No. 750,295. PATENTED JAN. 26, 1904.

C. B. MAXSON.

PAPER FEEDING MACHINE.

APPLICATION FILED APR. 7, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

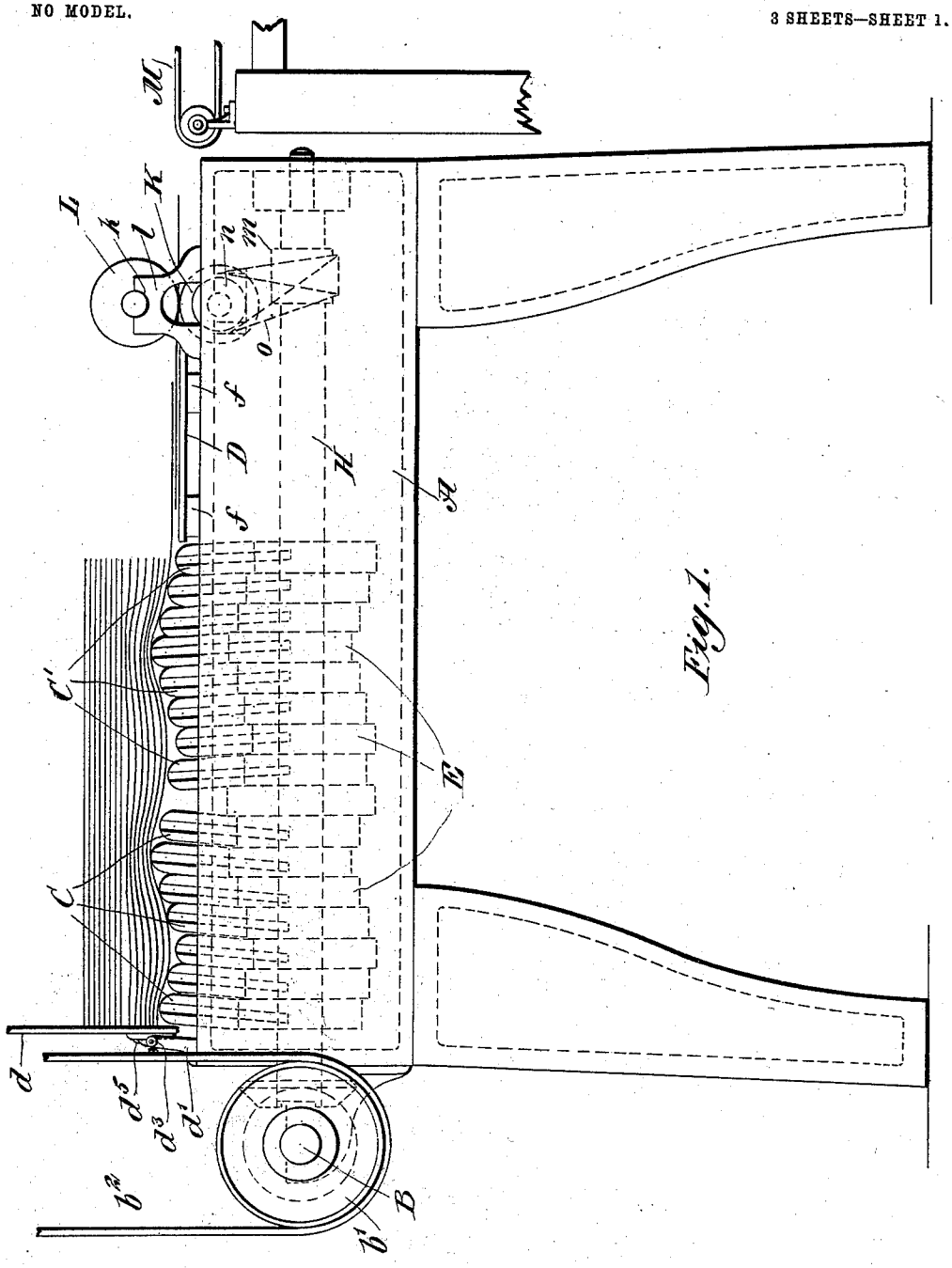


Fig. 1.

