

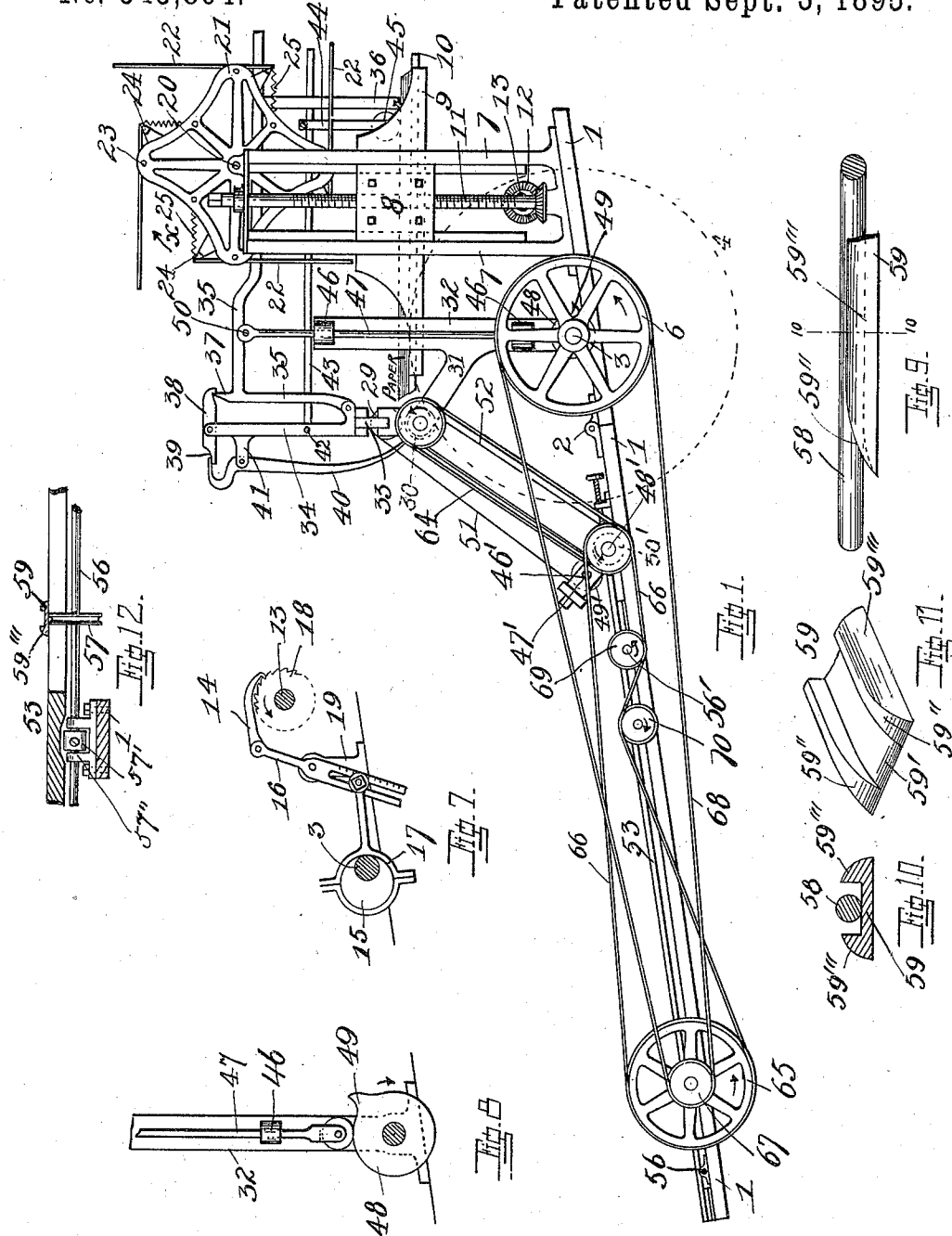
(No Model.)

