F. GIROUD.

PAPER SHEET FEED MECHANISM.

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946,347.

Patented Jan. 11, 1910.

FIG. 1.

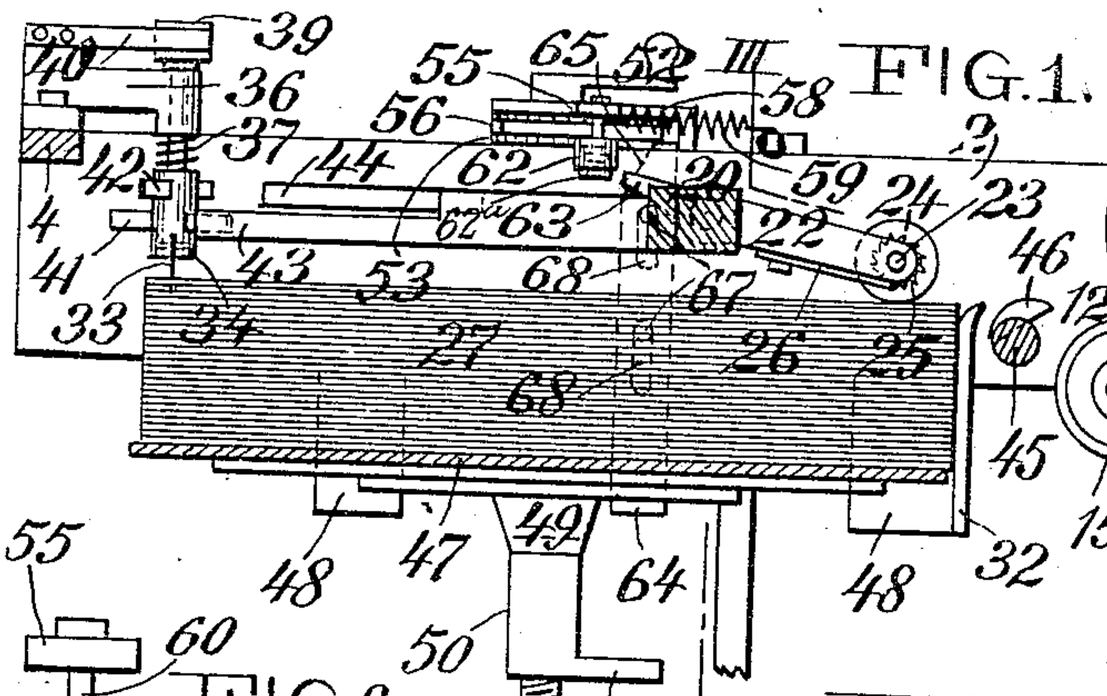


FIG. 4.

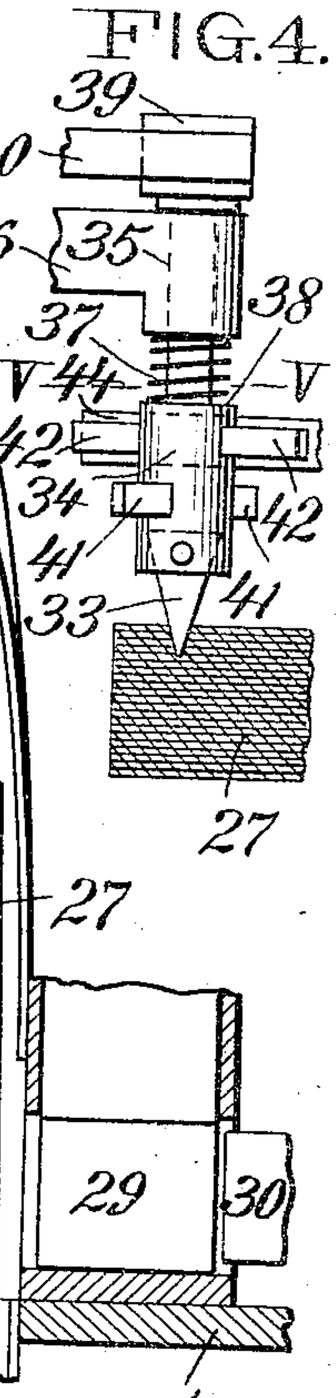


FIG. 6.

