany, have invented certain new and useful Improvements in Paper-Box-Making Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

One of the chief objects of my invention is to facilitate the manufacture in a single machine of paper boxes and box-covers with the bodies or sides and the bottoms and tops attached thereto.

It consists in certain novel features of construction and in the arrangement and combination of parts hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters and numerals designate the same parts in the several figures.

Figure 1 is a vertical cross-section on the line 1 1, Fig. 2, of a machine embodying my invention. Fig. 2 is a view of the same, partly in plan and partly in horizontal section. Fig. 3 is a vertical longitudinal section on the line 3 3, Fig. 1. Fig. 4 is a section on the line 4 4, Fig. 1, of mechanism for feeding pasteboard and paper blanks or strips for box bodies or sides to the machine. Fig. 5 is an enlarged section on the line 5 5, Fig. 2. Fig. 6 is a section on the line 6 6, Fig. 10, of the body-former, showing means for holding the advance end of a pasteboard blank or strip thereto. Fig. 7 is a side elevation as viewed from the right with reference to Fig. 8 of a wheel for pressing the covering-strip against the pasteboard-body and turning it over the edge of an adjoining bottom piece. Fig. 8 is a section on the line 8 8, Fig. 1, of the presser and forming wheel shown in Fig. 7 and of associated parts; and Figs. 9, 10, 11, 12, and 13 are enlarged longitudinal sections of the bottom-clamping and body-forming heads and associated parts in different positions for performing the various operations required to make a box.

Referring to Figs. 1, 2, and 3, *a* is the main shaft of the machine provided with a gear *b* and cams *c*, *d*, *e*, *f*, *g*, *h*, *i*, *j*, and *k*. *l* and *m* are rotary and longitudinally-movable shafts

arranged in line with each other and parallel with the shaft *a* and provided at their inner ends with clamping-heads *n* and *o* and at their outer ends with roller-bearings which are held by springs *p* and *q* in engagement with the cams *e* and *f*, respectively. The shaft *l* is provided with a wide-faced pinion *r*, which meshes with the gear *b*. *s* is a receptacle for bottom blanks arranged parallel with the shaft *m* and terminating at its inner end in a guideway *t* for conducting the bottom-blanks one at a time between the clamping-heads *n* and *o*. This guideway *t* is adjustably secured to the frame of the machine by screws *t'* *t'* and when screwed down flat against the frame will adopt the position of the blanks, so that only a very thin single blank will be carried up by the follower *y*. When it is desired to adapt the machine to blanks of greater thickness, the screws *t'* *t'* are loosened up and a bushing of paper or cardboard or metal bushings of predetermined thickness are inserted between the frame and the guideway *t*. In this manner the mechanism may be adjusted to blanks of any desired thickness. *u* is a follower connected by cords passing over pulleys *v* and *w* with a weight or weights *x* by which the bottom-blanks are fed forward in the holder *s* as they are removed one at a time from its inner end. *y* is a pusher carried by one end of a lever *z* and adapted to move back and forth past the inner end of the holder *s* through the guideway *t*. The opposite end of lever *z* is held by a spring 1 in the path of a projection on the periphery of the cam *d*.

Two reciprocating slides 2 and 3 for feeding pasteboard strips or blanks and the paper-covering strip for the bodies or sides of boxes are operated by lateral pins on a vibrating arm 4, which is connected by a rod with an arm 5, having a roller held by a spring 6 in engagement with the cam *g*. The slide 2 is connected directly by a lug on its under side with the pin on arm 4 nearest its fulcrum. The slide 3 is provided on its upper side with lugs 7 in the path of the other pin on said arm 4, so that during the initial movement of the slide 2 forward the slide 3 will remain at rest. These slides are grooved or flanged lengthwise on their upper sides and provided with springs 8 and 9 to hold

the pasteboard and paper blanks or strips in place thereon and to carry them forward therewith between the guide-rollers 10 when the slides are advanced, said springs permitting the withdrawal of the slides when the body-blanks are caught and held upon the forming-sleeve 19, as hereinafter explained. The body blanks or strips are previously cut to the required length and supplied by hand, one at a time, to the slide 2, or by slight modification of the feeding mechanism they may be cut to length as they are fed to the machine from a continuous strip wound on a reel.