3 Sheets—Sheet 1.

L. C. HOPKINS.
PAPER FEEDING MACHINE.

No. 545,864.

Patented Sept. 3, 1895.



Witnesses
C. F. Hayden

Harold L. Keith

Linton C. Hopkins Inventor

By Attorney

A. Woodson

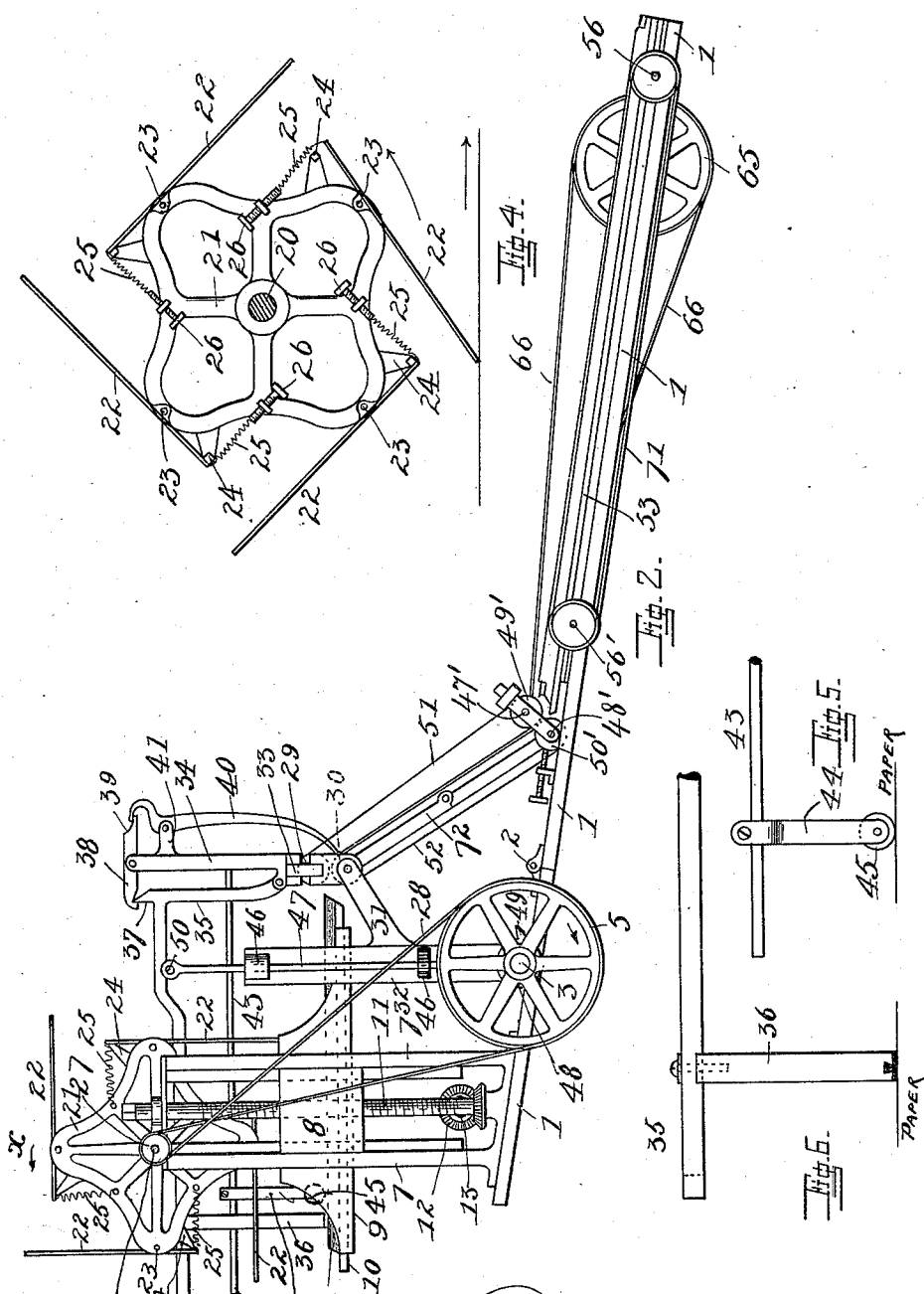
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3 Sheets—Sheet 2.

