D. W. SHIEK.

PAPER FEED DEVICE FOR COMPUTING MACHINES, &c.

APPLICATION FILED APR. 2, 1906.

1,105,853. Patented Aug. 4, 1914.

5 SHEETS—SHEET 1.

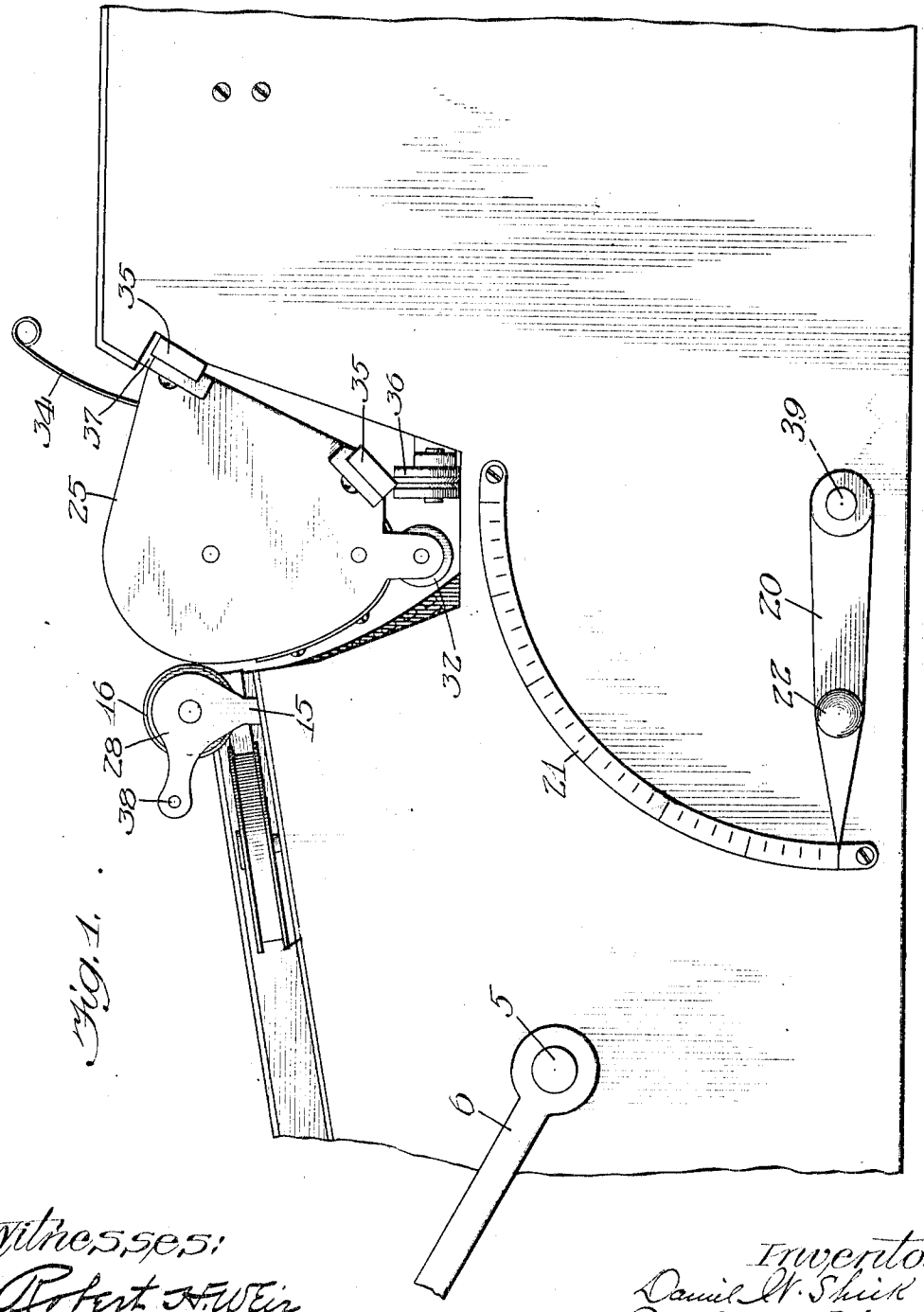


Fig. 1.

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5 SHEETS—SHEET 2.

