H. A. W. WOOD & J. A. ISBELL.

PULSATING FAN DELIVERY.

APPLICATION FILED AUG. 5, 1912. RENEWED OCT. 11, 1917.

1,266,737.

Patented May 21, 1918.

4 SHEETS—SHEET 1.

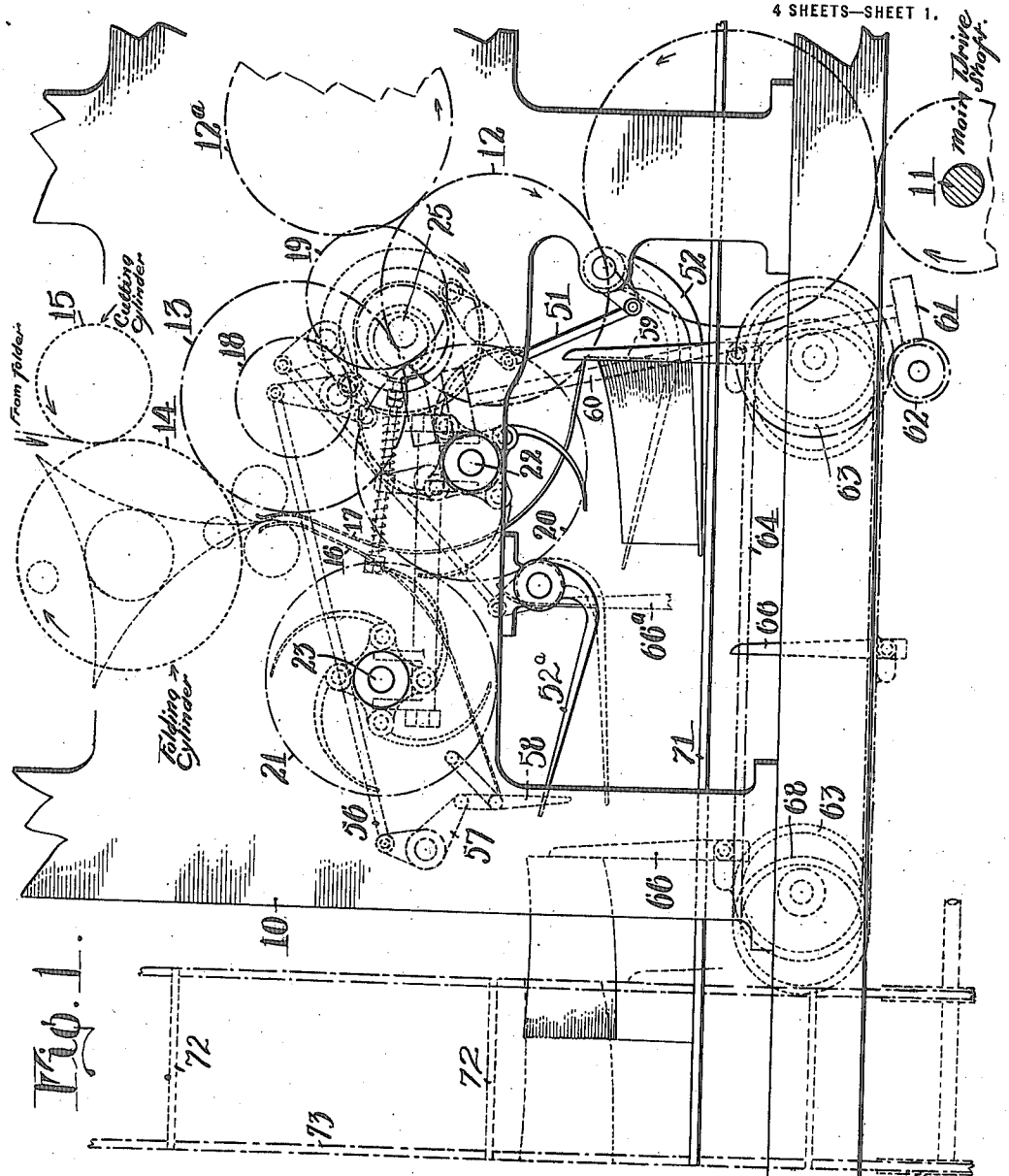


Fig. 1.

Fig. 2.

