W. A. PRINGLE.

WEB HANDLING MECHANISM.

APPLICATION FILED JAN. 17, 1910.

1,149,684.

Patented Aug. 10, 1915.

3 SHEETS—SHEET 1.

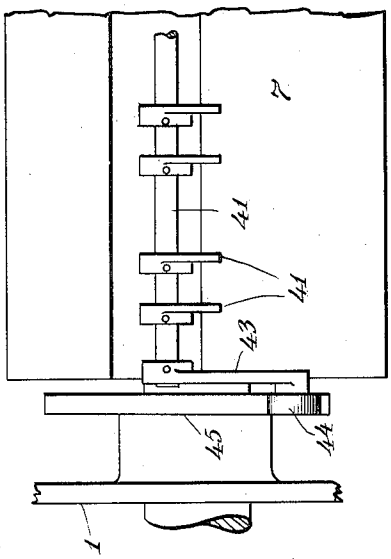


Fig. 2.

Fig. 1

WITNESSES:

Leonard A. Watson

Henry Ryan

W. A. Pringle INVENTOR

BY

Dunn, Whitfield & Dunn

ATTORNEYS

W. A. PRINGLE.

WEB HANDLING MECHANISM.

APPLICATION FILED JAN. 17, 1910.

1,149,684.

Patented Aug. 10, 1915.

3 SHEETS—SHEET 2.

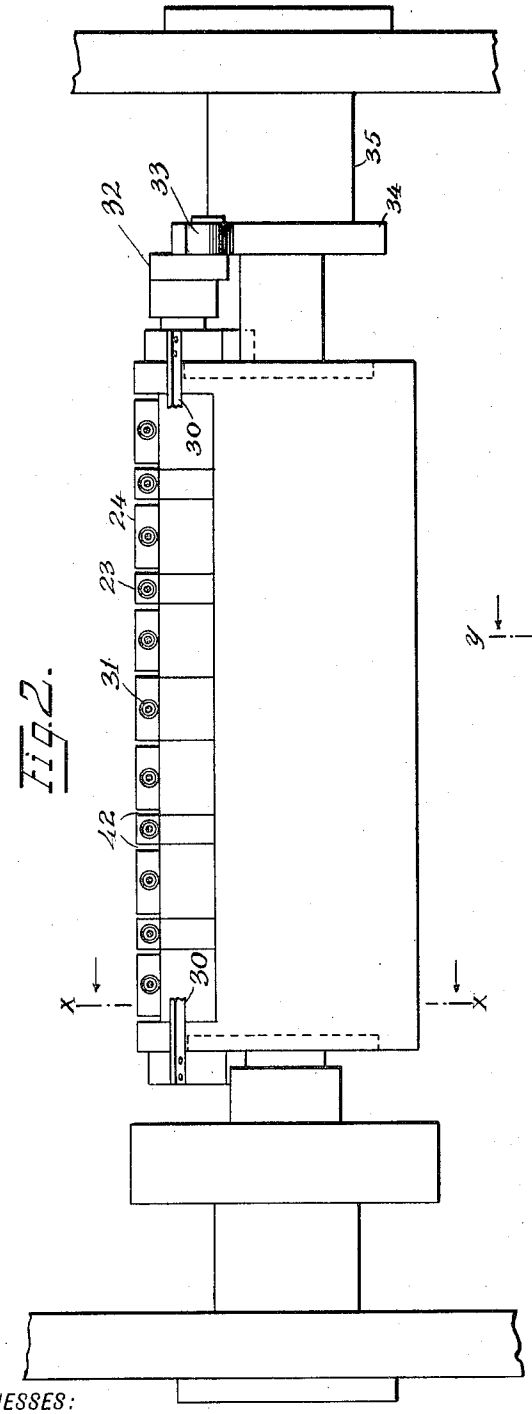


Fig. 2.