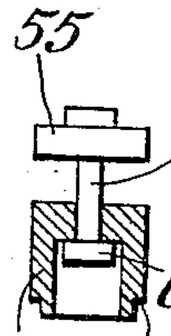


FIG. 3.

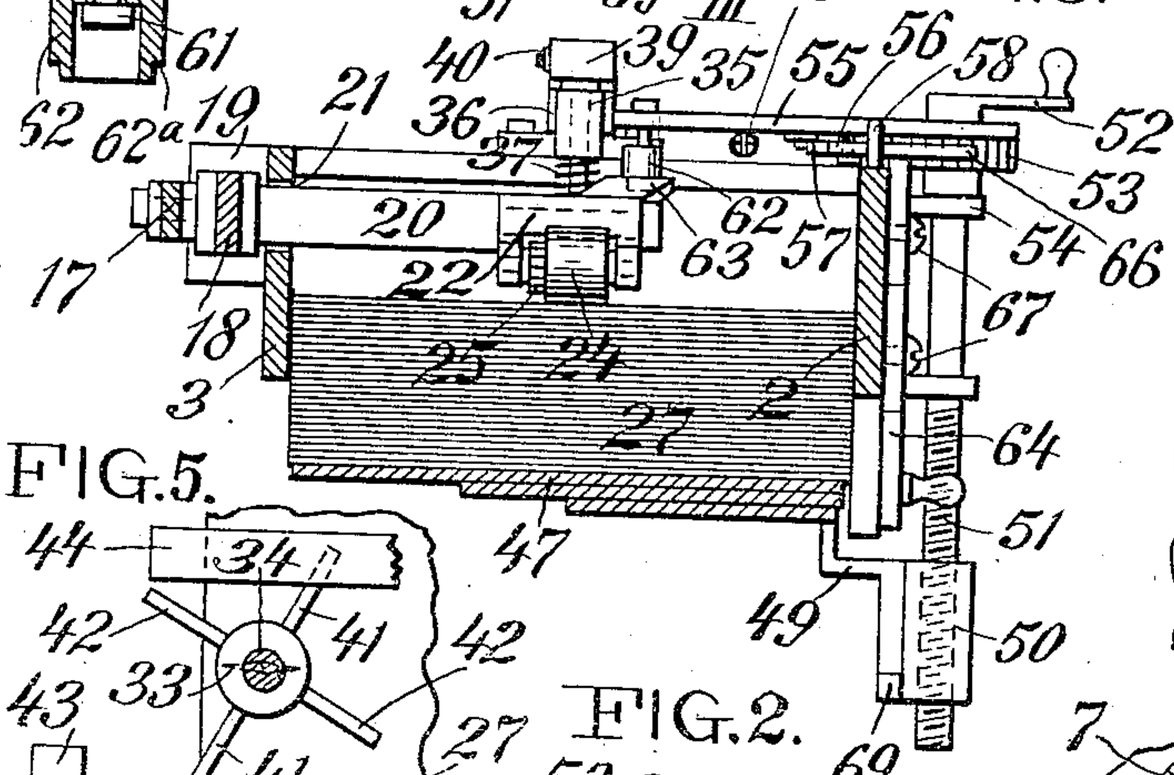


FIG. 5.