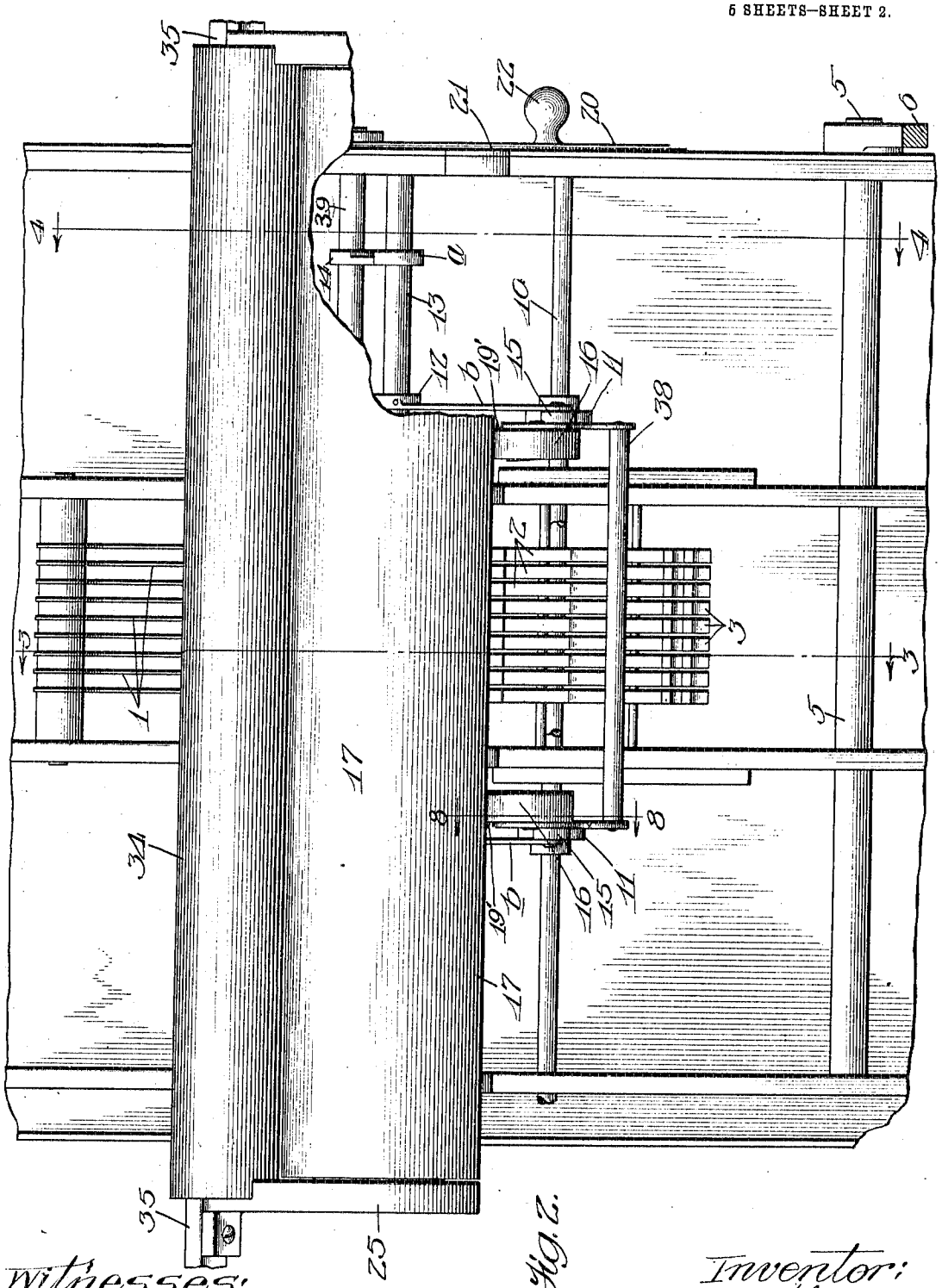


Fig. 2.