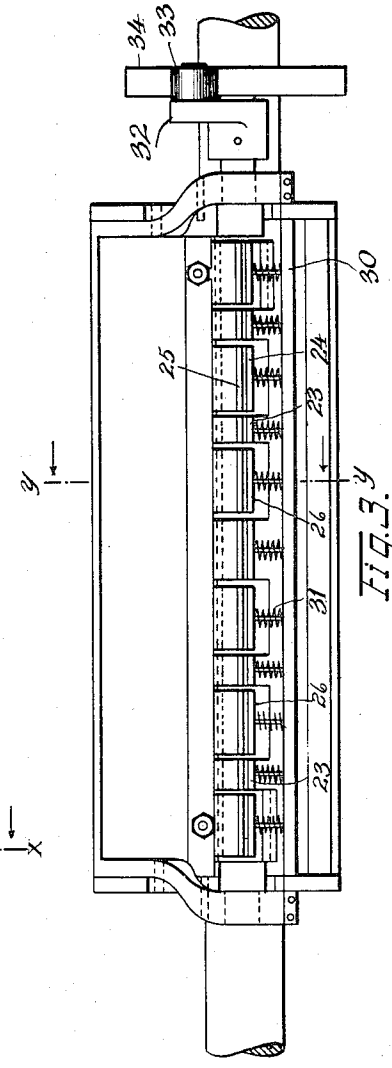


Fig. 3.

WITNESSES:

Leonard Paxton

Henry Ryan.

INVENTOR

W. A. Pringle

BY

Dewey, Warfield & Dewey

ATTORNEYS

W. A. PRINGLE.

WEB HANDLING MECHANISM.

APPLICATION FILED JAN. 17, 1910.

1,149,684.

Patented Aug. 10, 1915.

3 SHEETS—SHEET 3.

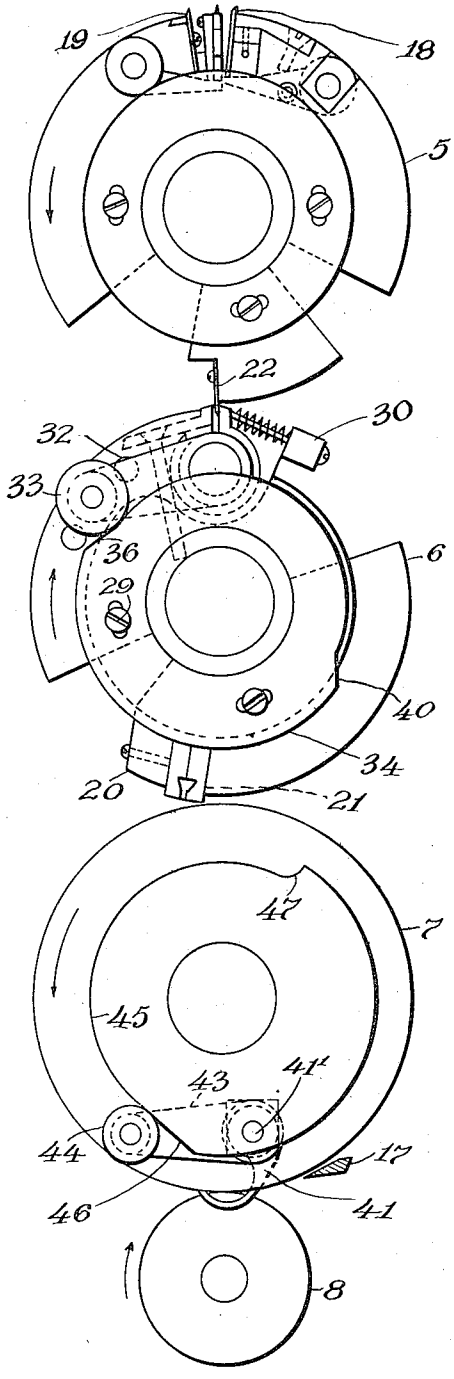


Fig. 4.