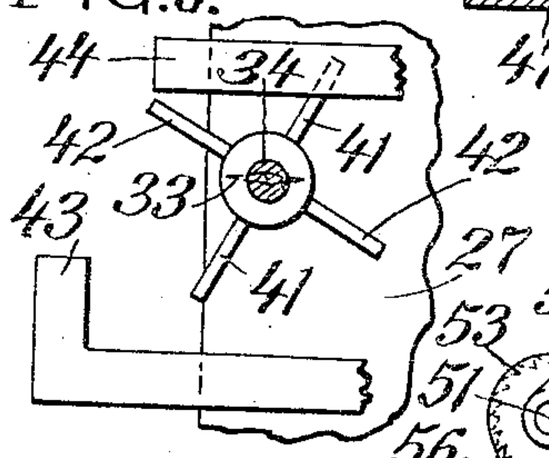
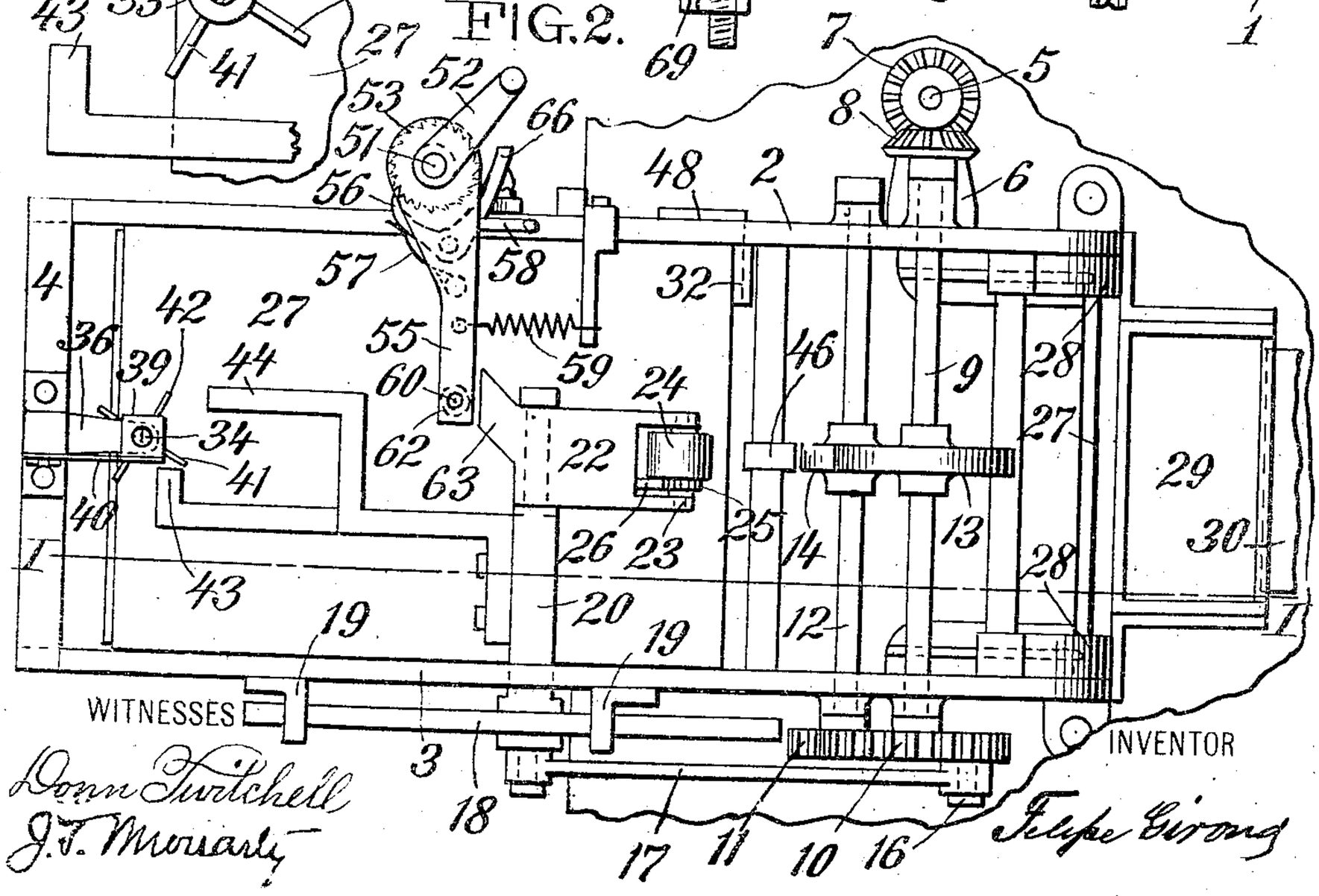


FIG. 2.



WITNESSES

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PAPER-SHEET-FEED MECHANISM.

946,347. Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed December 4, 1908. Serial No. 465,960.

To all whom it may concern:

Be it known that I, FELIPE GIROUD, a citizen of Cuba, and resident of the city of New York, in the county of New York and State of New York, have invented a certain new and useful Paper-Sheet-Feed Mechanism, of which the following is a specification.

This invention relates to mechanism for feeding paper from a stack of flat sheets. Such use of paper is an advantage in some cases, as for example, when it is desired to wrap an article with a label which must be printed in flat sheet form, or when feeding flat sheets to folding or other machines.

The invention consists of means for separating one sheet from the stack, and means for feeding this separated sheet to carriers which deliver it to operating parts of the machine using said paper.