WITNESSES:

S. VanBrocklin

R. F. Sweeny.

INVENTOR:

Charles B. Maxson,

BY

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ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

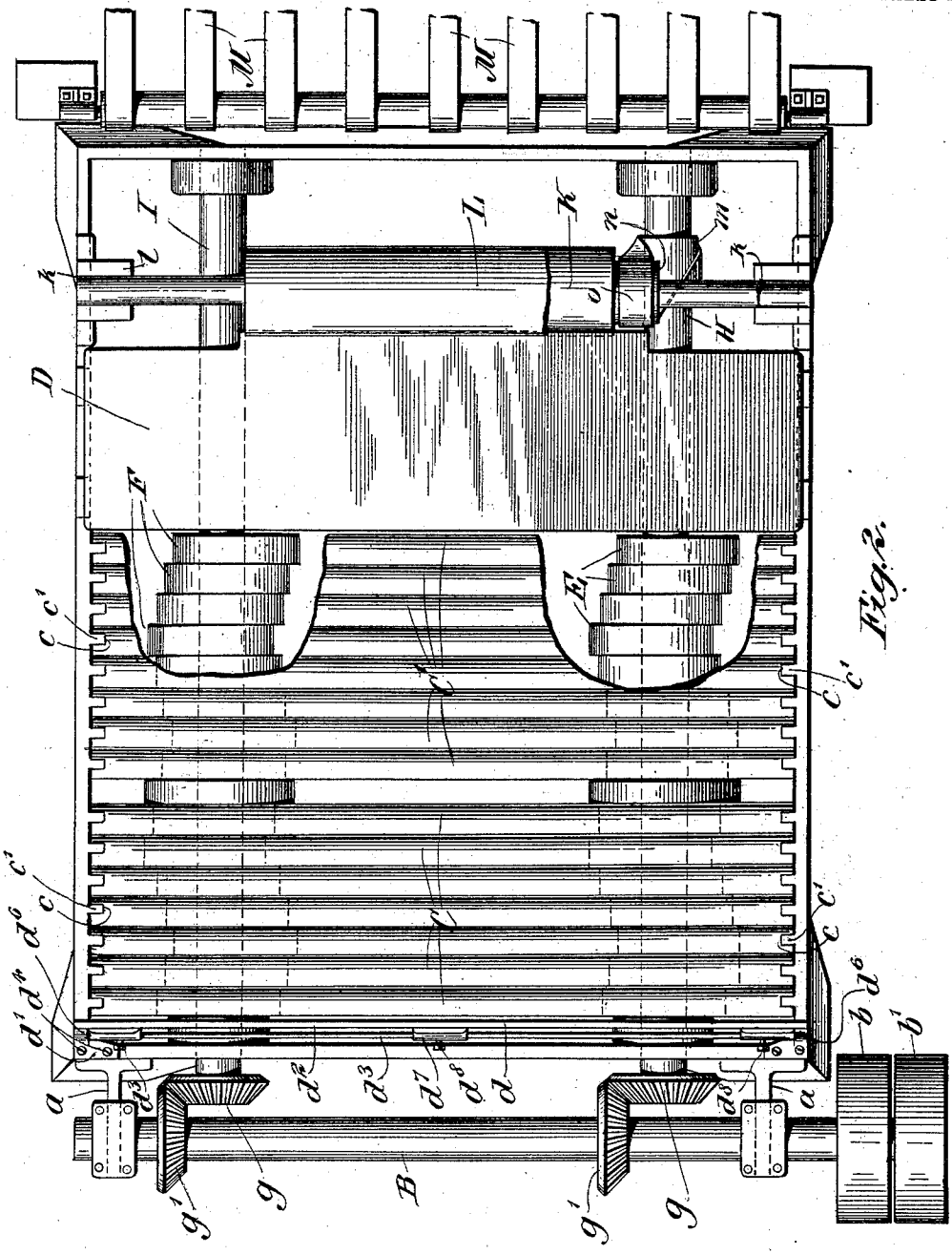


Fig. 2.

WITNESSES:
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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 4.

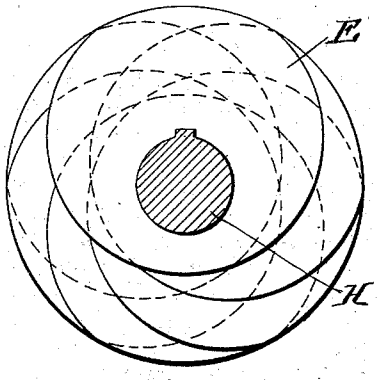


Fig. 3.