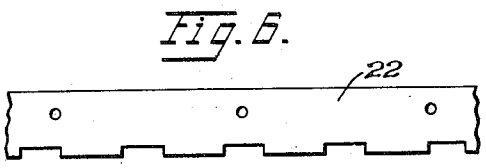


Fig. 6.

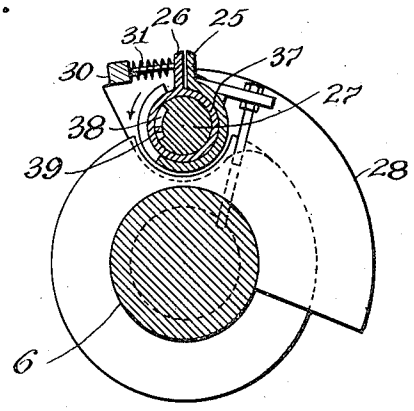


Fig. 5.

WITNESSES:

Leonard Watson

Henry Ryan.

INVENTOR

W. A. Pringle

BY

ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM A. PEINGLE, OF NIAGARA FALLS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN SALES BOOK COMPANY, LIMITED, A CORPORATION OF ONTARIO, CANADA.

WEB-HANDLING MECHANISM.

1,149,684. Specification of Letters Patent. Patented Aug. 10, 1915.

Application filed January 17, 1910. Serial No. 538,382.

To all whom it may concern:

Be it known that I, WILLIAM A. PRINGLE, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Web-Handling Mechanism, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to web handling mechanism, and with regard to certain more specific features thereof to mechanisms for folding, stripping and delivering the web in a suitable condition to be bound into books.

One of the objects of this invention is to provide a self-contained means of the above character that will be practical and efficient in operation.

Another object of this invention is to provide practical and efficient folding mechanism of simple construction and reliable action.

Another object of this invention is to provide means of the above character for positively insuring the removal of the web from the folding mechanism without danger of injury thereto.

Other objects will be in part obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown one of various possible embodiments of this invention, Figure 1 is a diagrammatic view of the complete apparatus; Fig. 2 is a side elevation of the gripper cylinder; Fig. 3 is a plan view of the same; Fig. 4 is a diagrammatic view showing the relative position of the folding, gripping and stripping cylinders; Fig. 5 is a sectional view taken on the line x—x of Fig. 2 on line y—y Fig. 3 looking in the direction of the arrow; Fig. 6 is a detailed view of the folding blade; and Fig. 7 is a partial plan view of the stripping roll.

Similar reference numerals refer to similar parts throughout the several views.

In order that certain features of this invention may be the more readily and fully understood it may be noted that this invention is particularly adapted for handling the web used in making folded leaves for sales books and the like, and the apparatus shown is adapted to be mounted adjacent a printing press and receives the web therefrom. It may also be noted that in the use of folding mechanism difficulty has been found in preventing the folding blade from drawing the fold out of the gripping members as it recedes therefrom. This and other defects are remedied in constructions of the nature hereinafter described.

Referring now to the drawings in detail, and particularly Fig. 1, 1 represents one of the side plates of a suitable frame adapted to be adjustably clamped to an upright vertical support 2 in any desired position adjacent the delivery end of a printing press. Suitably mounted in the upper part of the side plates 1 is a driven shaft 3 supporting an intermediate driving means 4 adapted to be connected in any suitable manner with a part of the driving mechanism of the printing press to which the device is attached. This member 4 engages a feed roller or folding cylinder 5 to rotate the same in the direction of the arrow, which in turn drives a second feed roller or gripping cylinder 6. Connected with this cylinder so as to be rotated thereby, is a stripping cylinder 7 and a delivery feed roller 8 adapted to feed the sheets into position to be engaged by a reciprocating fly 9 driven by means of a crank arm 10 connected by means of a link 11 with the cylinder 5. Suitable receiving means such as shown diagrammatically by a traveling belt 12 passing beneath a receiving box 13, is provided for removing the folded sheets.