The invention further consists of means for automatically adjusting the position of the stack to compensate for removal of paper by said feeding mechanism.

In the accompanying drawings Figure 1 is a sectional elevation on the line I—I of Fig. 2, showing the paper feed mechanism adapted for use on a wrapping machine. Fig. 2 is a plan view. Fig. 3 is a cross section on the line III—III of Fig. 1. Fig. 4 is a detail elevation showing the operation of the sheet separating device. Fig. 5 is a sectional plan on the line V—V of Fig. 4. Fig. 6 is a detail view of part of a device for adjusting the position of the stack of paper.

The machine 1 is provided with a frame composed of side plates 2, 3, and a cross bar 4.

Continuously driven from machine 1, is a vertical shaft 5 having a bearing near its upper end in a bracket 6 on side plate 2. To the upper end of vertical shaft 5 is secured a bevel gear wheel 7, in mesh with a bevel gear wheel 8 on a shaft 9 which extends across and rotates in bearings formed on side plates 2 and 3. To one end of shaft 9 is secured a gear wheel 10 in mesh with a gear wheel 11 on a shaft 12 which also extends across and rotates in bearings formed on side plates 2 and 3. Midway between side plates 2 and 3 are wheels 13 and 14 which are secured to the corresponding shafts 9 and 12. The wheels 13 and 14 are each provided with a rubber tire 15, the tires of the two wheels bearing against each other, during their continual rotation.

Secured eccentrically to gear wheel 10 is a crank pin 16 which is connected by a rod 17 to a slide 18. By means of the crank pin 16 and rod 17, slide 18 has reciprocating movement in guides 19 formed on side plate 3.

Forming part of slide 18 is an arm 20 which extends through a slot 21 formed in side plate 3, and has a swinging frame 22 pivoted upon it. Rotating in bearings 23 at one end of swinging frame 22 is a rubber roller 24 which is provided with a ratchet wheel 25 in engagement with a spring pawl 26 preventing rotation of roller 24 except in one direction. Roller 24 rests upon the stack of paper 27, and when slide 18, arm 20, and swinging frame 22, move forward toward the wheels 13 and 14, rotation of roller 24 is prevented by engagement of spring pawl 26 with ratchet wheel 25. Friction of rubber roller 24 upon the top sheet of paper will therefore cause forward movement of the top sheet, until its forward end passes between the rubber tires of wheels 13 and 14. As the wheels are constantly rotating the sheet of paper will be carried by the wheels into the chute 28 which conveys it to a position to be acted upon by moving parts of machine 1. The moving parts of the machine shown in the drawings consist of an article 29 to be wrapped, and a plunger 30 which forces the article against the sheet of paper 27, causing the paper to be forced against the plates 31 which fold the paper upon the article. It will be understood that the machine receiving the sheet of paper which is delivered by wheels 13 and 14, could be any machine adapted for using such paper. When return movement of arm 20 and swinging frame 22 carries rubber roller 24 away from wheels 13 and 14, the roller 24 will be free to rotate, thereby reducing friction and causing no disarrangement of the paper while the roller travels rearwardly upon it.

The stack of paper is held in place on the two sides by means of the side plates 2 and 3, and at the forward end by a plate 32 attached to the side plate 2. The reciprocating movement of roller 24 is confined to a small part of the stack of paper extending from near the middle toward the forward end. When forward movement of roller 24,

moves the top sheet of paper forward, the friction of the top sheet throughout its under surface upon the next sheet below it is liable to carry the second sheet forward also. In order to prevent this, the pointed end of a knife blade 33 is caused to pierce the upper sheets of paper, near the rear end of the stack. The knife is adjusted to have a cutting edge directed toward the rear end of the top sheet of paper, so that when roller 24 moves forward and, acting upon the forward end of the top sheet, moves it forward, the rear end of the top sheet will be cut by means of the knife. The friction of the top sheet of paper upon the second sheet is not enough to cause the second sheet to be forced against the cutting edge of the knife with sufficient force to cut the paper, consequently the second sheet will be held stationary by means of the knife, while the first sheet will be separated from the stack. This is due to the fact that sufficient friction or force can be applied to move the top sheet with little risk of moving the sheet below it. It will be evident that this affords a means for separating the top sheet from the stack; consisting of insertion of a knife from the top thereby supplying a means for holding the sheets below the top one stationary, while friction or force can be applied to the top sheet against the knife, sufficient to cut the top sheet loose. As the sheets are successively cut by the knife, an accumulation of small particles of paper gather against the knife which would finally prevent the cutting action. For this reason means is provided whereby such particles are automatically removed from the knife. To accomplish the automatic cleaning the knife 33 is provided with two cutting edges and is rigidly secured to a vertical rod 34. Vertical rod 34 has horizontal rotary and vertically sliding movement in a guide 35 formed on an arm 36 attached to a cross bar 4. A spring 37 placed between the arm 36 and a shoulder 38 on rod 34 forces the point of the knife downward through the top sheets of paper until a square collar 39 secured to the upper end of the rod, comes to rest on the arm 36.