11 is a reel on which is wound the paper-covering strip and from which it passes between rollers 12 and around guide-rollers 13 to the slide 3. The lower roller 12 is supplied with paste from a box 14 by a roller 15. Referring to Figs. 9 and 10 in connection with Figs. 2 and 3, the shaft *l* passes at its inner end loosely through a sleeve 16, formed at one end with an external collar, to which is secured a sleeve 17. The sleeve 16 is made to turn with the shaft *l* by a pin or key 43, secured in said sleeve and engaging a longitudinal groove in said shaft, as shown in Fig. 10, or by other suitable means. The sleeve 17 is longitudinally slotted on opposite sides and is formed at its outer end with an external flange fitting into a flanged ring 18, by which it is revolvably connected with the adjacent bearing of the shaft *l*. In the annular space between the two sleeves 16 and 17 is loosely fitted an axially-movable sleeve 19, which serves as a form for making the bodies or sides of the boxes. It is connected by screws or pins passing through the slots in the sleeve 17 with a ring 20, loosely fitting in an internally-grooved ring 21, thus permitting the sleeves 16, 17, and 19, with the ring 20, to turn with the shaft *l*, while the ring 21 does not turn. The ring 21 is pivotally connected with one end of a bell-crank lever 22, the opposite end of which is provided with a roller engaging with a groove in the face of cam *k*, as shown in Figs. 2 and 5.

For holding the advance ends of the pasteboard strips or blanks on the body-forming sleeve 19 while it makes a revolution and wraps the strip or blank around it the clamping-head *n* is provided with an inwardly-yielding point 23. This point is carried by a block which is loosely fitted in a recess in the head *n* and a notch in the end of sleeve 19 and is mounted, as shown in Figs. 10 and 11, on the free end of a spring 24, attached to the shaft *l* in a longitudinal recess therein.

25 is an elastic presser-foot, made of rubber or other suitable material and carried in one end of a lever 26, the opposite end of which is provided with a roller held by a spring 27 in engagement with the cam *h*. The presser-foot 25 stands over the inner end of the sleeve 19 when the latter is in posi-

tion for winding a pasteboard strip or blank thereon.

I have shown the point 23 and the spring 24 as inwardly yielding. By mechanical change these parts may be made outwardly yielding and grasp the blank from the outer side rather than the inner side. The essential feature is that the point 23 reciprocates on a plane of the axis of rotation and that such reciprocation is caused by a part moving over the axis of the rotating parts.

28 is a presser-wheel carried by one end of an angular lever 29, the opposite end of which is provided with a roller held by a spring 30 in engagement with the cam *i*. The wheel 28, as shown in Fig. 8, is composed of two parts 31 and 32. The part 31 has a plain smooth face with a groove or recess in one side to receive the projecting edge of a bottom blank, as shown in Fig. 11. The part 32 is slightly beveled on the side next to the part 31 and extends beyond its periphery. It is yieldingly held against the part 31 by a spring 33 (shown in Fig. 7) to allow for variations in the thickness of the bottom-blanks and to avoid tearing the paper-covering strip by which the bottoms are attached to the bodies of the boxes.

34 is a movable knife working with a stationary knife 35 and carried at one end of a lever 36, the opposite end of which is provided with a roller held by a spring 37 in engagement with the cam *j*. These knives are located between the slide 3 and the guide-rollers 10 for cutting off the paper-covering strip at the proper points.

The lever 26 is provided with a twisted angular spring 38 for turning the paper-covering strip inward over the edge of the pasteboard body, as shown in Fig. 12.

39 is a sleeve fitted upon and turning with the shaft *m*, which is movable endwise therein. It is internally recessed, as shown in Fig. 3, to receive the spring *q*, and is provided at its inner end with a flanged head 40 for pressing the inturned edge of the paper covering-strip against the bottom, as shown in Fig. 12. The head 40 is recessed to receive the clamping-head *o*, as shown in Fig. 9. At its outer end the sleeve 39 is formed or provided with a grooved collar engaged by the forked end of a bell-crank lever 41, the opposite end of which is provided with a roller engaging a groove in the face of the cam *c*.

The clamping-heads *n* and *o* are recessed to receive elastic pads in their opposing faces, as shown in Fig. 10, to more effectively hold the bottom or end blanks between them.

In the machine herein shown and described as illustrating the invention the gear and pinion *b* and *r* are so proportioned that the shaft *l*, with the clamping-heads *n* and *o* and the forming-sleeve 19, will make six revolutions to one revolution of the main shaft *A*; but this proportion may be varied according

to the number and order of the operations which the machine is designed to perform.

