O. W. JOHNSON.

PAPER FEEDING MACHINE.

APPLICATION FILED SEPT. 14, 1909.

1,114,143.

Patented Oct. 20, 1914

5 SHEETS-SHEET 1.

Fig. 1.

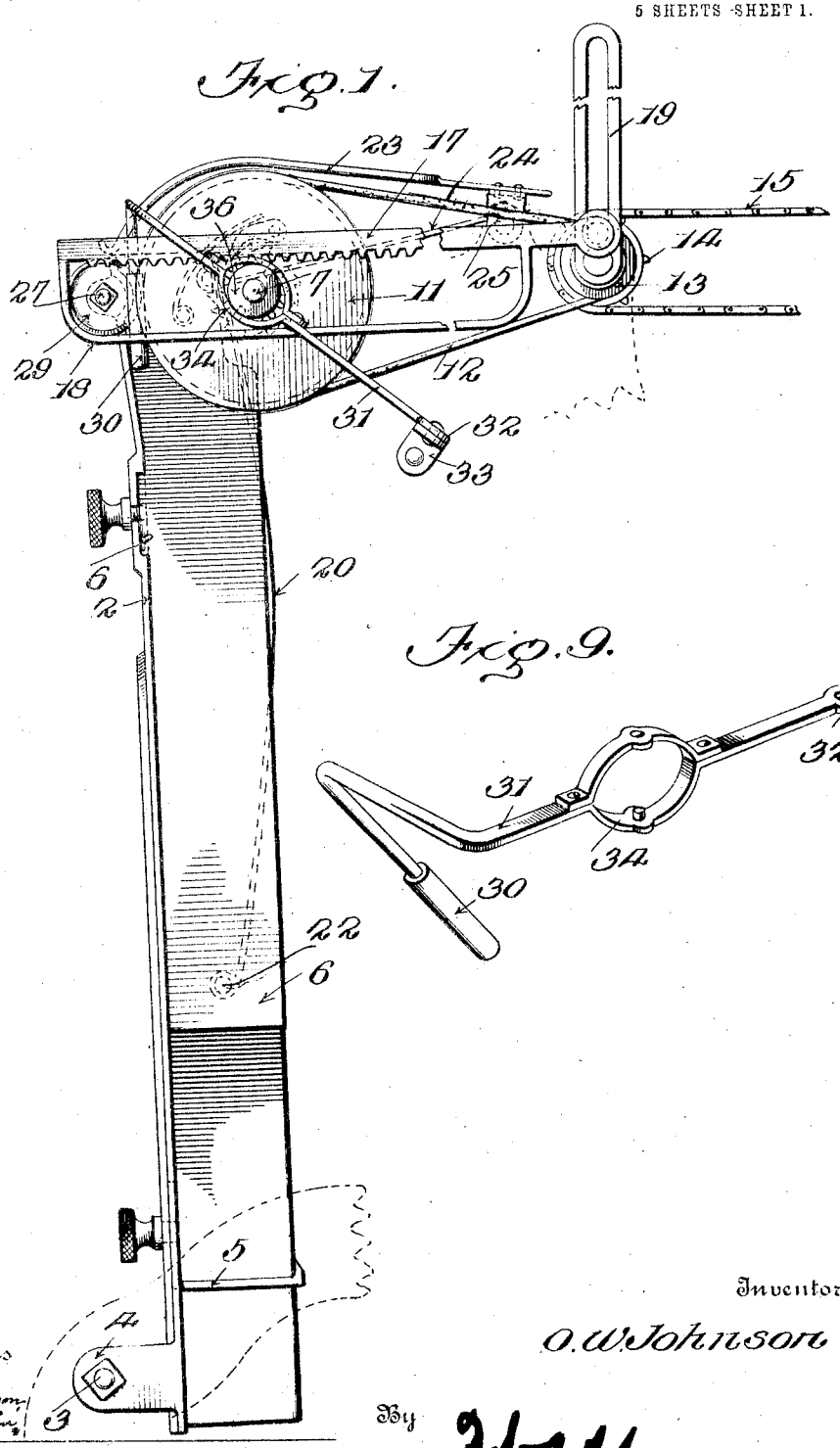


Fig. 9.

Witnesses

W. H. Woodcom

Irma M. Fallin

Inventor

O. W. Johnson

By W. H. Macey, Attorneys

O. W. JOHNSON.

PAPER FEEDING MACHINE.