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L. F. Hayden.

Hardie L. Kirk.

Inventor
Linton C. Hopkins.
By Attorneys
A. Woodson.

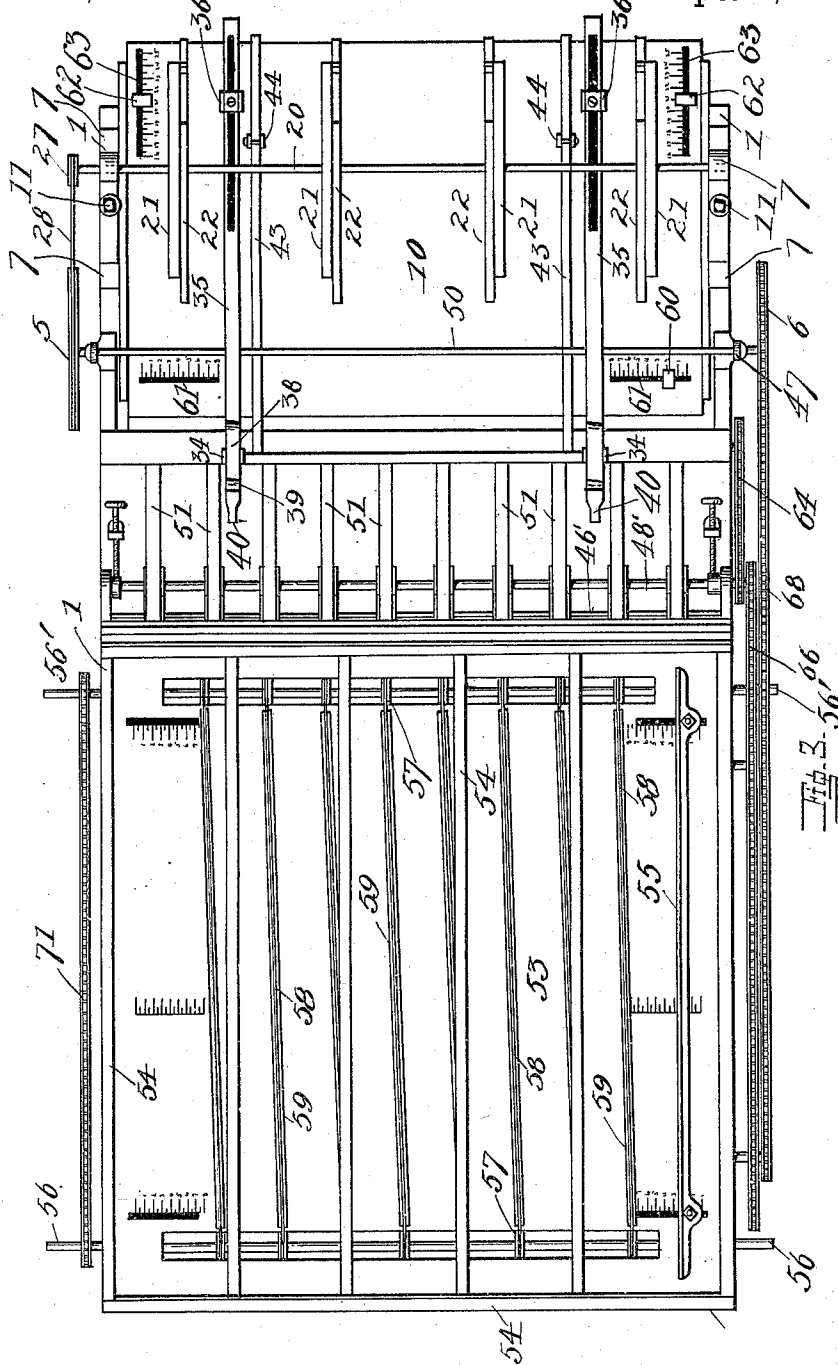
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3 Sheets—Sheet 3.