The machine herein shown and described operates as follows: The bottom receptacle *s* being supplied with bottom or end blanks, and the follower *u* being placed against the outer end of the series, the slide 2 being supplied with a body-blank cut to the required length, and a covering-strip being wound on the reel 11, passed between the rollers 12 and around the rollers 13 and its end tucked underneath the spring 9 on the slide 3, and the box 14 being supplied with paste when the machine is started by power applied to the pulley 42 on shaft *i* the pusher *y* is swung upward by the cam *d* and carries a single bottom or end blank from the inner end of receptacle *s* through the guideway *t* into place between the clamping-heads *n* and *o*. The head *n* is then thrust inward by cam *f* into position to clamp said blank between it and the opposing head *o*, as shown in Fig. 9. Both the clamping-heads, with the blank held between them, are thereupon moved back together by cam *e* to the forming-sleeve 19, as shown in Fig. 10. Simultaneously with or immediately following the last-mentioned operation the slides 2 and 3 are moved forward by the cam *g*, carrying the inner ends of a body-blank and the covering-strip between the guide-rollers 10, the body-blank moving in advance of the covering-strip, which being supplied with paste on the lower side is stuck to the upper side of the body-blank as it passes between said rollers. The advance end of the body-blank passing between the sleeve 19 and the foot 25 is momentarily pressed down upon the point 23, as shown in Figs. 6 and 10, by the engagement of the shorter projection on cam *h* with the roller on lever 26. The spring 38, the lower end of which strikes the sleeve 19, yields upwardly to permit the depression of the foot 25 in the foregoing operation. The body-blank, with the covering-strip pasted thereto, being caught and held by the point 23, is wrapped around the sleeve 19 by the rotation of the shaft *l*. At the same time the roller on lever 29 dropping into a depression in the cam *i* permits the spring 30 to carry the wheel 28 toward the sleeve 19, holding said blank and the covering-strip with a yielding pressure against said sleeve and turning one edge of the covering-strip inward over the edge of the bottom or end blank, as shown in Fig. 11. The knife 34 is depressed at the proper time by the cam *j* to cut off the covering-strip to a length sufficient to extend a little more than once around the box and to lap upon itself, and the presser-wheel 28 is held against the forming-sleeve 19, while the latter makes a little over a complete revolution so as to firmly press and stick the lapped end of the covering-strip in place. The forming-sleeve 19 is thereupon withdrawn from the head *o*

by the cam *k*, and the spring 38 is depressed by the longer projection on the cam *h*, as shown in Fig. 12, while the clamping-heads make another complete revolution, thereby turning the edge of the covering-strip inward over the edge of the body-blank at the open end of the box. Immediately following the foregoing operation the sleeve 19 is moved back by the cam *k* toward the head *o* to turn the covering-strip inside of the box, as shown in Fig. 13. While the last two preceding operations are taking place the head 40 is thrust inward by the cam *c*, pressing the other in-turned edge of the covering-strip against and sticking it to the bottom of the box, as shown in Figs. 12 and 13. The cams *e* and *f* now permit the springs *p* and *q* to separate the clamping-heads *n* and *o*, the head 40 is withdrawn by the cam *c* to its original position, as shown in Figs. 9 and 10, and the sleeve 19 is withdrawn by the cam *k* to the position in which it is shown in Fig. 12, thereby releasing the finished box, which is stripped from the sleeve 19 by the sleeve 17 and allowed to drop from the machine. The foregoing operations being repeated as explained, a complete box or cover is made to each revolution of the main shaft *a*.

By varying the shape of the clamping-heads *n* and *o*, the forming-sleeve 19, the presser-wheel 28, and the head 40 the machine may be made to produce polygonal boxes having any desired number of plain sides with rounded corners without change in principle or mode of operation.

The covering-strip is usually composed of two bands of paper, and by slight and obvious modifications in the feeding mechanism these bands may be wound on separate reels and pasted together as they are fed to the machine. The covering-strip may also be cut to the required lengths and these lengths, like the body-blanks, fed to the machine one at a time by hand or otherwise. The body-blanks, on the other hand, may be supplied in rolls and, like the covering-strip, cut to length as they are fed to the machine. They may also be made of thinner stock and wrapped a number of times around the forming-sleeve 19 to produce a body of the requisite thickness and stability. The terms "body-blanks" and "covering-strip" as employed in the claims are intended to include such blanks and strips whether cut to length as they are fed to the machine or beforehand. In short, various changes and modifications in the details of construction and in the arrangement of component parts of the machine may be made within the spirit and intended scope of the invention.