Secured to arm 36 is a flat spring 40 the free end of which presses against the square collar 39, thereby holding the knife in position. To the lower end of vertical rod 34 is secured two arms 41 which extend radially from opposite sides of the rod. Above the arm 41 are two similar arms 42 which extend radially at right angles to the arms 41.

Secured to the arm 20 on slide 18, are two fingers 43 and 44 adapted to engage the corresponding lower and upper radial arms 41 and 42 on vertical rod 34. The knife 33, radial arms 41, 42 and the square collar 39, are so placed on vertical rod 34 that when the fingers 43 and 44 on arm 20 occupy the forward position shown in Figs. 1 and 2, the knife 33 will stand crosswise of the line of travel of roller 24. In this position the finger 43, by engagement with one of the radial arms 41, has moved the vertical rod 34 a quarter turn, and caused the flat spring 40 to engage a face on the square collar 39 which holds the knife crosswise. This quarter turn of vertical rod 34 has caused one of the upper radial arms 42 to move into range with the upper finger 44. Then as the fingers are moved to the rear, the finger 44, by engagement with radial arm 42, will give the vertical rod 34 a quarter turn causing the flat spring 40, to engage a face on the square collar 39, which will cause the knife to stand on a line with the travel of roller 24. The parts will then occupy the position shown in Fig. 5; a radial arm 41 is then in range with the finger 43, which latter stands removed toward the rear, in order that forward movement of roller 24 shall draw the top sheet of paper against the knife before the finger 43 engages the radial arm 41.

It will be seen that rotation of the knife causes the knife edge which has cut one sheet of paper to be turned forward after the cutting, and that forward movement of the next sheet of paper will remove particles of paper from the knife edge which cuts the first sheet, and so on the knife edge which has cut one sheet being cleaned by means of the sheet coming after. Rotation of the knife also keeps the point clean, thereby preventing accumulation of paper particles which would interfere with penetration of the paper by the knife point.

As a further safeguard against feeding two sheets of paper at once, a cross bar 45 extends across below the path of the paper as it is moved toward the wheels 13 and 14. Secured to the center of this bar is a rubber friction surface 46 which projects above the bar and toward the wheels 13 and 14. In case two sheets are moved forward by roller 24 the forward end of the sheet below the top one will take against the rubber friction surface 46 which acting against the center of the forward end, retards the second sheet without causing much friction of the second sheet against the under side of the first or top sheet. The action of knife 33 in piercing the upper sheets of paper whereby the sheets below the top one are held stationary while force is applied to the top sheet to effect its removal and the retarding action of rubber friction surface 46 against a small part of a sheet below the top sheet thereby increasing the tendency of the paper below the top sheet to remain stationary, afford two means of preventing the feed of more than one sheet at a time.