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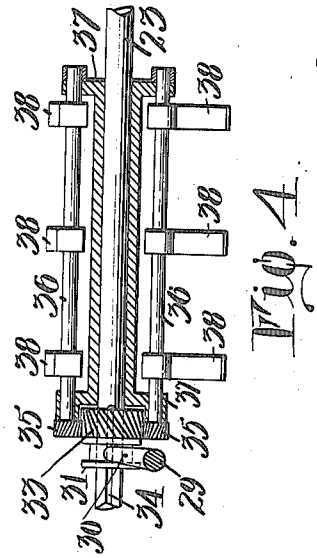


Fig. 4.

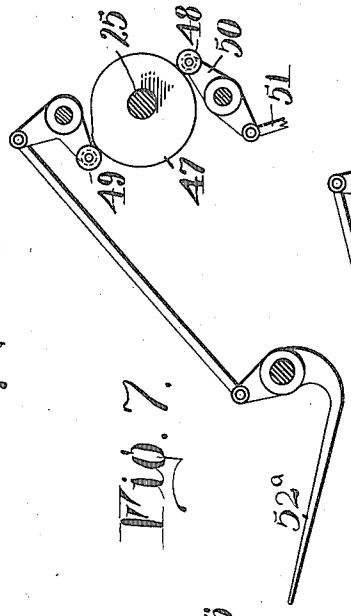


Fig. 7.

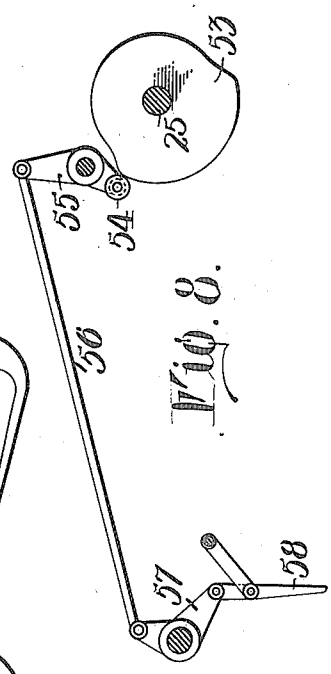


Fig. 8.

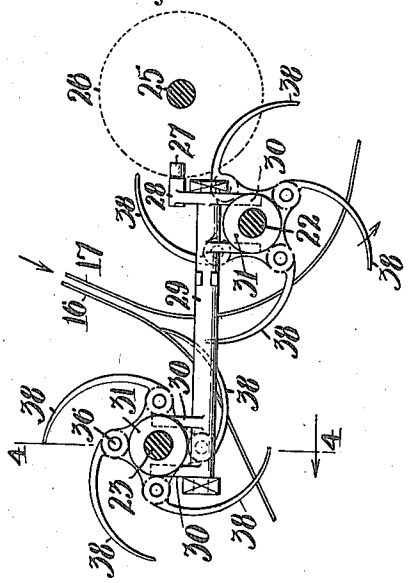


Fig. 3.

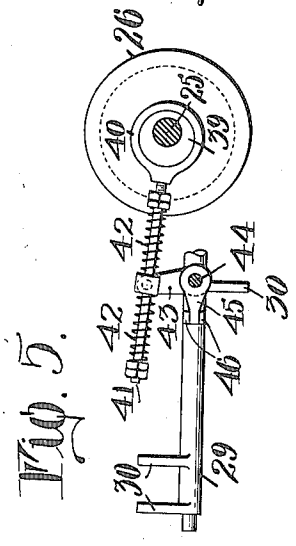


Fig. 5.

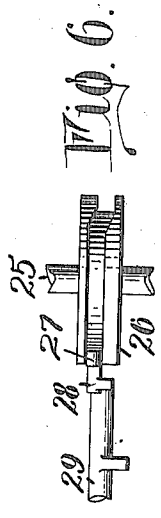


Fig. 6.

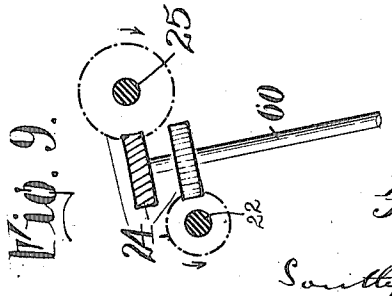


Fig. 9.

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4 SHEETS—SHEET 3.