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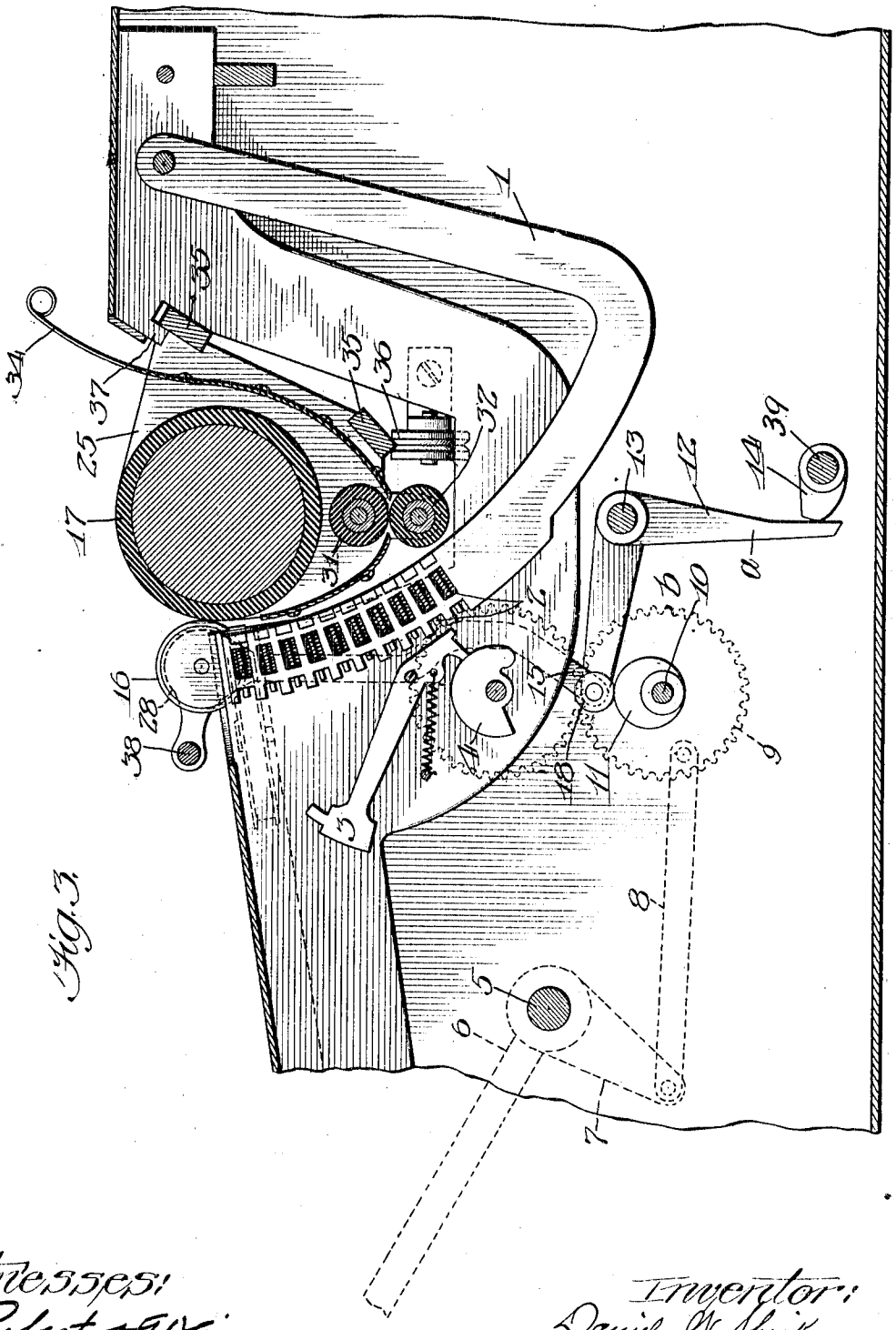


Fig. 3.