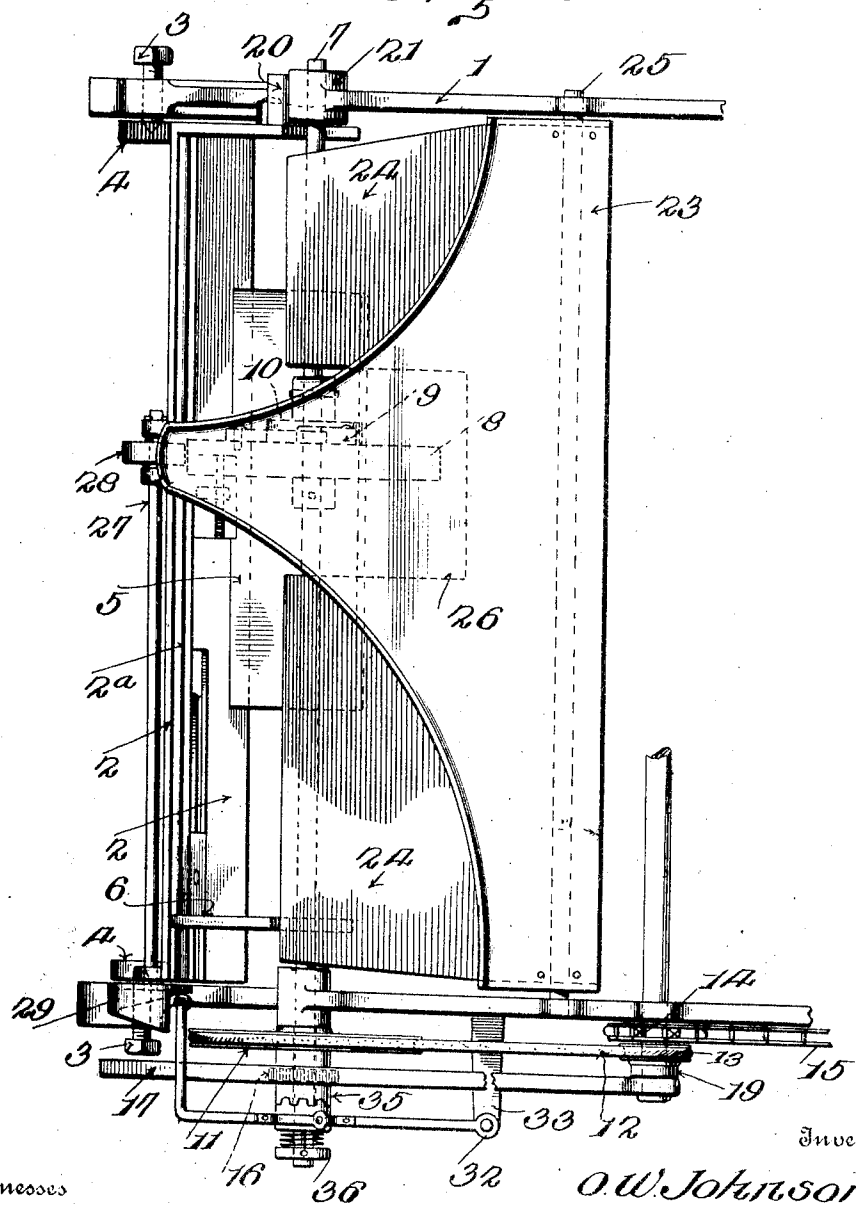
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5 SHEETS—SHEET 2.

Fig. 2.



Witnesses

H. C. Hoodson.

Juana M. Fallin.