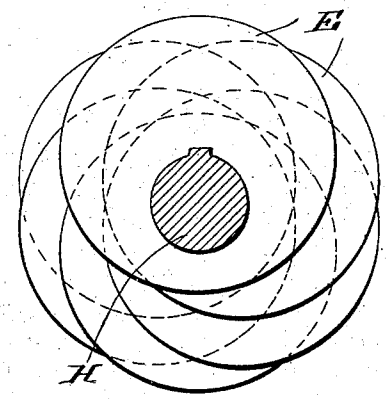
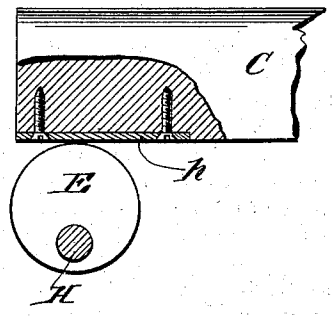


Fig. 5.



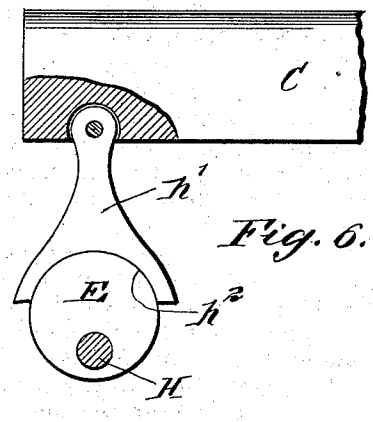


Fig. 6.

WITNESSES:

S. Van Brocklin.

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No. 750,295. Patented January 26, 1904.

UNITED STATES PATENT OFFICE.

CHARLES B. MAXSON, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO THE MAXSON PRINTING PRESS COMPANY, OF WESTERLY, RHODE ISLAND, A CORPORATION OF NEW JERSEY.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 750,295, dated January 26, 1904.

Application filed April 7, 1903. Serial No. 151,474. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. MAXSON, a citizen of the United States, and a resident of Westerly, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

My invention relates to that class of machines which are employed to select successive sheets of paper or other material from a pile or mass and feed them forward sheet by sheet to a ruling or other appropriate machine for subsequent treatment therein.

In Letters Patent of the United States No. 690,167, dated December 31, 1901, I have shown and described a machine of this class in which the selection and forward translation of the successive sheets are effected by imparting to the pile or mass from which the sheets are supplied a succession of progressively-traveling wave-like pressures from its rear to its front or place of discharge through the intervention of a series of bars, which, extending across the pile or mass from one edge thereof to the other, are successively and progressively moved toward and away from the pile or mass from one end of the series to the other by appropriate cam mechanism. In one form of the mechanism thus shown and described in the Letters Patent aforesaid the movements of these bars toward and away from the pile or mass from which the successive sheets are to be selected and moved forward toward the discharging end of the machine are in planes perpendicular to the surface thereof, while in another form of the mechanism shown and described therein the movements of these bars toward and away from the pile or mass are in planes that are more or less inclined in the direction toward which the successive sheets after having been selected are moved or fed. These two forms of mechanism, while efficient to an eminent degree when employed in connection with most kinds of material, are found more or less defective when employed in connection with sheets of material that are extremely thin and possessed of little or no stiffness, principally because of the fact that the pile or mass in being repeatedly acted upon by the approaching and receding bars is frequently carried forward against the vertical restraining-wall at the front edge thereof with such pressure that when moved vertically in contact therewith by the action of these bars the front edges of the sheets that are in close proximity to those which are being discharged are bent upward or downward against its inner face, and instead of being moved outward across this wall when selected and fed forward these sheets are folded up against its inner face, thereby frequently clogging the machine, and this is particularly the case when the planes of movement of the different bars toward and away from the pile or mass being operated upon are inclined in the direction toward which the successive sheets are to be fed.

The object of my invention is therefore to obviate this defect and produce a machine in which the selection and feeding forward of successive sheets of paper or other material from a pile or mass may be efficiently effected, and this, too, whether the sheets are thick or thin or stiff or sleazy.