The web denoted by the numeral 14 in Fig. 1, as it is delivered from the printing mechanism, is received by suitable feed rollers 15 and a tension member 16 for delivering the same between the folder cylinder 5 and the gripper cylinder 6, from whence it passes downwardly around the cylinder 6 in the direction of the arrow, until engaged

by the stripping mechanism, hereinafter described in detail, carried by the roller 7, which removes it from the grippers and carries it downwardly to the lower part thereof, where the strippers are automatically released and the folded web is engaged by a stripper bar 17 whence it is knocked into the receiving box 13 by the fly 9.

Referring now to the folding mechanism, more clearly shown in Figs. 2, 3 and 4, the cylinder 5 is provided with perforating blade 18 and a cutting blade 19 adapted to co-act with the edge 21 and the part 20 respectively, carried by the cylinder 6 to cut the web into sheets and form the line of perforation between the body of the sheet, and the end whereby the sheets are bound together, so that this sheet may be separated into original and duplicate parts in a well known manner. As this feature of this invention forms the subject-matter of a separate application of mine, Serial No. 552,957, filed April 2, 1910, it need not be described more in detail at this time.

Substantially diametrically opposite the perforating and cutting mechanism on the cylinder 5 is positioned a folding blade 22 provided with an irregular folding edge as clearly shown in detailed view of Fig. 6. This folding edge comprises a plurality of projecting blades sufficiently close together to form a distinct crease in the paper and force the same into the grippers carried by the gripping cylinder 6, or, in other words, it may be considered as a continuous folding edge provided with cut-away portions whereby the paper may be gripped without the possibility of clamping the folding blade between the gripper jaws or fingers. This gripping mechanism comprises two sets of grippers having different movements and functions, each set comprising a plurality of parts as clearly shown in Fig. 2 by the numerals 23 and 24, denoting the narrow and wide grippers respectively. Each gripper comprises a stationary member 25, Fig. 5, and a movable member 26 mounted on a relatively stationary shaft 27 carried by end blocks 28 adapted to be clamped to the cylinder 6 in adjusted position as by means of a bolt and slot construction 29 shown diagrammatically in Fig. 4. Extending from one end block 28 to the other is a relatively stationary bar 30 having connected therewith a plurality of springs 31 adapted to engage the movable members 26 of both sets of grippers. Near one end of the gripper cylinder 6 and rigidly mounted upon the shaft 27, is a rocking member 32 carrying at one end thereof, a roller 33 adapted to traverse a stationary cam 34 mounted on a collar 35 secured to the side plate 1 as clearly shown in Fig. 2. The contour of this cam is so constructed as to oscillate the rocker member 32 to bring the jaws 25 and 26 of the gripper together on opposite sides of the folding blade 22 when in the position shown in Fig. 4, and release the same at a later stage as shown by the inclined portions 36 and 40 of the cam in Fig. 4.

The movable member 26 of each gripper is provided with one of a plurality of sleeves 37, Fig. 5, surrounding the shaft 27, which is provided with a longitudinal recess 38 in which moves pin 39 carried by each sleeve 37. This construction permits a limited relative movement of the parts 25 and 26 independent of the action of the rocker member 32, so that as the rocker member is engaged by the cam 34 to be moved to close the jaws of the grippers, the set 23 which co-acts with the cut-away portions of the folder blade, will be permitted to have a greater movement under the action of the springs than the movable jaws of the grippers of set 24 which contact with the paper against the projecting parts of the blade, said projecting parts of which thus coöperate to grip, as well as fold. In other words, under the action of the springs 31 the movable parts 26 will be permitted a further movement by reason of a space between the pin 39 and the end of the recess 38 so as to come substantially into contact with the stationary member 25 and clamp the paper firmly therebetween. As the rocker member is moved to release the jaws, the end of the recess 38 will contact with the pin 39 so as to carry the movable members 26 out of contact with the stationary member 25 at the proper moment, or when the paper is engaged by the strippers hereinafter described.