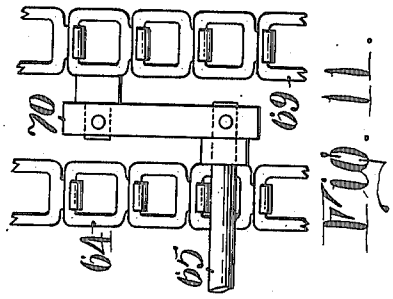


Fig. 11.

Fig. 10.

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PULSATING FAN DELIVERY.

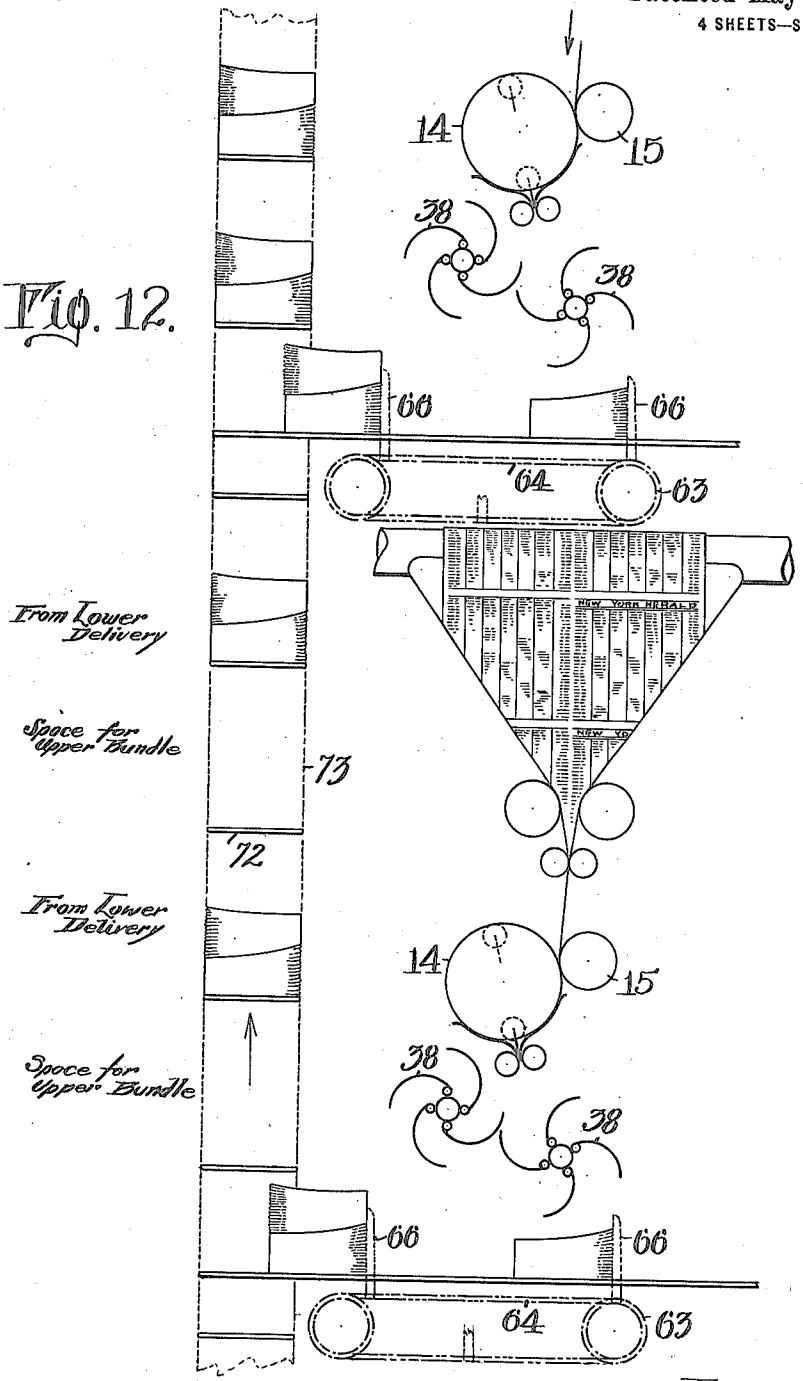
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Patented May 21, 1918.

4 SHEETS—SHEET 4.

Fig. 12.



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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, AND JOHN A. ISBELL, OF MIDDLETOWN, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO WOOD NEWSPAPER MACHINERY CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF VIRGINIA.