To these ends the invention consists, first, in the peculiar arrangement and operation of the bars whereby not only are the successive sheets of paper or other material selected one after another from a pile or mass and fed forward and delivered in that order, but the pile or mass from which they are selected restrained from moving forward with them as well; second, in a series of bars divided into a plurality of groups and in mechanism for raising these bars one after another progressively from one end of the series to the other and inclining the movements of the bars of one group forward to one angle with respect to the horizon and the movements of bars of the other group backward to another angle with respect thereto, and, third, in various other features of construction and arrangement, all as will hereinafter more fully appear.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of a paper-feeding machine constructed in accordance with my in-

vention, showing also in like elevation a portion of a paper-ruling machine of ordinary or other construction; Fig. 2, a plan view of the same with certain parts of the feeding-machine broken away for purposes of illustration; Fig. 3, a transverse section of one of the feed-bar-operating cam-shafts, with a series of one of the forms of cams that may be employed for operating the feed-bars shown in side elevation; Fig. 4, a similar transverse section of one of the feed-bar-operating shafts, with a series of cams of a slightly-modified form also shown in side elevation; Fig. 5, a detail front elevation of a portion of one of the feeding-bars and its operating-cams detached, showing one form of shoe against which the cam may operate applied in connection therewith, parts being broken away; and Fig. 6, a similar front elevation of these parts detached, but showing a shoe of a slightly-modified construction, parts being likewise broken away.

In all the figures like letters of reference are employed to designate corresponding parts.

A indicates the main frame or housing of the machine, which is or may be constructed of any approved form, and B indicates the main driving-shaft, which is rotatively mounted thereon through the intervention of suitable hangers *a* and is provided at one of its ends with appropriate fast and loose pulleys *b* and *b'*, through the former of which and a suitable belt b^2 power may be communicated to the machine from any convenient source.

C and C' indicate the bars upon which the paper or other material is supported and the individual sheets thereof successively selected and fed forward for delivery to the ruling or other machine. These bars instead of being arranged in a continuous and unbroken series throughout are divided into groups, of which the rearmost portion C constitute one group and the foremost portion C' the other. As thus disposed, the bars of each group are arranged side by side in close relationship to one another, and in the form selected for purposes of illustration they are preferably constructed of a length to extend across the interior of the rear end portion of the frame or housing A from the inner face of one of its side walls to the inner face of the other, with their upper edges which contact with the paper or other material rounded and the opposite ends of each provided with grooves *c*, that are adapted to slide upwardly and downwardly upon correspondingly-shaped guides *c'*, extending inwardly from the inner faces of the respective side walls of the frame or housing adjacent to them. The groups of bars being thus constructed and arranged receive the paper or other material, which is deposited upon them in bulk from time to time, as may be required, and as thus supplied the selection of the successive sheets thereof and the feeding of them forward for delivery to the ruling or other machine are effected by simply imparting up-and-down movements to such bars in progressive sequence from the rear to the front bar thereof, the effect of which is to communicate to the under surface of the paper or other material resting upon them a succession of wave-like rising-and-lowering movements which travel progressively from the rear to the front edge thereof. As thus acted upon by the bars C and C' the successive sheets of paper or other material from the under surface of the mass or pile will be separated from those above and moved forward one after another toward the front or delivery end of the machine, each up-and-down movement of the extreme rear bar of the group C separating a new sheet from those above and initiating its forward travel, while the up-and-down movements of the remaining bars in progressive sequence from the rear to the front move forward one after another toward the front or delivery end of the machine the successive sheets that have been separated from those above and started forward on their travel by the rear bar of the group C, as above explained. The successive sheets thus fed forward by the bars C and C' follow one another with only a short distance between their respective forward ends, and in order to prevent the pile or mass from moving forward with them as they are thus fed forward the up-and-down movements of the bars C and C' instead of being in vertical lines are more or less inclined with respect to the horizon, those of the bars of the group C inclining slightly forward in the direction toward which the successive sheets are fed, while those of the bars of the group C' are inclined slightly backward in an opposite direction. By this arrangement whatever tendency is imparted to the pile or mass to move forward with the successive sheets as they are selected out and moved forward by the bars of the group C is neutralized and the pile or mass forced backward by the bars of the group C', which in practice are more numerous than those of the group C, and which in thus acting upon the pile or mass to force it backward allow and aid in the feeding forward of the sheets that are selected by the bars of the group C and started forward on their travel by them.