Inventor

O. W. Johnson

By Wallace & Mackey, Attorneys

O. W. JOHNSON.

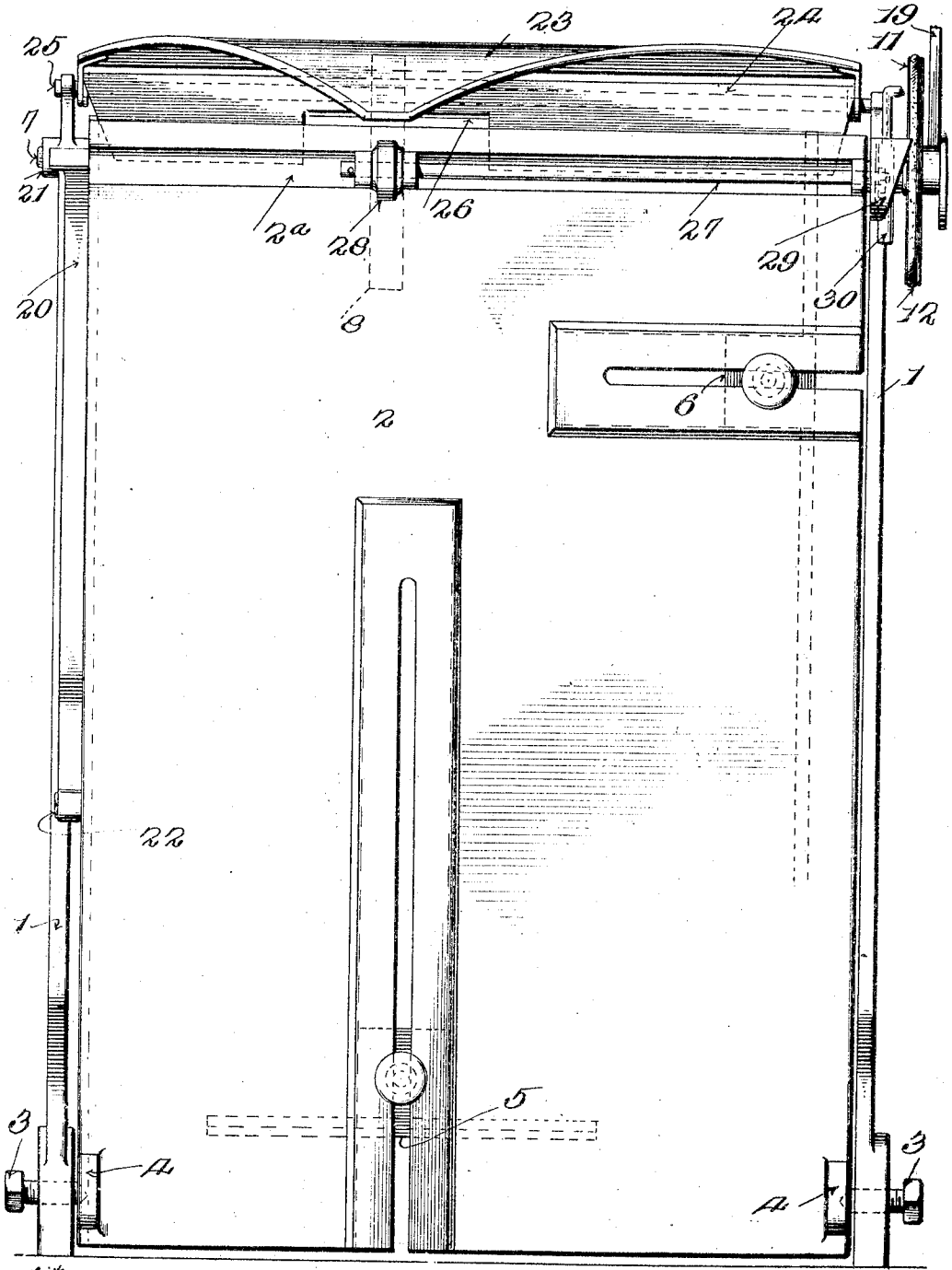
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5 SHEETS—SHEET 3.



Witnesses

W. A. Woodson

Juana M. Fallin

Fig. 3

Inventor

O. W. Johnson

By Hall & Lacey, Attorneys.

O. W. JOHNSON.

PAPER FEEDING MACHINE.