After the paper has been firmly grasped by both sets of grippers and carried downwardly around the cylinder 6, the roller 33 carried by the rocker member 32 will contact with an abruptly inclined portion 40 of the cam adapted to swing the rocker member with the shaft 27 in a direction to separate the jaws 25 and 26 of both sets of grippers. At the instant of separation, however, the folded web is engaged by a plurality of stripper fingers 41 adapted to co-act in the spaces 42 between the various units of each set of grippers. This stripper mechanism comprises besides the fingers 41, which are pivoted to the cylinder 7 at the point 41', a rocker member 43 having at one end thereof a roller 44 adapted to contact with a cam 45 which is mounted on the side plate 1 in substantially the same manner as the cam 34, Fig. 2. The contour of this cam, shown clearly in Fig. 4, comprises two substantially concentric portions connected by abruptly inclined sections 46 and 47 adapted to release and secure the fingers 41 in their action on the folded web. In order to avoid any possible chance of the web from dropping as soon as released by the fingers 41, shown in Fig. 4, a roller 8 is

provided for feeding the web into position to be engaged by the fly 9 above the receiving box 13. The stripper bar 17 is provided to prevent the web being carried around on the cylinder 7 if by any possible chance it should become entangled with the stripper fingers 41 or stuck to the cylinder 7.

The operation of this device is substantially as follows: The roller 4 is suitably connected with any desired source of power so as to drive the various parts of the apparatus as previously explained. The web is passed through the tension members and feed roller mechanism and delivered to the cutter and perforator, after which it is engaged by the folder blade 22 and forced between the jaws 25 and 26 of both sets of grippers 23 and 24. At the instant the paper is received between the jaws of the grippers the rocker member 32 is actuated by means of the roller 33 traversing the cam 34 so as to close upon the paper and firmly grip the same between the jaws of the several units. Those units engaging the web in the cut-away portion will be permitted a free movement by reason of the springs 31 so as to grasp the paper firmly, then as the cylinders 5 and 6 revolve away from each other and the folder blade 22 is withdrawn from between the jaws 25 and 26, the paper will positively be removed therefrom, due to the fact of the much larger area thereof being in contact with the gripping surfaces. The cut and folded sheet is then carried downwardly and around by the cylinder 6 until the grippers reach the lowest point in their path of travel, at which moment the stripper fingers 41 have come upwardly and around and are in opened position, adapted to receive the folded web. Simultaneously the inclined portions 40 and 47 of the cams 34 and 45 respectively, actuate the rocker members on the cylinders 6 and 7 to open the grippers and close the fingers 41 upon the fold of the web; then as the rollers continue in their movement the web firmly clamped by the fingers 41, will be carried downwardly and around until the rocker member 43 is acted upon by the inclined portion 46 of the cam 45 to open the same. At this point, however, the roller 8 and the stripper bar 17 co-act to positively deliver the folded sheet into the receiving box 13, where it is knocked down by the fly 9 to form a superimposed pile upon the traveling belt 12, whence it is carried to a convenient point to be further acted upon in the manufacture of the sales books.

It is thus seen that this invention provides for a self-contained, practical and efficient machine that is relatively simple in construction and cheap to manufacture, and which may be applied to any form of printing press and driven thereby, whereby the web is cut, folded and delivered in a short space of time. The mechanism being subject to adjustment in its various parts, it is positive in its action upon the web in removing it from the folder blade and in delivering it from the grippers to the strippers as the same is acted upon.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

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

1. In combination, in a mechanism of the character described, web feeding mechanism, a folder and a gripper, said gripper having independently actuating parts adapted to contact with a greater area of the web than said folder whereby said web is positively removed from said folder.

2. In combination, in a mechanism of the character described, web feeding mechanism, a folder, and a gripper operatively associated with said web feeding mechanism, said gripper having independently actuating parts adapted to contact with a greater area of the web than said folder whereby the web is positively removed from said folder.