To provide for imparting a forward inclination to the movements of the bars of the group C and a backward inclination to the movements of the bars of the group C', the guides *c'*, upon which the ends of these respective bars are fitted to slide, are inclined forward and backward with respect to the horizon, as the requirements of their respective bars demand, while in order to limit the backward movement of the pile or mass by the action of the bars of the group C' and serve as a stop therefor the upwardly-extending vertical wall or abutment *d* is employed.

This wall or abutment is preferably located in rear of the group of bars C, and in that position it is supported upon the frame or housing A through the intervention of brackets d', clips d^2, and a rod d^3. Of these the brackets d' are secured to the frame or housing A by suitable screws d^4, while the clips d^3 are in like manner secured to the wall or abutment d by appropriate screws d^5, and as thus secured in place they are connected by the rod d^3, which extends through sleeves d^6 and d^7, with which the brackets and clips are respectively provided, and has these sleeves rigidly clamped to it by clamping-screws d^8.

While the backward movement of the pile or mass upon the bars is thus prevented by the wall or abutment d, the forward travel of the successive sheets selected therefrom in the opposite direction is unimpeded, and in order to support them in their onward travel after once initiated I make use of the table D, which extends horizontally across the top of the frame or housing A and is supported thereon by stands f, which, secured to the under side of the former, rest at their lower ends upon the latter, as shown.

For imparting the required upward-and-downward movement to the groups of bars C and C′ various means may be employed. In the form of the invention illustrated in the drawings, however, the upward movement is imparted to these bars by cams E and F and their downward movement by gravity. When this arrangement is adopted, these cams may be constructed in eccentric form, as shown in Fig. 3. I prefer, however, to construct them in eccentric form with the portion of the periphery of each that is located at the greatest distance from its axis of rotation flattened into a curve that is drawn from that axis, as shown in Fig. 4, whereby as its respective bar is raised to its highest limit it will be held in that position and not start on its descent until the next succeeding bar has been brought to the same limit of its movement, and so on throughout the bars of the different groups that may be employed, each bar being held at the highest limit of movement until the next succeeding bar is brought to the same elevation before beginning its descent. With either of these constructions employed the cams are respectively secured to shafts H and I, which, being disposed beneath such bars near the respective opposite ends thereof, are mounted in suitable bearings formed in or secured to the front and rear ends of the frame or housing A and are severally connected with the driving-shaft B through the intervention of appropriate bevel-gears g and g', whereby to be rotated in unison. As thus disposed the bars C and C′ severally rest upon their respective cams, which in each series are equal in number to that of the bars, and in order that the required upward-and-downward movements may be imparted to them in a progressive sequence from the rear to the front of the series and their opposite ends moved in unison the series of cams E and F are so disposed upon their respective supporting-shafts as to bring the points of least eccentricity of the successive individual members of each into a spiral line extending around its appropriate shaft from one end of the series to the other, as well as into corresponding relationship with respect to those of the coöperating fellow cams of the other.

With the cams constructed and arranged as above described the raising and lowering of the series of bars are effected in the required order by simply rotating the shafts H and I through the main shaft B, when the successive bars are carried upward by the action of their respective cams and downward by the action of gravity.

In some instances the cams E and F may act upon the bars of the different groups through the intervention of shoes h, fixedly secured to the under edges of these bars, near the ends thereof, as shown in Fig. 5, while in others they may act upon them through the intermediary of shoes h', which, pivoted at their upper ends in suitable seats formed in the under edges of the bars near their opposite ends, are themselves provided in their lower ends with curved recessed seats h^2, which embrace and rest upon their respective cams, as shown in Fig. 6, and either of these forms of shoes may be adopted as may be preferred and the machine operate with equal efficiency.

The means by which the successive sheets of paper or other material are fed forward by the bars C and C′ over the table D and are delivered to the ruling or other machine preferably consists of the rolls K and L, which are disposed near the front end of such table, with the under roll K journaled at its ends in suitable bearings i, formed on or secured to the inner faces of the side walls of the frame or housing A, and the roll L resting thereon and journaled at its ends in similar bearings k, formed in the stands l, that are secured to the upper edge of such frame or housing, as shown. As thus disposed the bite of these rolls is brought substantially into line with the upper surface of the table D, whereby as the successive sheets are fed forward over the latter they will be forced into the former and be carried through between the rolls when these rolls are rotated. For imparting the required rotation to these rolls various expedients may be adopted. Of these the one I have found the most convenient consists of the pulleys m and n, which are respectively secured to the shaft H and to one of the journals of the under roll K and are connected by a quarter-turn belt o. By this arrangement the under roll is positively rotated and communicates the required rotation to the upper roll by the friction between them.