I claim—

1. In a paper-box-making machine the combination of axially-movable clamping-heads for holding end blanks, means for feeding end blanks one at a time between said

heads, means for closing said heads against an end blank, a rotary body-former, adjacent to one of said heads, means for feeding body-blanks to said former into position to be joined to the end blanks, and means for feeding a covering-strip to and forming it over and uniting the body and end blanks, substantially as described.

2. In a paper-box-making machine the combination of rotary clamping-heads for holding end blanks, a rotary former for shaping body-blanks and holding them in position to be united to end blanks held by said heads, means for catching and holding the advance ends of the body-blanks to said former, and means for wrapping a covering-strip around and thereby uniting the body and end blanks, substantially as described.

3. In a paper-box-forming machine the combination of rotary and axially-movable clamping-heads for holding end blanks, a rotary and axially-movable body-former arranged coaxially with said heads, means for feeding blanks to the machine, means for closing said heads upon the bottom-blanks and moving them together up to the body-former, means for wrapping a covering-strip around and thereby uniting the body and end blanks, means for turning the edge of the covering-strip over the edge of the body-blank when the former is withdrawn therefrom, and means for withdrawing the former from the box formed thereon during the preceding operation and then thrusting it back to fold the inturned edge of the covering-strip into the open end of the box, substantially as described.

4. In a paper-box-making machine in combination with a rotary body-former and means for feeding in body-blanks, means for gripping the end of a body-blank comprising a reciprocating presser-foot having its movement in a plane in which the axis of said rotary body-former lies, and means for reciprocating said presser-foot consisting of a non-rotating sleeve moving over the axis of said former, and means for actuating said sleeve, substantially as and for the purposes set forth.

5. In a paper-box-making machine the combination of rotary and axially-movable clamping-heads, a rotary and axially-movable former arranged coaxially with and next to one of said heads, a rotary and axially-movable presser-head arranged coaxially with and next to the other clamping-head and recessed to receive the same, means for feeding end blanks to the clamping-heads, means for feeding body-blanks to said former, means for closing the clamping-heads on the end blanks and moving them together toward the former, means for wrapping a covering-strip around adjoining body and end blanks, means for turning the edges of said strip over the edges of the body and end

blanks and means for moving said former axially outward and inward to fold one inturned edge of said strip into the open end of the box, and means for moving the presser-head axially inward to press the other inturned edge of said strip against the end blank, substantially as described.

6. In a paper-box-making machine the combination of a rotary and axially-movable body-former, means for feeding body-blanks and a covering-strip to said former, means for turning one edge of the covering-strip inward over one edge of a body-blank, and means for moving the former axially at the proper time to fold the inturned edge of the covering-strip inside of the body-blank, substantially as described.

7. In a paper-box-making machine the combination of axially-movable rotary clamping-heads, a rotary and axially-movable body-forming sleeve coaxial with said heads, springs tending to separate said heads, cams arranged to move said heads toward each other, a cam arranged to move said sleeve axially, means for feeding bottom or end blanks one at a time between said heads, and means for wrapping body-blanks around said sleeve and joining them to bottom or end blanks held between said heads, substantially as described.

8. In a paper-box-making machine the combination of axially-movable rotary clamping-heads, means for turning said heads and moving them toward and from each other, a bottom or end blank holder parallel with the axis of said heads and terminating in a transverse guideway, a pusher adapted to transfer said blanks one at a time through said guideway from said holder to the clamping-heads, and means for forming box-bodies and attaching them to the bottom or end blanks while they are held between said heads, substantially as described.

9. In a paper-box-making machine, the combination of axially-movable rotary clamping-heads, means for turning said heads and moving them axially, a bottom or end blank holder parallel with the axis of said heads and terminating in a transverse guideway, a reciprocating pusher arranged to move back and forth through said guideway past the adjacent end of said holder, a cam for operating said pusher, means for forming box-bodies on one side of and next to a bottom or end blank held between said heads, and means for wrapping a covering-strip around adjoining body and bottom or end blanks and turning the covering-strip over the edges of the bottom or end blanks, substantially as described.