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PAPER FEEDING MACHINE.

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Witnesses
L. F. Hayden
Hardie L. Keith

Linton C Hopkins Inventor
By Attorney
Ad. Woodson

UNITED STATES PATENT OFFICE.

LINTON C. HOPKINS, OF ATLANTA, GEORGIA.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 545,864, dated September 3, 1895.

Application filed November 24, 1894. Serial No. 529,838. (No model.)

To all whom it may concern:

Be it known that I, LINTON C. HOPKINS, a citizen of the United States, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Sheet-Feeders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form part of this specification.

The invention has for its object the feeding of sheets of paper to a press, folder, or other device a single sheet at a time and at a predetermined rate, the details of the device wherein these ends are accomplished being hereinafter specified.

In the accompanying drawings, Figure 1 is a side elevation of the device. Fig. 2 is an elevation of the other side thereof. Fig. 3 is a plan of the device, showing the arrangement of the paper-table, guides, and stops thereon, the side-shift table, and, rudimentarily, the inclining tapes. Fig. 4 is a side elevation of the sheet-separating and initial feeding-wheel. Fig. 5 shows the wheel employed for increasing adjustably the friction between the sheets. Fig. 6 is a detail of the sheet-stop. Fig. 7 is a detail of the means for raising the paper-table. Fig. 8 shows the cam and piston whereby the sheet-stop is intermittently elevated. Fig. 9 is a side elevation of one end of the tape-shield, with a portion of the tape shown; and Fig. 10 is a section thereof on the line 10 10, Fig. 8. Fig. 11 is a perspective view of a portion of the end of said tape-shield, showing the peculiar form of said end. Fig. 12 is a detail showing the adjustability and manner of mounting the shafts under the feed-table.

Like reference-marks are used to designate corresponding parts in all the views.

1 is a base, which may either fit the press-frame or be part of a separate frame wholly for the feeder and is jointed by hinge 2.

3 is the main shaft, which is journaled on said base, 4 being the main driving-pulley and 5 and 6 being, respectively, for driving

the sheet-separating wheels and the feed-rollers.

Standards 7 rise from the base 1 and are provided with suitable guideways for the blocks 8, between which is secured the table 9, having a movable false bottom 10, which slides to and from the take-off rollers and upon which is placed the pile of paper to be fed from. Each of said blocks 8 is provided with an adjusting-screw 11, same being mounted parallel with the plane of movement of said block and being driven by bevel-gears thereon meshing with the gears 12 on the shaft 13, which shaft is journaled on the frame and carries intermediately a ratchet-wheel 18, which is engaged by a pawl 14, reciprocated by the eccentric 15 on the main shaft 3.

In order to accommodate the device to different weights of paper, it being desirable to keep constant the position of the upper side of the pile of paper being fed from, the reciprocation of the pawl 14 is made adjustable, and, as shown in Fig. 7, this may be very desirably done by the intervention of a pivoted rocking lever 16, which is bifurcated at its lower end, and a block arranged to slide therein, to which is secured the pitman portion of the eccentric-strap 17.

A bracket 19, secured to the frame 1, serves to pivot the rocking lever. The lower end of said lever may be so graduated that the adjustment to feed paper a given number of thousandths of an inch thick will be plain at a glance.