3. In combination, in a mechanism of the character described, web feeding mechanism, a folder having an irregular edge operatively associated therewith, a plurality of independently operating grippers adapted to co-act with the irregularities of said folder and means for positively separating the jaws of said grippers.

4. In combination, in a mechanism of the character described, web feeding mechanism, a folder having an irregular folding edge operatively associated therewith, and a plurality of independently operating grippers adapted to co-act with said folder.

5. In combination, in a mechanism of the character described, web feeding mechanism, comprising a plurality of rollers, a web cutter, a folder, and a plurality of sets of independently operating grippers arranged adjacent each other along one side of one of said rollers, adapted to co-act with said folder.

6. In combination, in a mechanism of the character described, web feeding mechanism,

comprising a plurality of rollers, a folder having an irregular edge mounted on one roller, a plurality of sets of yielding grippers adapted to coact with said folder, means for operating said grippers and a lost motion device between the operating means and the grippers.

7. In combination, in a mechanism of the character described, web feeding mechanism, a folder, a plurality of sets of yielding grippers adapted to co-act with said folder, one of said sets of grippers having a different function and movement from the other.

8. In combination, in a mechanism of the character described, web feeding mechanism, a folder, a plurality of sets of grippers having different ranges of movement, one of said sets having a different function from the other set.

9. In combination, in a mechanism of the character described, web feeding mechanism, a folder, a plurality of independent sets of adjacent grippers adapted to co-act with said folder, each of said sets having a plurality of parts, the parts of one set being movable relatively to the parts of another.

10. In combination, in a mechanism of the character described, web feeding mechanism, a folder having cut-away portions, a plurality of sets of yielding grippers, each set comprising a plurality of parts adapted to co-act with said folder and cut-away portions, and mechanism for actuating said sets of grippers whereby the paper is gripped at the cut-away portions as well as on the folder.

11. In combination, in a mechanism of the character described, web feeding mechanism, a folder having cut-away portions along the folding edge thereof, a plurality of grippers co-acting with said folder and the cut-away portions thereof, for positively removing the web therefrom, and a stripper finger co-acting with said grippers for removing the web.

12. In combination, in a mechanism of the character described, a plurality of rollers, a folder located on one of said rollers, a plurality of independently operating grippers spaced apart from each other and mounted upon the other roller in the direction of the length thereof, said grippers being adapted to coact with said folder, a plurality of stripper fingers located upon a third roller and adapted to pass between said grippers for removing the web therefrom, and means adapted to actuate said grippers as they coact with said folder.

13. In combination, in a mechanism of the character described, a plurality of rollers, a folder having cut-away portions located upon one of said rollers, a gripper co-acting with said cut-away portions located on another roller, and a plurality of stripper fingers located on a third roller adapted to co-act with said gripper for removing the web therefrom, and mechanism for releasing said gripper when in co-active position with said stripper fingers.

14. In combination, in a mechanism of the character described, web feeding mechanism, a folder having a plurality of cut-away portions along its folding edge, a plurality of grippers co-acting with said folder and the cut-away portions thereof, stripping mechanism adapted to remove the web from said grippers, and means for actuating said stripping mechanism when in operative relation to said grippers.

15. In combination, in a mechanism of the character described, web feeding mechanism, a folder having a plurality of cut-away portions along its folding edge, a plurality of grippers co-acting with said folder and the cut-away portions thereof, stripping mechanism adapted to remove the web from said grippers, and means for simultaneously releasing said grippers and actuating said stripper when in operative relation to each other.

16. In combination, in a mechanism of the character described, web feeding mechanism, a folder having a plurality of cut-away portions along its folding edge, a plurality of sets of grippers, one set co-acting with said folder and the other with said cut-away portions, and stripping means for moving the paper from said grippers.