10. In a paper-box-making machine the combination of two rotary and axially-movable shafts arranged in line with each other and provided at their inner ends with clamping-heads, cams engaging the outer ends of

said shafts, springs tending to separate said heads and hold the outer ends of said shafts in engagement with said cams, sleeves loosely fitted upon and turning with said shafts, one of said sleeves being provided with a recessed or flanged head which is adapted to receive the adjacent clamping-head, cams arranged to move said sleeves axially upon said shafts, means for feeding bottom or end blanks one at a time between said clamping-heads, means for wrapping body-blanks around one of said sleeves and joining the same to bottom or end blanks held between said clamping-heads, and means for rotating said clamping-heads, substantially as described.

11. In a paper-box-making machine, the combination with a rotary body-former and means for feeding body-blanks to said former, a presser-foot in rotation with said former and pivoted to reciprocate in a plane of the axis of said former, means for reciprocating said presser-foot, and means for forcing the end of a body-blank into contact with said presser-foot, substantially as described.

12. In a paper-box-making machine the combination of a rotary body-former provided with a yielding pin normally projecting from one side thereof, and means for feeding body-blanks to said former, of a presser-foot, means for forcing said presser-foot against the advance ends of the body-blanks as they pass between said foot and the pin on said former, and means for retracting said pin from the box-bodies to permit their removal from said former, substantially as described.

13. In a paper-box-making machine the combination of rotary and axially-movable clamping-heads, means for feeding bottom or end blanks one at a time between said heads, a rotary body-former arranged adjacent to and concentric with one of said heads, means for feeding body-blanks and a covering-strip to said former, and a presser-wheel adapted to press the covering-strip against the body-blanks on the body-former and around the edges of adjoining bottom or end blanks held between the clamping-heads, substantially as described.

14. In a paper-box-making machine the combination with rotary clamping-heads and a body-former arranged to hold end and body blanks in the proper relation to each other, of a presser-wheel having a peripheral groove at one end and an axially-yielding flange next to said groove for pressing a covering-strip against the body-blanks and around the projecting edges of adjoining bottom or end blanks, means for feeding end blanks one at a time between said clamping-heads, and means for feeding body-blanks and a covering-strip to said body-former, substantially as described.

15. In a paper-box-making machine the combination with rotary clamping-heads and

body-former, of means for feeding bottom or end blanks one at a time between said clamping-heads, means for feeding body-blanks to and wrapping them around said former next to bottom or end blanks held between said clamps, and a yielding presser-wheel adapted to press a covering-strip against adjoining body and bottom or end blanks, substantially as described.

16. In a paper-box-making machine the combination with rotary clamping-heads and a rotary body-former adjacent to one of said heads, of an axially-movable recessed presser-head adjacent to and concentric with the other clamping-head, and a grooved presser-wheel adapted to press a covering-strip against adjoining body and bottom or end blanks and to turn one edge of said strip inwardly over the edges of the bottom or end blanks, substantially as described.

17. In a paper-box-making machine the combination with rotary clamping-heads, an axially-movable rotary body-former adjacent to one of said heads, and means for wrapping a covering-strip around adjoining body and bottom or end blanks, of a part movable transversely to the axis of the body-former and adapted to turn the covering-strip inward over the open edges of the body-blanks when the rotary former is withdrawn therefrom, and means for moving said former toward the clamping-heads to fold the inturned edge of the covering-strip inside of the boxes, substantially as described.

18. In a paper-box-making machine the combination with a rotary body-former of reciprocating slides for feeding body-blanks and a covering-strip to said former, and means for holding said body-blanks and covering-strip against said former while they are wrapped around the same, substantially as described.

19. In a paper-box-making machine the combination with a rotary body-former, of reciprocating slides for feeding body-blanks and a covering-strip to said former, means for holding said blanks and strip against said former while they are wrapped around the same, and a cutter for severing the covering-strip, substantially as described.

20. In a paper-box-making machine the combination with a rotary body-former, of reciprocating slides for feeding body-blanks and a covering-strip to said former, means for holding said blanks and strip against said former as they are wrapped around it, and a rocker-arm for actuating said slides, having a lost-motion connection with one of them whereby it is adapted to move the body-blanks forward in advance of the covering-strip, substantially as described.

21. In a paper-box-making machine the combination with a rotary former, of reciprocating slides for feeding pasteboard blanks and a covering-strip to said former, means

for holding said blanks and covering-strip
against said former as they are wrapped
around it, a reel for holding the covering-
strip, means for applying paste to one side of
5 said strip, and a cutter for severing said strip
at the proper points, substantially as de-
scribed.

In witness whereof I hereto affix my signa-
ture in presence of two witnesses.

ALBIN OESTERREICH.

Witnesses:

HERMAN LEITTER,
CHAS. L. GOSS.