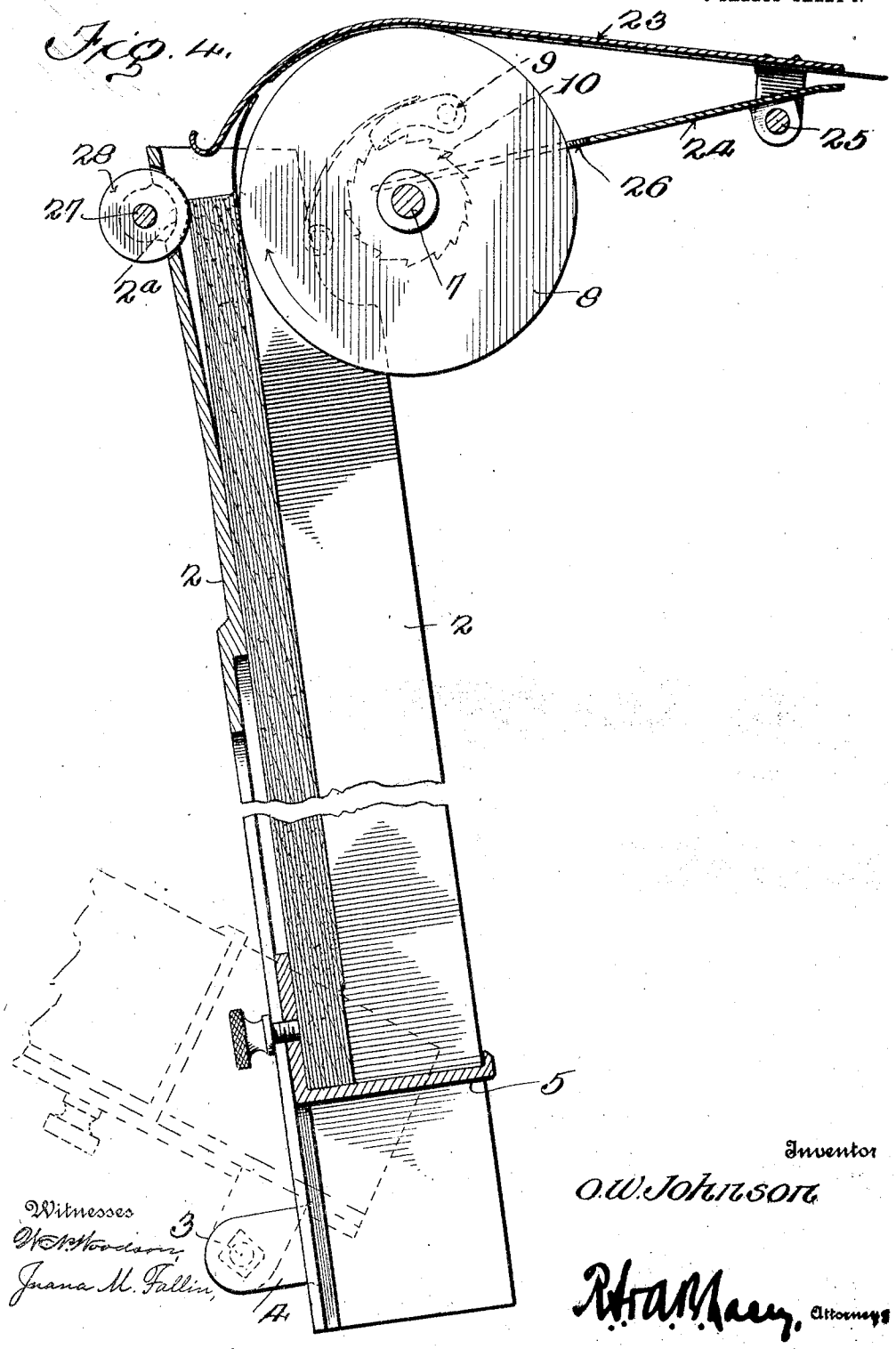
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5 SHEETS—SHEET 4.

Fig. 4.



Witnesses

W. A. Hardison

Juana M. Fallin

Inventor

O. W. Johnson

R. H. A. Macy, Attorneys

O. W. JOHNSON.

PAPER FEEDING MACHINE.

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5 SHEETS—SHEET 5.

Fig. 5.

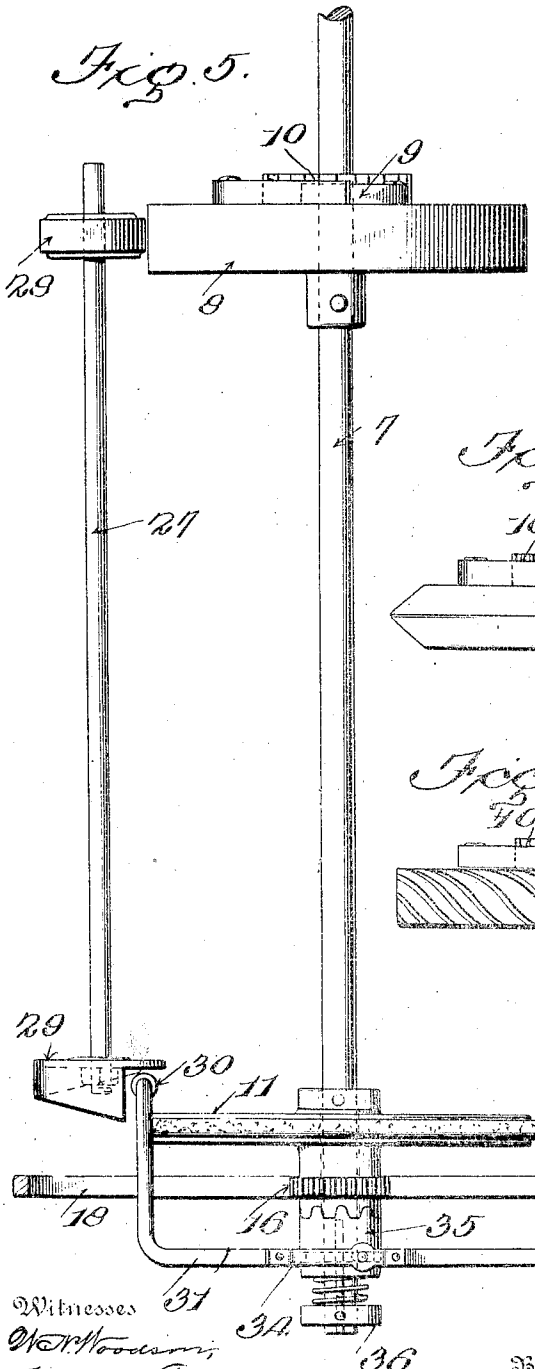


Fig. 6.