PULSATING-FAN DELIVERY.

1,266,737. Specification of Letters Patent. Patented May 21, 1918.

Application filed August 5, 1912, Serial No. 713,303. Renewed October 11, 1917. Serial No. 196,088.

To all whom it may concern:

Be it known that we, HENRY A. WISE WOOD and JOHN A. ISBELL, citizens of the United States, said WOOD residing at New York, county and State of New York, said ISBELL residing at Middletown, in the county of Orange and State of New York, have invented a new and useful Pulsating-Fan Delivery, of which the following is a specification.

This invention relates to folding machines for delivering the product in separated or folded sheets and particularly to the class of folding machines usually used in connection with web printing presses.

The principal objects of the invention are to provide improved means for directing a multiplicity of folded sheets first in one direction and then a multiplicity of folded sheets in another direction, and means cooperating therewith for automatically assembling the two bundles of predetermined numbers of sheets in one pile with their folded edges facing in opposite directions.

Further objects and advantages of this invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which—

Figure 1 is a front elevation of a preferred embodiment of the invention;

Fig. 2 is a plan of part of an elevator used in connection with the delivery;

Fig. 3 is a detail end view of the pulsating fans;

Fig. 4 is a side elevation of one of said fans;

Fig. 5 is a detail of the softening arrangement for the fan operating cam;

Fig. 6 is an edge view of the fan operating cam;

Fig. 7 is a detail side view of one of the lowering arrangements;

Fig. 8 is a side view of mechanism for operating a disappearing stop;

Fig. 9 is a view of the driving arrangement for the cam shaft and traveling stacker;

Fig. 10 is an elevation of the stacker fingers;

Fig. 11 is a front view of an arrangement for keeping the fingers in a constant plane, and

Fig. 12 is a diagrammatic elevation showing the elevator and folder.

The machine is shown as comprising a frame 10 which supports the main driving shaft 11. Through gearing this shaft drives a gear 12 which in turn drives a gear 13, a folding cylinder 14 and a cutting cylinder 15. These parts can be arranged in any suitable way to deliver folded sheets between guides 16 and 17. The gear 12 drives a similar gear 12^a and all the mechanism hereinbefore and hereinafter described as being driven from the gear 12 is duplicated on the other side of the machine, preferably, and driven in the same way by the gear 12^a.

On the shaft with the gear 13 is a gear 18 driving a gear 19 and through that a gear 20. The gear 20 drives a gear 21 of the same size. The gears 20 and 21 are on two shafts 22 and 23 respectively, these shafts being similar and being hereinafter designated as the lower and upper fan shafts respectively. These two shafts rotate at the same speed in opposite directions. The shaft 22 is used for driving several of the mechanisms to be described hereinafter, and can be considered as an intermediate driving shaft.

Through two pairs of worm and spiral gears 24 the shaft 22 drives a cam shaft 25. On this shaft is located a grooved cam 26 which operates a roller 27 on an arm 28 projecting from an oscillating lever shaft 29. This shaft extends past the two shafts 22 and 23 and is provided with pairs of fingers 30 on opposite sides thereof. Each of these pairs of fingers engages between the flanges of a collar 31. One of these collars is located slidably on the shaft 22 and the other on the shaft 23. The two sets of fingers are so located that when one of these collars is moved to the right the other will be moved to the left. Each of these collars is provided with a preferably cylindrical extension 33 having angular teeth on its outer surface. It will be understood that while these members 31 and 33 are movable together along the shafts on which they are located, they are connected with them by a sliding spline in a groove 34 in each shaft so that they rotate with the shaft. Meshing with the angular teeth of the member 33 are a plurality of rotary toothed members 35 fixed on the ends of a corresponding series of shafts 36 journaled in members 37 fixed on the shafts 22 and 23 respectively. On

each of these shafts 36 are a series of fan blades 38.

From what has been said it will be seen that as the cam 26 revolves it gives a forward and backward lateral motion to the sleeves 31. Through the angular teeth thereon, the shaft 36 causes the fan blades on one of the shafts 22 or 23 to be extended while those on the other of these two shafts are withdrawn, these fan blades of course having simply an oscillating motion on the shafts 36. Therefore, the parts so far described are so designed that when a given number of sheets have been delivered through the lower fan on the shaft 22 the lower fan blades are withdrawn from the guides 16 and 17. The blades on the upper fan shaft 23 are simultaneously and automatically extended into the path of the sheets between these guides, and then a similar number of sheets having been delivered to the upper fan the reverse action takes place.