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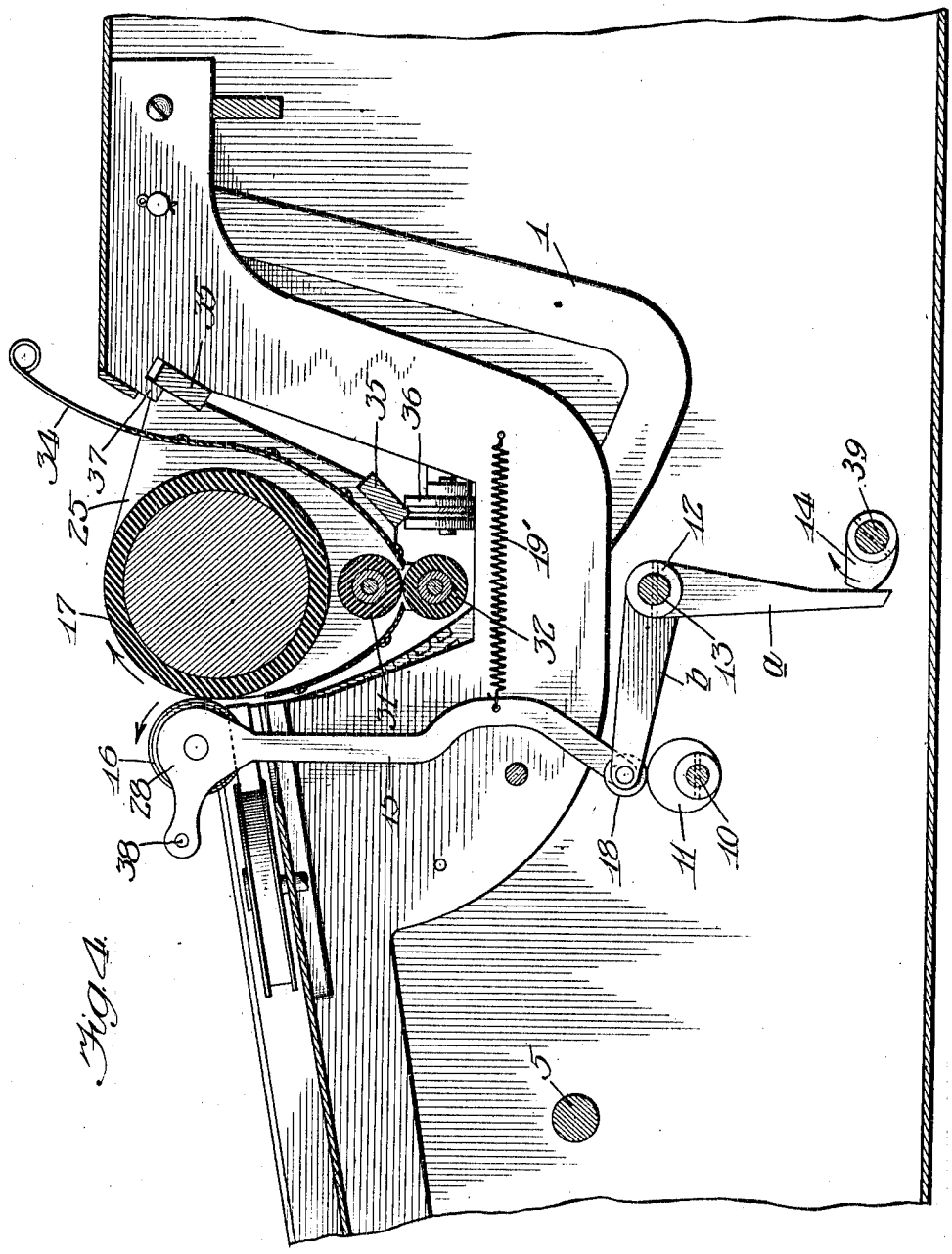


Fig. 4.

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5 SHEETS—SHEET 5.

Fig. 5.