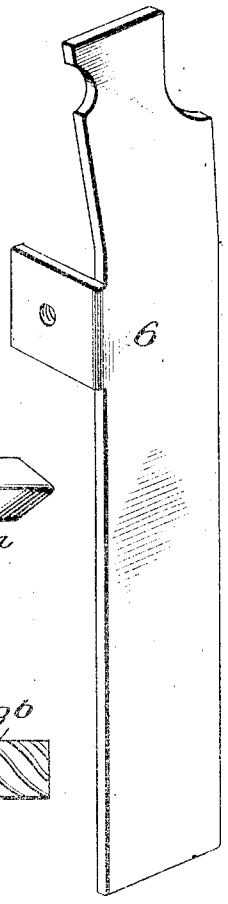


Fig. 7.

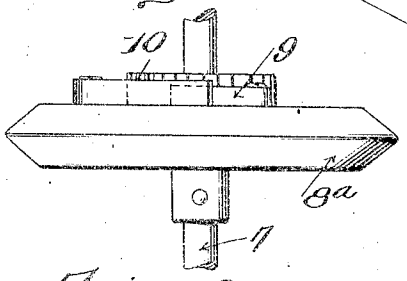
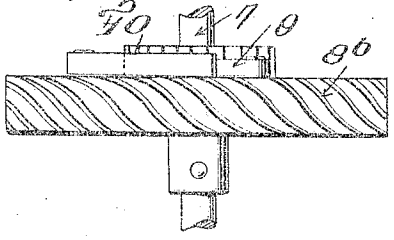


Fig. 8.



Witnesses

W. H. Woodson,

Juan a. M. Fallin,

Inventor

O. W. Johnson

By R. H. & R. Lacey.

Attorneys

UNITED STATES PATENT OFFICE.

OLIVER W. JOHNSON, OF GENEVA, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CLEVELAND FOLDING MACHINE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PAPER-FEEDING MACHINE.

1,114,143. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed September 14, 1909. Serial No. 517,683.

To all whom it may concern:

Be it known that I, OLIVER W. JOHNSON, citizen of the United States, residing at Geneva, in the county of Ashtabula and State of Ohio, have invented certain new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

This invention comprehends certain new and useful improvements in sheet feeding apparatus, designed particularly for use in connection with a paper folding or printing machine, although applicable to other receiving machines generally, and relates particularly to that type of paper feeding devices in which the paper sheets are fed to the receiving machine from a lift or stack deposited in the stacking box of the feeding apparatus, the sheets being automatically and successively operated upon, one at a time, and passed upwardly from the stack and then substantially horizontally into and between the feeding rolls or the like of the receiving mechanism which is equipped with the feeding apparatus.

The invention has for its primary object a feeding machine of this character which will possess to a marked degree the characteristics of simplicity, durability, effectiveness and ease of operation, ease of adjustment and serviceability within a wide range of sheets of different sizes, thickness or stock, so that the varied requirements of the printing and allied trades may be effectively fulfilled.

The invention also has for its object a sheet feeding machine which is so arranged that the sheets may be fed from a pile, stack or lift of sheets, one sheet at a time, either continuously or at stated intervals, as may be required, and delivered to the receiving machine accordingly.

The invention has for a further object a machine of this character which will operate to engage the sheets in succession near their upper edges and in which machine there are embodied devices whereby the tension of the lift of sheets against the stripping device or roll, may be accurately adjusted to any degree of pressure desired by the operator in order to insure a positive stripping action of only one sheet at a time, said adjustment being necessary in view of the different qualities, weights and sizes of sheets that may be fed by the machine.

Another object of the invention and subsidiary to the object mentioned in the preceding paragraph, is an improved construction and arrangement of holder in which the sheets are first placed, this, of its own weight holding the sheets against the stripping roller of the device and the tension means for varying the pressure of the sheets against such roller being mounted on and co-acting with said casing and some stationary portion of the framework of the receiving machine to which the invention is applied, so that such weight or pressure may be properly regulated, as above mentioned.

Another object of the invention is the provision of adjustable guides carried by said holder of the apparatus and arranged to support the sheets at their bottom and side edge, according to the particular size of sheet being operated upon.

Another object of the invention is the provision of stripping rollers of various shapes and formations, which may be applied to the supporting shaft intended for use, according to the particular and varied requirements of the trade, it being intended to equip each feeding machine with one or more of these rollers of each different design.