A shaft 20 is journaled on the upper ends of the uprights 7 and carries a separating-wheel 21, of which as many as desired may be used. This wheel is best shown in Fig. 4, and consists of a web, whereon are pivoted fingers 22, which are best if slightly resilient themselves. Pins 23 serve to pivot same, and lugs 24 serve to hold said fingers substantially tangential and limit the movement of the ends thereof, which contact with the sheets, said ends being forced outwardly by pullingsprings 25, which should be adjustable as to tension, and are so shown in the drawings, screws 26 serving this end. The springs and pivotal mounting of these fingers are preferred, inasmuch as if the natural resilience of said fingers was relied on solely to allow the

side thereof to be drawn over the sheet it would not be durable and could not be adequately adjustable. This wheel is revolved by means of a pulley 27, Fig. 2, on the shaft 20 and a belt 28 between said pulley 27 and the pulley 5 on the main shaft. As the wheel or wheels 21 revolve in the direction of the arrow α , Figs. 1, 2, and 4, the ends of the fingers 22 are drawn across the paper in the direction of the take-up rollers 29 and 30, which are journaled on arms 31 of the uprights 32, secured to and projecting upwardly from the base 1 on each side of the machine.

A bar 33 is secured to and extends between the upper end of the arms 31, and to this bar 33 is secured one or more uprights 34. Near the bottom of the uprights 34 are pivoted levers 35, which extend across the table 10 and carry downwardly-projecting arms 36, which are each shod on its lower end with material adapted to increase its frictional contact with the paper—such as, for example, soft rubber—and which arms are adjustable longitudinally of the corresponding one of the levers 35, so that each can be easily set to stand on the paper near its edge distal from the take-up rollers. On the back end of each of said levers, near its pivotal point, is an upwardly-projecting lug 37, and pivoted so as to tilt in the upper end of each of the uprights 34 is a lever 38, which is provided with a lip adapted to engage the upper end of the lug 37 and hold same, whereby the lever 35 is held elevated from contact with the paper. On the back end of each lever 38 is a cam-surface 39, and a finger 40, of light material, pivoted on an extension 41 of each upright 34, contacts with said cam-surface 39, its other end being extended to near the rollers 29 and 30 into such a position as to be struck and caused to swing forward by the paper issuing from between said rollers.

Carried in guides 46 on the uprights 32 are rods 47, and on the shaft 3 are wheels 48, having each a lug 49 on its periphery, so that as the shaft 3 revolves, and once in each revolution thereof, the rods 47 will be moved vertically in their guides. To the top ends of these rods 47 is a bar 50, which rests under the levers 35, and as the rods are elevated so are the levers 35, and the lug 37 on each is engaged by the lever 38, which holds its lever 35 raised until a sheet of paper contacts with the corresponding finger 40.

A cross-bar 42 is pivotally secured between the uprights 34, and arms 43 extend from same across the paper. On the said arms 43 are downwardly-projecting arms 44, and rollers 45 are journaled in the lower ends thereof and rest on the paper, thereby increasing in proportion to the pressure applied the frictional contact of the separate sheets of paper in the pile, and thus adjusting the feed by resisting the action of the fingers 22 toward drawing the paper sheet by sheet to the take-up rollers.

Journaled on blocks 46' on the frame 1, below the hinge 2, are shafts 47' and 48', carry-

ing rollers 49' and 50', bands 51 and 52 running thereon and on the rollers 29 and 30, respectively, and between which the paper is carried by the revolution of said rollers to the table 53, over which is suspended a grid 54, (for which latter, especially, see Fig. 3,) and whereon is a side guide 55, reversible to either side of the said table, and to which the paper should be directed no matter in what position it reaches this table.

Suitably journaled on the underside of the table 53 are shafts 56 and 56', which have thereon sheave-pulleys 57. These shafts are adjustable longitudinally in their bearings by loosening the collar 57' thereon and moving the shaft through its journal 57'', so that one or both may be moved and alter the angle at which the round tapes 58, which run in the grooves of the pulleys 57, lie to the side guide 55. This longitudinal adjustment of the shafts is sufficient to reverse the angle of said tapes to said guide to allow the guide to be fed to regardless of which side of the table 53 it is on. Tape-guards 59 lie loosely upon the upper side of the table 53, extending between the pulleys 57, and the tapes 58 run in grooves in the upper side of same, the ends of said guards being rounded at 59' to prevent abrasion of the tapes. The upwardly-projecting flanges on the edges of the guards also are rounded at 59'', as are also the edges 59''', and brought thereby to a thin edge, so that the edge of the paper will not be engaged thereby and its motion stopped or impeded. It is obvious that the paper cannot pass under said tapes by any possibility with the tapes in the guards and that all of that portion of the surface of the said tapes necessary to drive the paper forward projects above said guard.