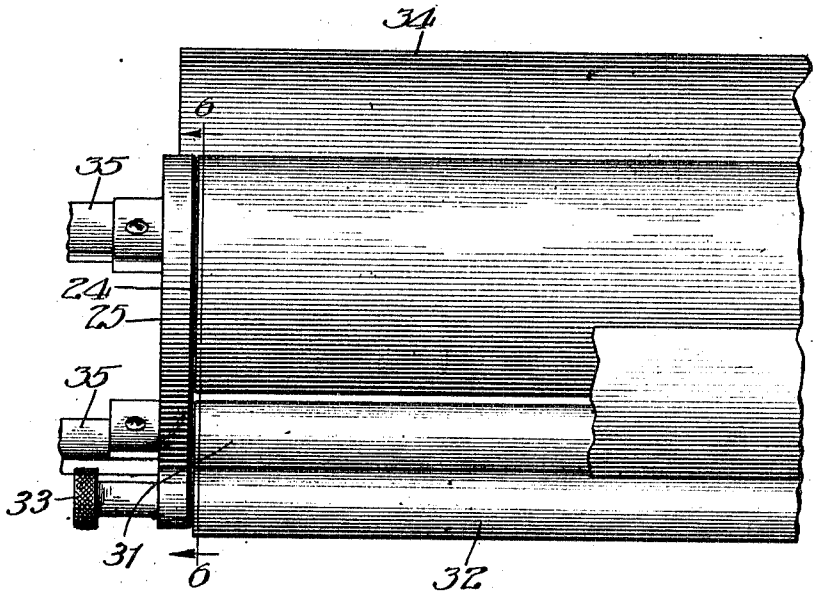


Fig. 6.

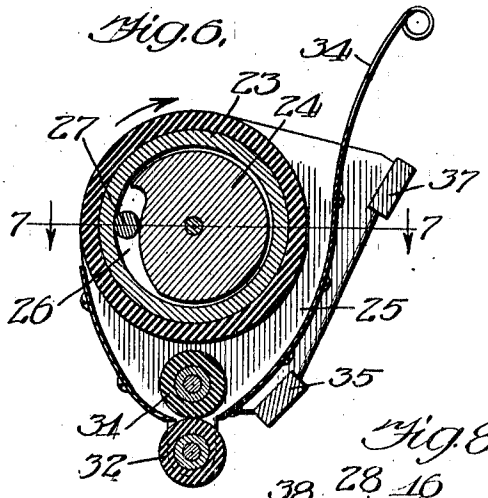


Fig. 7.

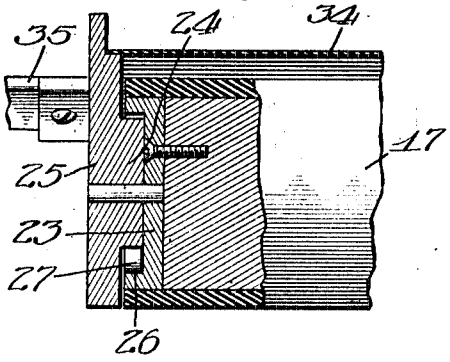


Fig. 8.

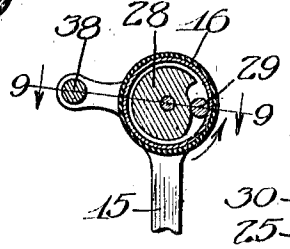


Fig. 9.

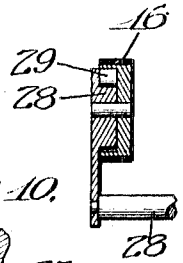
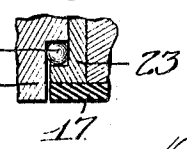


Fig. 10.



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UNITED STATES PATENT OFFICE.

DANIEL W. SHIEK, OF CHICAGO, ILLINOIS, ASSIGNOR TO WALTER L. MILLIKEN, OF BARNSTABLE, MASSACHUSETTS.

PAPER-FEED DEVICE FOR COMPUTING-MACHINES, &c.

1,105,853. Specification of Letters Patent. Patented Aug. 4, 1914.

Application filed April 2, 1906. Serial No. 309,477.

To all whom it may concern:

Be it known that I, DANIEL W. SHIEK, a citizen of the United States of America, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Paper-Feed Devices for Computing-Machines and the like, of which the following is a description.

My improvement belongs to the general class of devices for regularly feeding the paper forward at suitable intervals during the printing operation.

It has for its particular object the production of a practical and efficient device for the purpose described, by means of which the feeding operation may be regulated with precision to any degree between the limits of the device, and with greater exactness than is possible by any of the devices heretofore used for that purpose.

To this end it consists of the novel construction, arrangement and combination of parts herein shown and described and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts. Figure 1 is a partial side elevation of a machine equipped with my improvement; Fig. 2 is a top plan of the same; Fig. 3 is a longitudinal section of the machine, taken on line 3—3 of Fig. 2; Fig. 4 is a similar section taken on line 4—4 of Fig. 2; Fig. 5 is a view of the platen, feeding rollers, and connecting parts, with parts broken away to show the construction; Fig. 6 is a section taken on line 6—6 of Fig. 5; Fig. 7 is a partial view of one end of the platen with parts broken away to show the construction; Fig. 8 is a sectional view taken through the friction driving roller, taken on line 8—8 of Fig. 2; Fig. 9 is a section of the same, taken on line 9—9 of Fig. 8; and Fig. 10 is a sectional view showing a slightly modified form of gravity locking means.