Another object of the invention is an improved arrangement and construction of stripping roller and actuating mechanism therefor including a ratchet and pawl connection between said roller and its supporting shaft, whereby when the sheet is fed to the feeding rolls of the folding or other receiving machine and is caught thereby, said stripping roller may overrun or rotate freely on its shaft, in case such feeding rolls of the feeding machine are moving at a faster rate than the stripping roller of the feeding apparatus, another advantage of this arrangement of stripping roller residing in the fact that when the feeding apparatus is arranged for an intermittent feed of the sheets, said ratchet mechanism permits of the reversing of the motion of the roller supporting shaft, without imparting any reverse movement to the roller itself.

Another object of the invention is the provision of an automatically operating stopping mechanism which will result in the prompt stopping of the stripping roller after the pile or lift of sheets has become exhausted. And another object of the inven-

tion is an improved construction and arrangement of guide plates arranged to properly sustain the sheets as they are passing by the stripping roller into, say, the feed rolls of the machine and to also serve as directing means whereby a proper alinement will be maintained in such passage of the sheets.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of a paper feeding machine embodying the improvements of my invention; Fig. 2 is a top plan view thereof; Fig. 3 is a front or face view; Fig. 4 is a vertical longitudinal section; Fig. 5 is top plan view of some of the actuating mechanism; Fig. 6 is a detail perspective view of the side gage for the sheets; Figs. 7 and 8 are detail views illustrating modified views of sheet stripping rollers that may be employed. Fig. 9 is a detail perspective view of a shipper lever employed, and hereinafter specifically referred to.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Refering to the drawings, the numeral 1 designates two of the framework bars of a paper folding or other receiving machine which is equipped with the sheet feeding mechanism of my invention, these parts being only shown to illustrate some supporting means for the device.

2 designates the holder in which the sheets to be fed are placed on edge, as shown, so as to form a vertically standing pile or lift, said holder being closed at the front and on one side, but being open at the bottom, the opposite side, and back. In order to swing the holder 2 forwardly and downwardly to place the pile of sheets therein, it is pivotally mounted at its lower end so that it will swing from its upper end on a horizontal axis, friction reducing pivot bolts 3 being used in the present instance for this purpose and extending through the side bars 1 into bearing lugs 4 which project forwardly from the front of the holder near the lower end thereof.

In order that the holder 2 may be used with sheets of different lengths and widths, I have provided bottom and side edge supporting devices, the same consisting of slides designated respectively 5 and 6 and having a slot and set screw connection with the front of the casing 2, as best illustrated in Fig. 3. The device 5 constitutes a shelf for the pile of sheets, while the supporting device 6 constitutes a side gage.

Journaled in bearings in the frame members of the receiving machine is a transversely extending shaft 7. This shaft has mounted thereon a stripping roller 8 which may have either a smooth, plane circular periphery or a bevel periphery, as indicated at 8^a in Fig. 7, or a spirally ribbed or grooved periphery, as indicated at 8^b in Fig. 8, according to the particular requirement of the case, such as the quality or weight of the paper being operated upon. The roller 8 is designed to engage the rearmost sheet in the pile and near the upper edge thereof, as best illustrated in Fig. 4, and is mounted loose on the shaft 7, being actuated through the instrumentality of a pawl 9, which is carried by the roller and which is spring pressed into engagement with a ratchet 10 held fast to the shaft 7 by a set collar or other means.

As set forth at the outset of the specification, one of the objects of this invention is to provide means whereby the sheets may be fed substantially continuously, or at intervals or intermittently. To effect the continuous rotation of the stripper roller 8, I have equipped the shaft 7 with a pulley 11 preferably grooved which is loose on the shaft and which may be connected by a belt 12 to a grooved pulley 13 which is preferably formed integral with a sprocket wheel 14 mounted on a shaft journaled in one of the bars and driven by means of a sprocket chain 15 from any desired part of the receiving machine.

For the purpose of giving an intermittent rotation to the stripping roller 8 when desired, the shaft 7 carries a spur pinion 16 which is preferably carried by the hub of the pulley 11, and which is of course loose on the shaft. This pinion meshes with a housed rack bar 17, said rack bar being formed with a guide strip 18 and having a wrist pin connection at one end with a slotted crank 19 mounted on the shaft or connected to the grooved pulley 13 and sprocket wheel 14 to rotate therewith. By this means it will be understood that the reciprocation of the rack bar will effect a step by step movement of the roller 8. A rearward movement of the rack bar will rotate the roller 8 rearward but the forward movement of the rack bar will impart no motion to the roller owing to the pawl and ratchet connection between the roller and the shaft before noted.

When it is desired to drive the shaft 7 continuously in one direction, the rack bar 17 is disconnected from the crank and removed entirely and the belt 12 is placed over the grooved pulleys, operatively connecting the two. When, however, it is desired to give a step by step or intermittent movement to the shaft 7, the belt is discon-

nected and the rack bar attached and placed in engagement with the pinion. It will be noted that by using both a pulley and a pinion on the shaft, and by providing both a pulley and a slotted crank upon the driving shaft that it is possible to secure either a continuous or an intermittent movement of the stripping roller 8.