In order to insure of the proper friction

being imparted by the rolls to the sheets of paper or other material to carry the latter through between them when carried or otherwise fed into their bite, it may sometimes be found desirable to force these rolls together by spring-pressure. In the construction illustrated in the drawings, however, they are held in the required frictional contact by the action of gravity, to which end the upper roll is preferably constructed of metal and of the proper size to afford the required pressure.

With the rolls rotated and held in contact, as above explained, the sheets of paper or other material successively fed forward over the table D by the upwardly and downwardly moving bars C and C′ and forced into their bite will be carried through between them and delivered upon the moving tapes M of the machine, arranged in front to be carried forward by these tapes and successively acted upon by the operating mechanism appropriate to that machine. The machine thus arranged in front of these delivery-rolls K and L may be a ruling-machine, a printing-press, a package-wrapping machine, or other appropriate mechanism. The portion of the machine depicted in the drawings, however, as disposed in that relationship is of an ordinary paper-ruling machine and while forming no part of my present invention is shown in the drawings merely for the purpose of illustration.

In the above description I have referred to the opposite ends of the machine and of certain of its parts as being the "rear" end and the "front" end. Wherever, therefore, these terms appear herein it is to be understood that by "rear" end is meant the end where the paper or other material is supplied to the machine and as shown at the left in Figs. 1 and 2 and that by "front" end is meant the end where the delivery of the successive sheets to the ruling or other machine is effected, as shown at the right in those figures.

As thus set forth it will be seen that I produce a paper-feeding machine which while simple in construction and not liable to a disarrangement of its parts accomplishes the efficient feeding of the sheets of paper or other material upon which it may be called to operate successively forward one after another in consecutive sequence, as well as the delivery of the same to a ruling or other machine in that order, without the employment of rolls or other devices that move or travel along their surfaces, while at the same time avoiding the necessity of employing an upwardly-extending vertical wall or abutment at the front of the pile or mass, and thereby allowing of the feeding of the thinnest and most sleazy sheets of the material forward and delivery to the ruling or other machine.

While the form of mechanism above described is the one I prefer to employ in practice, it is to be distinctly understood that I do not restrict myself thereto, as it is obvious that modification of the same may be made and still be within the scope of my invention.

Having described my invention and specified certain of the ways in which it is or may be carried into effect, I claim and desire to secure by Letters Patent of the United States—

1. The combination, with the supporting and feeding bars of a feeding-machine divided into a plurality of groups, of mechanism for imparting an up-and-down movement to said bars progressively from one end of the row to the other and inclining the movement of the bars of the alternative groups in opposite directions, substantially as described.

2. The combination, with the supporting and feeding bars of a feeding-machine comprising a front and a rear group, of which the bars of the former group are more numerous than those of the latter group, and an upwardly-extending vertical wall or abutment arranged in rear of the rear group, of mechanism for imparting an up-and-down forwardly-inclined movement to the bars of the rear group and an up-and-down rearwardly-inclined movement to the bars of the front group, progressively from the extreme end of one group to the opposite extreme end of the other, substantially as described.

3. The combination, with the supporting and feeding bars of a feeding-machine comprising a front and a rear group, of which the bars of the former group are more numerous than those of the latter group, an upwardly-extending vertical wall or abutment, and delivery-rolls, of mechanism for rotating such rolls and imparting an up-and-down forwardly-inclined movement to the bars of the rear group and an up-and-down backwardly-inclined movement to the bars of the front group, progressively from the rear of the rear group to the front of the front group, substantially as described.

4. The combination, with the main frame of a paper-feeding machine, and a series of supporting and feeding bars arranged side by side and adapted to move up and down independently of one another in said main frame, of cams by which these supporting and feeding bars are operated, and shoes interposed between these bars and their respective cams, substantially as described.

5. The combination, with the supporting and feeding bars of a feeding-machine, and the cams by which they are operated, of shoes pivoted to such bars and engaging with said cams, whereby the operation of the bars is effected from the cams through said shoes, substantially as described.

In testimony whereof I have hereunto set my hand this 3d day of April, 1903.

CHARLES B. MAXSON.

Witnesses:
GEO. H. UTTER,
JOHN HISCOX.