A cushioning device is shown in Fig. 5. An eccentric 39 on the cam shaft 25 has a strap 40 provided with an adjustable rod 41. On this is a double spring 42 between the two parts of which is swiveled the end of an arm 43. This arm is pivoted on a stud 44 and has another arm 45 entering a space between two lugs 46 on the oscillating lever shaft 29. When the roll 27 shifts in the cam groove the eccentric 39 has just been shifted so that one half of the spring 42 is under compression. This softens the shock given to the parts operated by the cam 26.

On the shaft 25 is located a lowering cam 47. On this cam work two rollers 48 and 49. One of these rollers is mounted on a pivoted lever 50, and connected by a link 51 with the bottom lowering arms 52. The top lowering arms 52^a are operated from the other roll similarly. The cam 47 is so designed that when the lower fan blades are withdrawn to the bottom lowering arms 52 are in position to receive the pile of folded sheets therefrom and to lower them to the full line position shown in Fig. 1. The same conditions prevail with the upper lowering arms as will appear hereinafter.

Also located on the shaft 25 is a stop cam 53 operating a roll 54 on a lever 55 connected by a link 56 with a lever 57 which in turn operates a stop 58 to withdraw it upwardly out of the way of the advancing bundles when they are removed from the lowering arms in a manner to be described hereinafter. Guide 17 has a fixed stop 59.

A shaft 60, on which the gearing 24 is located, extends downwardly and is provided with a gear 61 near the bottom of the frame which in turn operates a conveyer through gearing 62. This conveyer comprises two pairs of sprocket wheels 63 for an endless chain 64. The cross pieces 65 with which this double chain is provided have transverse (vertical) pushing arms 66. These are kept in vertical position by providing a pair of hubs 67 horizontally eccentric with respect to the sprocket wheels 63 and having teeth 68 thereon for an endless chain 69. This chain is connected by a horizontal link 70 with the chain 64. This link is made horizontal at all times by connecting it up in that way and making its length equal to the eccentricity of the hubs 67. In this way the chain 64 is kept always in the same relative position with respect to the chain 69, and the cross pieces 65 are also incapable of turning on their own axes as they travel in their orbit. In this way the arms 66 are kept in vertical position.

The operation from the point at which the bundles are delivered by the fan to the lowering arms 52 and 53 is as follows:—

First the lower arms 52 are lowered to a point just above the table guides and the upper arms 53 are raised. Then the pushing arms 66 push the bundle of folded sheets from the arms 52 on the table guides 71 and advance to the position 66^A.

When the pushing arms 66 reach the dotted line position indicated by 66^A an upper bundle is completed and the fan blades are reversed. Thus the sheets are redirected to the bottom lowering arms 52, and the stop 58 is made to rise out of the way of the advancing bundles so that the bundle resting on the upper lowering arms is delivered on top of the bundle on the lower lowering arms. Both are delivered together in reverse position on the fingers 72 of an elevator or stacker 73 as shown in Figs. 1, 2 and 12. This elevator as shown receives bundles of folded sheets in its alternate spaces, from two delivering mechanisms. Each set of fingers is loosely pivoted on a rod 74 and has a projection 75 normally engaging under a fixed stop 76 projecting from the rod. This holds the fingers horizontal until they pass over at the top and then limits their reversal.

It will be seen therefore, that a comparatively simple mechanism is provided for accomplishing these results and that it is of such a nature that it can be timed readily so that the several motions will take place in proper order and it is practically impossible to get it out of order in ordinary practice because all the motions are positive.

Certain matter disclosed, but not claimed herein, is claimed in our co-pending application, Serial No. 206,544, renewed Dec. 10, 1917.

Although we have illustrated and described only one embodiment of the invention we are aware of the fact that the same can be carried out in other forms, and that other details of construction can be employed to effect the various movements.

Therefore we do not wish to be limited to all the details of construction herein shown and described, but what we do claim is:—

1. In a delivery, the combination with guides, of a pair of oppositely rotatable pulsating fan deliveries, a set of lowering arms below each delivery, and means for simultaneously raising one lowering arm and lowering the other.