From the drawings, it will be clear that when the holder 2 is in substantially upright position, that is, in operative relation to the other parts of the feeding mechanism, its weight will be almost if not entirely to one side of its axis or center, this means being employed to obtain pressure so that the sheets will bear against the stripping roller 8. In order to regulate this pressure, according to this particular requirement of the work in hand, I have provided a compensating spring 20, which is secured at its lower end to the side of the casing 2 and which extends upwardly with its free end bearing against some portion of the main supporting framework of the receiving machine, as indicated at 21. The lower end of this compensating spring 20 is secured to the casing by a set screw 22, so that its tension against the part 21 may be varied in order to relieve the same of the pressure which would otherwise be caused to bear on the sheets by the weight of the casing, this means, as is manifest, rendering the machine capable of being adjusted to a nicety in this regard, so that just a proper amount of pressure may be caused between the rearmost sheet in the pile and the stripping roller 8 to effect the stripping of one sheet at a time from the pile without any overlapping of the sheets.

From the foregoing description in connection with the accompanying drawings, it is clear that by turning the stripper roller 8 either continuously or intermittently, as desired, by either of the actuating mechanisms above specified, the rearmost sheet in the pile or lift will be stripped from the other sheets and carried upwardly between the stripping roller 8 and the horizontally extending rearwardly bowed portion 2^a formed in the front of the casing. In order to direct the stripped sheet upwardly and rearwardly so that it will be properly directed into the feed rolls or the like of the feeding machine, I have provided upper and lower deflector plates, designated 23 and 24, respectively. These plates are pivotally mounted at their rear ends one above the other, upon a transversely extending rod 25 and preferably extend slightly forward from their pivoted connection so as to form a contracted passage through which the sheet is discharged from the feeding apparatus, and the upper deflector extends forwardly from its points of attachment and preferably curves downwardly over the stripping roller 8, being preferably loosely supported thereon, and having its side edges forwardly tapered to any desired extent, although this taper is not essential. The lower deflector plate 24 extends downwardly and preferably rests upon the shaft 7, and is provided with a recess 26 to provide a clearance space for the stripping roller 8 and its correlated parts.

It will be remembered that I stated one of the objects of my invention to be the provision of means for automatically stopping the feeding apparatus when the pile or lift of sheets in the casing 2, has become exhausted. In order to accomplish this result, I have provided in the present embodiment of my invention, a transversely extending shaft 27 which is journaled in lugs formed on the casing 2 and which carries a roller 28 designed to engage some wheel or roller on the shaft 7 at the stated time. In the present instance, the roller 28 is arranged to engage the stripping roller 8 itself, as the casing gradually moves rearwardly as the supply of sheets becomes depleted, the final contact between this stop roller 28 and the roller 8 or some other wheel effecting the rotation of the roller 28 and the shaft 27 and bringing into play a stop cam 29 which is secured to one end of the shaft 27. In this rotation of the shaft 27, the cam 29 will ride upon a sleeve or roller 30 carried on the laterally extending end of a shipper lever 31, said lever being fulcrumed at its rear end, as at 32, upon a bracket 33 projecting outwardly from one of the side bars of the framework, the shipper lever 31 having a collar 34 engaged with a clutch 35 splined on the shaft 7 at one end thereof and limited in its movement in one direction by a stop collar 36. This clutch 35, in the normal operation of the parts, is engaged by a clutch formed on the hub which carries the grooved pulley 11 and spur pinion 16. It is therefore evident that when the shaft 27 is rotated and the cam 29 is turned, the shipper lever 31 will be forced out so as to disengage the clutch 35 from its hub and thereby bring the shaft 7 to a standstill. Any suitable spring device may be used to turn the shipper lever and clutch to normal position, as soon for instance, as the cam 29 is released from the roller or sleeve 30, by the forward and downward movement of the casing 2 to replenish the stock of sheets to be fed.

Having thus described the invention, what is claimed as new is:

1. In a sheet feeding machine, the combination with a sheet supporting holder adapted to hold the sheets in a pile on edge, a support for said holder, a stripping roller against which the sheets are held by the holder, means for actuating the stripping roller, and means including a stop roller attached to the main body of the holder in such manner as to directly engage the strip-

ping roller immediately after the last sheet has been drawn out and fed to the connected machine.