The stack of paper is placed upon a platform 47 which has vertical movement

against guides 48, and 32 forming part of the side plate 2. The platform 47 is supported by an arm 49 attached to a nut 50 having a screw thread through which passes a vertical screw 51 supporting the platform. Screw 51 rotates in bearings formed on the side plate 2; and a hand wheel 52 is secured to the upper end of the screw by which it may be rotated in order that the platform may be lowered to a position ready for insertion of a supply of paper, after a stack has been exhausted. Secured to the upper end of screw 51 is a ratchet wheel 53, the hub of which, resting on the bearing 54, serves to support the screw 51 and parts carried by it. Pivoted upon screw 51 is a lever 55 carrying a pawl 56 which is held in engagement with ratchet wheel 53 by means of a spring 57. The lever 55 extends across above the center of the paper and is held against a fixed stop 58 by means of a spring 59. The free end of lever 55 is provided with a downwardly projecting pin 60 having a head or flange 61 at its lower end supporting a roller 62 as shown in Fig. 6, the roller being capable of vertical movement and rotation on the pin 60. The swinging frame 22 is provided with a projection 63 on the end opposite the one carrying roller 24, and when the swinging frame moves rearwardly, the outer end of the projection 63 engages the roller 62 and moves the lever 55 away from stop 58. The pawl 56 on lever 55 engaging the ratchet wheel 53, causes rotation of the screw 51 and consequent upward movement of the stack of paper. Continued back and forth movement of lever 55 and consequent rotation of screw 51 will cause upward movement of the end of swinging frame 22 carrying the roller 24, causing the projection 63 at the opposite end to be lowered until it no longer engages the roller 62 on lever 55. Movement of screw 51 will then cease, and the stack of paper will remain stationary until removal of paper by the feeding mechanism causes the projection 63 on the swinging frame 22 to again engage the roller 62 on lever 55 and cause rotation of the screw 51. The lower end of roller 62 is provided with an offset, forming a shoulder against which the projection 63 bears in order that upward movement of projection 63 and consequent downward movement of roller 24 shall be prevented while actuating the lever 55. Roller 62 is free to rotate while it sides against the projection 63, and upward movement of roller 62 will be permitted to accommodate play of projection 63 during the operation of engagement or disengagement with roller 62. When the supply of paper is exhausted and it is desired to lower the platform 47, a hand slide 64 having an incline 65 is moved up against the tail 66 of pawl 56, thereby throwing the pawl out of engagement with ratchet wheel 53. The screw is then free to be rotated by the hand crank 52, in a direction causing the platform 47 to be lowered, and leaving space for insertion of paper against the end plate 32 and guides 48 on side plate 2. By means of screws 67 passing through slots 68 in slide 64 and into side plate 2, the slide is held in such position that in case a supply of paper is exhausted when the operator is away, continued upward movement of platform 47 will be prevented by means of a projection 69 on the arm 49. The projection 69 will lift the slide 64 and cause the inclined surface 65 to throw the pawl 56 out of action and prevent further rotation of screw 51.

I claim as my invention:

1. A paper sheet feed mechanism comprising a support for a stack of sheets of paper, a pointed knife, means whereby the point of said knife is forced into the paper at a right angle to the plane of the paper, means for causing rotary movement of said knife in a plane parallel with the plane of the paper, means for holding a cutting edge of said knife toward the rear end of the stack, and means for moving one of said sheets of paper forward against the knife whereby said sheet is cut loose, the point of said knife holding the remaining sheets stationary.

2. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper a reciprocating carriage, a vertically yielding and horizontally rotating rod, said rod carrying a two edge knife having a point which pierces the paper at a right angle to the plane of the paper, said rod having arms adapted to cause rotary movement of the knife in a plane parallel with the plane of the paper, said reciprocating carriage having means for actuating said arms whereby every back and forth movement of the carriage causes a half revolution of said knife, means for holding a cutting edge of said knife in line with the line of travel of said carriage, and said carriage having a device for moving one of said sheets against the knife during forward movement, whereby said sheet is cut loose.

3. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper, a knife having a point which pierces the paper at a right angle to the plane of the paper means for causing rotary movement of said knife in a plane parallel with the plane of the paper, means for holding a cutting edge of said knife toward the rear end of the stack, and means for moving one of said sheets of paper forward against the knife whereby said sheet is cut loose.

4. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper, a rotating two-edge-knife which pierces the

paper, a reciprocating carriage having a device for moving a sheet of said paper forward against the knife, and means whereby every back and forth movement of said carriage causes a half revolution of said knife.

5. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper, a rotatable knife piercing the upper sheets near the rear end of the stack, arms for actuating said knife, a reciprocating carriage and means for actuating it, said carriage having means for engaging one of said arms during return movement, whereby a cutting edge is turned into alinement with the line of travel of said carriage, the carriage also having a device for moving the top sheet of paper during forward movement, whereby the top sheet is cut loose by said knife.