2. In a device of the character described, the combination of a pair of oppositely rotatable pulsating fan deliveries having blades, means for projecting the blades of one fan and retracting those of the other, a set of lowering arms under each of said fans, and means for raising each lowering arm when the blades of the fan above are projected and lowering it when they are being retracted.

3. In a device of the character described, the combination of a pair of rotatable pulsating fan deliveries having blades, means for projecting the blades of one fan and retracting those of the other, a set of lowering arms under each of said fans, means for raising and lowering said arms, and a carrier below said lowering arms having means for receiving a pile of sheets from said lowering arms.

4. In a device of the character described, the combination of a pair of rotatable pulsating fan deliveries having blades, means for alternately operating them, a set of lowering arms under each of said fans, one of said lowering arms being located in a lower plane than the other, and a carrier below said lowering arms having means for receiving a pile of sheets from said lowering arms.

5. In a delivery for folded sheets, the combination of a set of guides, a pair of rotary members having blades adapted to extend between said guides, means for rotating said rotary members in opposite directions, means for withdrawing the blades of one member from the guides and introducing the blades of the other member therein, means below each of said rotary members for receiving a pile of folded sheets therefrom, and a traveling carrier for receiving the sheets from one of said receiving members adapted to travel into position to receive the other set of sheets on top of the first sheets.

6. In a device of the character described, the combination of a pair of oppositely rotatable pulsating fan deliveries having blades, means for projecting the blades of one fan and retracting those of the other, a set of lowering arms under each of said fans, means for raising each lowering arm when the blades of the fan above are projected and lowering it when they are being retracted, one of said lowering arms being in a lower plane than the other, a carrier below said lowering arm having means movable therealong for first receiving the pile of sheets from the lower lowering arm and then moving them under the upper lowering arm for receiving the sheets thereon in reverse position.

7. In a device of the character described, the combination of a pair of alternately operable pulsating fan deliveries, a set of lowering arms under each of said fans, means for alternately raising and lowering each set of lowering arms, and means for first receiving a pile of sheets from one set of lowering arms and then receiving a pile of sheets thereon from the other set of lowering arms in reverse position and delivering said assembled pile of sheets.

8. In a device of the character described, the combination of a pair of alternately operable pulsating fan deliveries, a set of lowering arms under each of said fans, means for alternately raising and lowering each set of lowering arms, means for first receiving a pile of sheets from one set of lowering arms and then receiving a pile of sheets thereon from the other set of lowering arms in reverse position and delivering said assembled pile of sheets, and an elevator adapted to receive the bundles of sheets in alternate spaces thereof.

9. In a device of the character described, the combination of a pair of oppositely rotatable pulsating fan deliveries, a set of lowering arms under each of said fans, a movable stop for the sheets received by one set of lowering arms, means for carrying the sheets from the last named lowering arms when lowered, and means for removing the stop to permit the carrying means to operate.

10. In a delivery for folded sheets the combination of a set of guides, a pair of rotary members located on opposite sides of said guides having blades adapted to extend between said guides and arranged to receive and support sheets while between the guides, and means for rotating said rotary members to bring the blades into position for the sheets to slide off.

11. In a delivery for folded sheets, the combination of a pair of stationary guides adapted to guide sheets between them, a rotary member having blades extending therefrom for receiving sheets from the guides, and supporting them, and means for rotating said rotary member to first bring said blades into a position between the guides where they will receive a sheet and then to bring them to a position for the sheets to slide off.

12. In a sheet delivery, the combination with a set of guides, of a rotary fan for taking the sheets therefrom, said fan comprising a shaft and a plurality of blades rotatable with the shaft and movable with respect to the shaft, and means for withdrawing said blades into a position in which their path of travel does not intersect said guides.

13. In a sheet delivery, the combination with a set of guides, of a rotary fan for taking the sheets therefrom, said fan comprising a shaft and a plurality of blades rotatable with the shaft and pivoted with respect to the shaft on axes parallel therewith, and means for simultaneously withdrawing all of said blades into a position in which their path of travel does not intersect said guides.

14. In a delivery, the combination with guides, of a pair of parallel shafts, each having a set of blades pivotally connected therewith on axes parallel with the shafts, and means for swinging the blades inwardly or outwardly on their axes, whereby in one position they will pass between said guides and in another position will be withdrawn therefrom.