A guide 60 is set in a slot 61 in the false bottom 10, and said bottom is marked with graduations near the said slot, as is also the table 53 near the side guide, so that the pile of paper on the false bottom 10 may be properly placed and the guide set to feed the paper on to the make-up of the press, so as to properly register with the form. The guide 60 should be set, say, one-half inch closer the center of the machine than is the side guide in order that should the sheet accidentally be fed onto the table 53 out of parallel with said guide the tapes will have a short distance in which to move it in righting it.

A stop 62, set in a slot 63 in the false bottom, provides for the proper placing of the paper relative to the rollers 29 and 30 and the paper-stop 36. The stops 60 and 62 are reversible to the other side of the false bottom when desired.

The shafts carrying the rollers 30 and 50' are belted together by belt 64, and, as seen in Figs. 1 and 3, the latter shaft is belted to the intermediate pulley 65 by belt 66, which has on its side a smaller pulley 67, which is driven by belt 68 from the pulley 6 on the main shaft 3. The belt 66 passes under the pulley 69 on the tape-carrying shaft 56', and then

over a deflector-pulley 70. The shafts 56 and 56' are belted together by belt 71, as seen in Figs. 2 and 3, whereby the shaft 56 is driven. The manner of belting may obviously be altered at will, as it is only necessary to drive the various elements in the proper directions.

Fig. 2 shows a toggle-joint 72, which may be employed, if desired, to hold the lever end of the frame 1 down and in place, said lever in the construction shown being extended between the shafts of the pulleys 30 and 50. When these two levers are straightened, they will not bend except by a downward pressure at the pivotal point, and will hence hold the lower end of the frame 1 down.

The operation of this device is as follows: The guides 55, 60, and 62 are set, the first so that the paper will be fed to the impression-cylinder of the press or to the desired part of the folder or other machine to be fed by this device, the second, so that the paper will be delivered to the rollers 29 and 30 in such a position as to fall upon the table 53 and be paralleled by the side guide 55, and the latter so that the paper will be set and held in a position proper to be fed from, as dictated by the experience and desire of the operator. The false bottom 10 is then moved on the table 9 to the desired position and the arm 36 moved along the lever 35 to a position where it will, when falling, miss the sheet being moved forward by the take-up rollers 29 and 30. The arm 44 may then be adjusted upon its lever 43, although it is only necessary that this adjustment be approximate, as the result is the same when said arm is anywhere within a wide range. An adjustment of the pawl 14 in its movement to partially revolve the ratchet-wheel 18 is then made, the said adjustment being made by the micrometer or other measurement of the thickness of the paper and the scale graduated on the lever 16. If desired, a wheel 18 of finer or coarser pitch may be substituted, and it is thus evident that the range of adjustment of the intermittent elevation of the table 9 is very great and may be made to suit any thickness of paper. The machine is then started running and the table 9 elevated manually by the screws 11 to bring said table into operative position, whereupon the wheels 21 deliver the paper by separating the sheets and working them forward at the proper speed in number delivered per minute. The operation of the ratchet 14, owing to its nicety of adjustment, will then keep the said table moving upwardly in a degree of speed commensurate with the removal of the paper from the top of the pile. The lever 35, and consequently its arm 36, is elevated from contact with the paper. A sheet passes between the rollers 29 and 30, carried by the tapes 51 and 52, which by friction and their intimate contact therewith keeps its edge drawn taut. The edge contacts with the triggers 40, which, being of light material and having their fulcrums near the resistance, are easily moved outwardly, which causes their