2. In a sheet feeding apparatus, a holder adapted to hold a pile of sheets, a stripping roller adapted to strip the sheets from the pile, a stop roller mounted in the holder, means for actuating said stripping roller, a shaft on which said stop roller is mounted, a stop cam secured to said shaft, the means for operating the stripping roller including a driving device, and a clutch securing it to the shaft on which the stripping roller is mounted, and a shipper lever arranged to be engaged by the stop cam to disengage the driving device, the stop roller being arranged to automatically receive motion so as to turn its shaft upon the pile of sheets becoming exhausted.

3. In a sheet feeding mechanism, the combination of a sheet supporting holder, a stripping roller adapted to strip sheets one by one from the holder, a shaft on which the roller is mounted, a belt pulley on the shaft, a pinion carried by the pulley, a driving countershaft having a belt pulley and a crank, and a rack connected to the crank and engaging the pinion.

4. In a sheet feeding apparatus, the combination of a sheet supporting holder, a stripping roller adapted to strip sheets from the pile supported in said holder by frictional engagement therewith, a shaft on which said stripping roller is mounted, a pawl and ratchet connection between the stripping roller and the shaft, a belt pulley on the shaft, a pinion carried by the pulley, a driving shaft having a belt pulley and a crank, and a rack connected to the crank and engaging said pinion.

5. In a sheet feeding apparatus, a holder adapted to hold a lift or pile of sheets, a roller adapted to strip the sheets from the pile, a shaft upon which said roller is mounted, a ratchet secured to the shaft, a pawl carried by the roller and engaging said ratchet, driving devices mounted on said shaft, a spring pressed clutch adapted to hold said driving devices fast on the shaft, a shipper lever operatively connected to said clutch and provided at its free end with a sleeve, a cam arranged to engage said sleeve, a shaft to which the cam is secured, the holder having bearings in which said shaft is journaled, and a roller mounted on said last named shaft and arranged to engage the stripping roller when the supply of sheets is exhausted.

6. In a sheet feeding apparatus, a holder adapted to hold a lift of sheets on edge, means for loosely supporting the holder with its weight lying to one side of its points of connection to its supporting means, a stripping roller adapted to engage the rearmost sheet in the pile, the weight of the holder holding the sheets against said stripping roller, and means carried by the holder for engaging said stripping roller when the pile of sheets is exhausted, such means being movable by the stripping roller to automatically stop the operation of the latter.

7. In a sheet feeding apparatus, a holder adapted to hold a lift of sheets on edge, a stripping roller adapted to engage the rearmost sheet of the pile, a roller carried by the holder in line with the stripping roller and arranged to engage the same when the pile of sheets is exhausted, means for actuating the stripping roller, and means operable by the other roller when in engagement with the stripping roller to render the stripping roller actuating means inoperative.

8. In a sheet feeding apparatus, a holder adapted to hold a pile of sheets, a stripping roller adapted to strip the sheets from the pile, a stop roller mounted in the holder, means for actuating said stripping roller, a shaft on which said stop roller is mounted, a stop cam secured to said shaft, the means for operating the stripping roller including a driving device, and a clutch securing it to the shaft on which the stripping roller is mounted, and a shipper lever provided with a roller arranged to be engaged by the stop cam to disengage the driving device, the said roller being arranged to automatically receive motion so as to turn its shaft when the pile of sheets is exhausted.

9. In a sheet feeding apparatus, a holder adapted to hold a pile of sheets, a stripping roller adapted to strip the sheets from the pile, a stop roller carried by the holder, a shaft on which the stripping roller is mounted, clutch controlled means for actuating said shaft, a shipper lever operatively connected to the clutch, the stop roller being designed for engagement with the stripping roller when the pile of sheets is exhausted, and a cam operated by the stop roller and designed to engage the shipper lever upon the movement of the stop roller to disconnect the driving means from the shaft.

10. In a sheet feeding apparatus, the combination with a sheet supporting holder, a stripping roller adapted to strip the sheets one by one from the pile contained within said holder by frictional engagement therewith, a shaft on which the stripping roller is loosely mounted, a ratchet carried by said roller, a pawl carried by the shaft and engaging the roller for movement in a stripping direction, a countershaft, means for rotating the main shaft in one direction continuously from said countershaft, and means carried by said countershaft for causing an oscillation of the said roller carrying shaft.

11. In a sheet feeding apparatus, the combination of a sheet supporting holder, a stripping roller adapted to strip the sheets from the pile, a main shaft on which said

roller is mounted and with which it has a pawl and ratchet connection, means for continuously rotating said shaft, a pinion loosely mounted on the shaft, a rack bar engaging said pinion, a clutch connecting the pinion with the main shaft, a counter shaft, a longitudinally slotted crank carried by the countershaft, and a wrist pin carried by the rack bar and having an adjustable connection with said crank.

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

OLIVER W. JOHNSON. [L. S.]

Witnesses:
WM. S. TALBOTT,
E. H. JONES.