15. In a delivery, the combination of a rotary shaft, a pair of heads rotatable therewith, a plurality of shafts journaled in said heads and rotating therewith, blades fixed on each of said shafts, a longitudinally reciprocable member on each shaft, and means connected with said member for oscillating the last named shafts simultaneously to turn their blades in or out.

16. In a delivery, the combination of a rotary shaft, a plurality of shafts rotating therewith, blades fixed on each of said shafts, a reciprocable member on the first mentioned shaft, and means connected with said member for oscillating the last named shafts simultaneously to turn their blades in or out.

17. In a delivery, the combination of a rotatable shaft, a pair of heads carried thereby and rotatable therewith, a plurality of shafts oscillatably mounted on said heads and rotatable therewith, and means on the first shaft for oscillating the oscillatable shafts on their own axes, said means comprising a longitudinally movable member having angular teeth thereon concentric with said rotatable shaft, and a series of toothed members meshing therewith, one located on each of said oscillatable shafts, whereby the reciprocation of said member will turn said oscillatable shafts on their own axes.

18. In a delivery, the combination with guides, of a pair of shafts on opposite sides of the guides, oppositely rotatable series of blades carried by each of said shafts and movable toward and from the shafts on which they are located, an oscillatable shaft adjacent to the first named shafts, means for turning the oscillatable shaft, and means on the oscillatable shaft for moving said blades toward and from the shafts on which they are located.

19. In a delivery, the combination with guides, of a pair of shafts on opposite sides of the guides, oppositely rotatable series of blades carried by each of said shafts and movable toward and from the shafts on which they are located, an oscillatable shaft adjacent to the first named shafts, means for turning the oscillatable shaft, means on the oscillatable shaft for moving said blades toward and from the shafts on which they are located, and means for cushioning the motion of said oscillatable shaft.

20. In a machine of the class described, the combination of a pulsating fan delivery, an endless conveyer therebelow for receiving the sheets therefrom, said conveyer having pushing arms for engaging a pile of sheets removing them from the delivery and depositing them on the conveyer, and means for maintaining said pushing arms in vertical position.

21. In a machine of the character described, the combination with a delivery, of a series of table guides, a conveyer under said guides, pushing arms on said conveyer and movable therewith for moving the sheets from the delivery on the table guides and advancing them therealong, and means movable with said conveyer for holding said pushing arms perpendicular thereto, said means comprising an auxiliary endless chain connected with said pushing arms, and means for supporting the chain.

22. In a machine of the character described, the combination of an endless chain conveyer comprising sprocket wheels, a chain movable over the sprocket wheels, pushing arms on said chain, a second pair of sprocket wheels eccentrically mounted with respect to the first sprocket wheels, a chain on the second pair of sprocket wheels, and means for connecting said arms with the second chain at a point in advance of the arms a distance equal to the distance between the centers of the two sets of sprocket wheels.

23. In a machine for delivering sheets, the combination of a conveyer, pushing arms pivoted on said conveyer and movable therewith for forming a pile of sheets into a bundle thereon, and means movable with said conveyer for holding said pushing arms perpendicular thereto at all times, said means comprising an auxiliary endless chain connected with said pushing arms, and means for supporting the chain.

24. In a delivery, the combination of a shaft a series of blades carried by said shaft an oscillatable shaft adjacent to the first named shaft, means on the oscillatable shaft for moving said blades toward and from the shaft on which they are located, and means for cushioning the motion of said oscillatable shaft.

25. In a delivery, the combination of a shaft, a series of blades carried by said shaft and movable toward and from the shaft, an oscillatable shaft adjacent to the first named shaft, means for turning the oscillatable shaft, and means on the oscillatable shaft

for moving said blades toward and from the shaft on which they are located.

26. In a delivery, the combination of a rotatable shaft, a plurality of shafts oscillatably mounted on said shaft and rotatable therewith, a fan blade affixed to each of said plurality of shafts, and means for oscillating the oscillatable shafts, said means comprising a movable member having angular teeth thereon, and a series of toothed members meshing therewith, one located on each of said oscillatable shafts, whereby the reciprocation of said member will turn said oscillatable shafts on their own axes.

In testimony whereof we have hereunto set our hands, in the presence of two subscribing witnesses.

HENRY A. WISE WOOD.
JOHN A. ISBELL.

Witnesses:
BLODWEN W. JONES,
LILLIAN C. JONES.