6. A paper-sheet feed mechanism comprising a reciprocating carriage and means for actuating it, a support for a stack of sheets of paper, a rotatable two edge knife piercing the upper sheets near the rear end of the stack, means for holding the knife in alinement with the line of travel of said carriage, arms for actuating said knife, said carriage having a device for moving the top sheet of paper during forward movement; and means for engaging said arms, whereby the cutting edges are reversed, thereby turning a new cutting edge toward the rear end of the stack, whereby forward movement of the top sheet by means of the carriage causes the top sheet to be cut loose by the new knife edge, and the previous cutting edge is freed from particles caused by previous cutting.

7. A paper-sheet feed mechanism comprising a reciprocating carriage and means for actuating it, a support for a stack of sheets of paper, a rotatable two edge knife piercing the upper sheets near the rear end of the stack, means for holding a cutting edge of said knife toward the rear end of the stack, arms for actuating said knife, said carriage having a device for moving the top sheet forward against the knife thereby cutting the top sheet loose, said carriage having means for engaging said arms during forward movement whereby the knife is given a quarter turn, said carriage also having means for engaging said arms during return movement, whereby the knife is given another quarter turn, thereby causing a new cutting edge to be pointed toward the rear end of the stack.

8. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper, a device for automatically adjusting said support to compensate for removal of paper by the feeding mechanism, a reciprocating frame carrying a pivoted frame, said pivoted frame having a device at one end resting on and having means for effecting removal of the paper, the opposite end of said pivoted frame having means for engaging and actuating the adjusting device, whereby the support for the stack of paper is lifted, causing the end of the pivoted frame carrying the device for removing the paper to be raised, thereby throwing the opposite end out of engagement with the adjusting device substantially as described.

9. A paper-sheet feed mechanism comprising a platform for supporting a stack of sheets of paper, a screw supporting the platform, mechanism for causing rotation of said screw, a lever for actuating said mechanism, a pivoted reciprocating frame having one end resting on the stack of paper and adapted to move the top sheet during forward movement, the other end of said frame during its return movement engaging the lever causing rotation of said screw whereby the platform is raised; and means whereby continued upward movement of the platform causes the pivoted reciprocating frame to be thrown out of engagement with said lever.

10. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper, a device for automatically adjusting said support to compensate for removal of paper by the feeding mechanism, a rotatable knife piercing the upper sheets near the rear end of the stack, arms for actuating said knife, a reciprocating frame having a device for engaging the top sheet of paper during forward movement said reciprocating frame having means for engaging and actuating the adjusting device, and means for engaging said arms for actuating the knife whereby a cutting edge is turned toward the rear end of the stack; and means for actuating said reciprocating frame whereby the top sheet is cut loose by forward movement against the knife, while the sheets below are held stationary by means of the knife.

11. A paper-sheet feed mechanism comprising a platform supporting a stack of sheets of paper, a screw supporting the platform, a ratchet wheel on said screw, a lever carrying a pawl for engaging the ratchet wheel, whereby the screw is rotated, a vertically moving slide adapted to throw said pawl out of engagement with the ratchet wheel, said platform having an arm attached thereto for actuating the slide, a reciprocating frame having a device for removing the sheets in succession, said reciprocating frame having means for engaging and actuating the lever carrying said pawl, thereby causing rotation of said screw, whereby the platform is raised, causing the arm on the platform to actuate the slide which throws the pawl out of engagement with the ratchet wheel.

12. A paper-sheet feed mechanism comprising a support for a stack of sheets of paper, a device for automatically adjusting said support to compensate for removal of paper by the feeding mechanism, a verti-

cally yielding and horizontally rotating rod, said rod carrying a pointed two edge knife which pierces the upper sheets of paper, said rod having arms for causing its rotary movement, a reciprocating carriage supporting a pivoted frame, a pivoted frame having a device at one end resting on the sheets of paper having means for moving a sheet of said paper against the knife, the opposite end of said pivoted frame having means for engaging and actuating the adjusting device, whereby the support for the stack is lifted, said reciprocating carriage also having means for actuating said arms whereby every back and forth movement of the carriage causes a half revolution of said knife.

13. In a paper feeding mechanism a self cleaning knife having a point and two sharp opposite edges in combination with mechanism to rotate said knife a half revolution in order that said edges be alternately presented to the paper, the axis of rotation of said knife being at right angle to the plane of the paper.

Signed at New York city in the county of New York and State of New York this 27th day of Nov. A. D. 1908.

FELIPE GIROUD.

Witnesses:
DONN TWITCHELL,
J. T. MORIARTY.