17. In combination, in a mechanism of the character described, web feeding mechanism, a folder having a plurality of cut-away portions along its folding edge, a plurality of grippers co-acting with said folder and other grippers engaging the web through the cut-away portions of the folder, stripping means passing between said grippers for moving the paper from said grippers, and mechanism for actuating said stripping means when in operative relation to said gripper.

18. In combination, in a mechanism of the character described, web feeding mechanism, a folder having a plurality of cut-away portions along the folding edge thereof, a plurality of grippers having spaces therebetween operatively associated and co-acting with said folder for removing paper therefrom, a roller, and stripping fingers projecting from the surface thereof adapted to operate in the spaces between said grippers for removing the web therefrom.

19. In combination, in a mechanism of the character described, a web handling mechanism, including a pair of feed rollers, a folder having an irregular edge mounted upon one of said rollers, a plurality of sets of independently operating grippers coacting with the irregularities of said folder, a single means positively actuating all of said

grippers and auxiliary means for partially actuating some of said grippers independently of others.

20. In combination, in a mechanism of the character described, a feed roller, a plurality of separate independently operating grippers mounted thereon, a folder with which said grippers are adapted to coöperate, a single means for actuating all of said grippers, and a lost motion device intervened between said means and said grippers whereby certain grippers are permitted to have a different range of movement.

21. In combination, in a mechanism of the character described, web feeding mechanism, a folder, a plurality of sets of grippers adapted to co-act with said folder, said sets having different movements and functions, stripper means, and mechanism for receiving the folded web.

22. In combination, in a mechanism of the character described, a support, web handling mechanism adjustably mounted on said support comprising side plates, feed rollers mounted thereon, folding and stripping mechanism carried by said rollers, and a delivery box operatively associated with said mechanism for receiving the folded sheets, said delivery box being adjustable independently of said web handling mechanism.

23. In combination, in a mechanism of the character described, a support, web handling mechanism adjustably mounted on said support comprising side plates, feed rollers mounted thereon, folding and stripping mechanism carried by said rollers, and a fly driven by one of said rollers for piling the folded sheets as the same are delivered.

24. In combination, in a mechanism of the character described, a support, web handling mechanism adjustably mounted on said support comprising side plates, feed rollers mounted thereon, folding and stripping mechanism carried by said rollers, a receiving box for receiving the folded sheets, and a fly driven by one of said rollers for piling the same in said receiving box.

25. In a mechanism of the character described, in combination, a pair of rollers, a plurality of pairs of gripper jaws carried by one roller, a folding member carried by the other roller adapted to fold a web between the jaws of each pair of gripper jaws, said member having a gripping folding portion adapted to extend between the jaws of one pair of said grippers, said other pair of grippers being so disposed relatively to said member as to directly grip the web between its jaws, and means adapted to cause said web to be yieldingly gripped between said folding portion and one of said jaws between which said folding portion extends.

26. In a mechanism of the character described, in combination, a pair of rollers, a plurality of pairs of gripper jaws carried by one roller, a folding member carried by the other roller adapted to fold a web between the jaws of each pair of gripper jaws, said member having a gripping folding portion adapted to extend between the jaws of one pair of said grippers, and a recess disposed to permit said other pair of jaws to directly grip the web, and means adapted to cause said web to be yieldingly gripped between said last-mentioned pair of jaws and between one of said other jaws and said folding member.

27. In a mechanism of the character described, in combination, a pair of rollers, a plurality of pairs of gripper jaws carried by one roller, and a folding member carried by the other roller adapted to fold a web between the jaws of each pair of gripper jaws, said member having a gripping folding portion adapted to extend between the jaws of one pair of said grippers, said other pair of grippers being so disposed relatively to said member as to directly grip the web between its jaws, one jaw of each pair of said gripping jaws being independently movable relative to a jaw of another pair.

In testimony whereof I affix my signature, in the presence of two witnesses.

WILLIAM A. PRINGLE.

Witnesses:

T. D. SUTHERLAND,

JOHN R. DICKSON.