upper ends to pass along or ascend the cam-surfaces 39 on the levers 38 and causes a disengagement of the lever 38 and lug 37 by tilting the former, which allows the arms 35 to descend and bring the arms 36 into contact with the edge of the sheet being uncovered by the progression of the sheet being carried forward by the tapes and holds it securely against any forward movement, excepting a slight one which acts to separate the sheets and facilitate their delivery, until the cam 48 is again revolved and brings the horn 49 to contact with the lower end of the rods 47 and again elevates the arm 36 and causes, or, rather, allows, the engagement of the lever 38 and lug 37, when the then top sheet will be delivered to the tapes 51 and 52. If for any reason whatever one side of the paper is being fed forward even the least faster than the other, the weight on the lever 43 on that side may be increased, which will immediately find its effect in a proper feeding on that side as compared with the opposite side. This may also be accomplished when the irregular feeding is traced to the wheels 21 by altering the tension of the spring 25 which seems incor- rectly adjusted. When the paper is delivered from between the rollers 49 and 50 upon the table 53, under the grid 54, it falls upon the forwardly-running tapes 58, where its forward movement is continued, and, also, owing to the angularity of the position of the tapes to the side guide and to the general direction of the forward movement of the paper, a slight diagonal movement of the sheet toward the said side guide is produced, which will square it to said guide and also bring it and keep it in contact therewith until it stops against the press-pins to be taken by the grippers on the impression-cylinder.

When it is desired to feed to a side guide on the other side of the table 53, either or both of the shafts 56 and 56' are moved longitudinally until the angular position of the tapes is reversed to the desired position and extent and the stop 60 set on the corresponding side of the false bottom 10, and the device is ready to print the other side of the paper by working the same edge of the paper to the guide. Obviously any of the tapes 58 which may be in the way or unnecessary may be removed from their pulleys and the guide 59 corresponding be also removed, which will lower the said tape to a position out of the way of contact with the paper.

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

1. In a sheet-feeder, a paper-separating wheel consisting of a web, fingers pivoted near their one end thereon and extending substantially tangentially, lugs whereon their inner ends may rest, pulling-springs secured to said inner ends and to the web, and means for adjusting said springs.

2. In a sheet-feeder, a paper-table, means for feeding off the top sheet therefrom, and

an arm suspended over the back edge of the paper and adapted to contact with the paper, mechanism whereby same is elevated just before the initial movement of the top sheet, caught when elevated, and released after the initial movement of said top sheet, said means for catching and releasing consisting of a trip-lever adapted to engage said arm when same is elevated, a trigger lying across the line of movement of the paper and adapted to engage said trip-lever when same is in engagement with the said arm.

3. In a sheet-feeder, a paper-table, means for separating and feeding sheets therefrom, sheet carrying mechanism, an upright secured to the frame, a lever pivoted thereto and extending to near the back edge of the paper-table and adapted to contact with the paper thereon, means for lifting said lever, a lug on said lever, a tilting lever pivoted on said upright having a notch to engage said lug a cam-surface thereon, a lever having its long arm extending into a position to be struck and moved by the moving sheet and pivoted so that, in moving, its opposite end traverses the

said cam-surface in opposition thereto and thereby actuates the said tilting-lever, substantially as and for the purpose specified.

4. In a sheet-feeder, a feed-table, tapes mounted so as to run their forwardly running halves above said table, and tape guards consisting of longitudinally channeled bars each having its side flanges rounded to a thin edge on top and its ends beveled on top, said tape guards being placed under said tapes upon the table, for the purpose specified.

5. In a sheet-feeder, a table having transverse slots therein, laterally adjustable sheaves mounted so as to revolve in said slots, tapes carried on said sheaves and channeled bars laid on said table under said tapes so as to be freely movable laterally thereon, and means for delivering sheets of paper on said tapes, substantially as specified.

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

LINTON C. HOPKINS.

Witnesses:

A. P. WOOD,
HARDIE L. KEITH.