My invention, which is designed to be used with slight modifications upon various forms of computing devices, is illustrated as applied to a computing machine for which I have heretofore filed application for Letters-Patent of the United States, on December 10, 1901, Serial Number 85,383. In this form of device, 1 is an oscillating type carrying bar carrying at its free end a series of longitudinally movable type which are suitably positioned before the platen by the operation of individual keys and the actuating device of the machine, said type being driven against the platen and the interposed paper by means of suitable spring-actuated hammers 3 controlled by rotation of the cam 4.

5 is the actuating rock-shaft operated by the lever 6. As shown, the rock-shaft 5 is provided with a crank-arm 7 connecting with a link 8, which has its opposite end connected with a suitable pinion or equivalent part 9 secured to a shaft 10. The shaft 10 is provided with a cam 11 for a purpose which will be hereafter described. (See Figs. 1 to 4.)

12 is a bell-crank lever pivotally supported at 13 and having one arm *a* extended in line with a cam 14, or equivalent part and the other arm *b* extended in line with the cam 11, before referred to. The latter arm is connected to a longitudinally reciprocating bar or rod 15 carrying at its upper end friction rollers 16 adapted to coact with the platen 17 for the purpose of rotating the latter. The lower end of the arm 15 is preferably provided with an anti-friction wheel 18, which rotates upon the cam 11. A spring 19′ or equivalent means, tends to normally hold the roller 16 firmly in contact with the platen (see Figs. 2 and 4). The arm *b* which I have heretofore designated as one arm of the bell-crank lever, becomes such by reason of the fact that it is fixed to the shaft 13, while the arm *a* is also fixed to said shaft, the section of shaft between the two thus forming a part of the bell-crank (see Fig. 2). The arm *b*, reciprocating bar 15, and friction roller 16, are preferably duplicated upon the opposite side of the machine, as may also be the cam 11, and such is the preferable construction for the purpose of securing regularity and accuracy in feeding the paper.

The cam 14 is mounted upon a rotatable shaft or equivalent construction 39, which extends through the outer casing of the machine, as shown in Fig. 1, and is provided on the exterior with a pointer 20 coöperating with a graduated scale 21. A knob 22 may be positioned upon the pointer for convenience in operating the same. Suitable means may be employed for retaining the pointer in its adjusted position. In the embodiment illustrated the friction of the shaft 39 is relied upon to accomplish this result.

Any suitable means may be employed to permit the rotation of the platen and the friction rollers, each in one direction only, to secure the proper rotation of the platen in the direction indicated by the arrows in Fig. 4. For this purpose, the rotation of said parts is limited to one direction each, so that upon the upward movement of the bar 15 with the friction rollers 16, said rollers shall be firmly held against rotation and by the friction of the same upon the platen, will rotate the platen as indicated. On the down-stroke of said bar, however, the action is reversed, the platen being firmly held against rotation backward while the rollers are permitted to freely rotate, this action serving to regularly advance the paper positioned between the two. In the preferred form, shown in Figs. 6, 7, 8, and 9, the end of the platen is provided with the part 23, freely rotating about the extension 24 of the fixed part 25 of the carriage. The part 24 is cut away, forming a recess 26 and constituting the part 24 a cam. Between the part 23 and the extension 24, and located in the cam-space 26, is positioned a gravity locking device 27. It will be readily understood that the platen may freely rotate in the direction indicated by the arrow, during which time the gravity locking device 27 will, by such action, be carried forward toward the larger portion of the space 26 without in any way interfering with such rotation. Any tendency of the platen to rotate in the reverse direction however will cause the gravity locking device 27 to become wedged between the part 23 on the platen and the fixed part 24, and thus effectually lock the platen against rotation in that direction. The friction-rollers 16 are preferably constructed in the same manner, the direction of rotation, however, being reversed for the purpose before stated. Thus each friction roller (see Figs. 8 and 9) is provided with the fixed part 28 and the gravity locking device 29, and the operation being as before described. As shown in Figs. 6 and 7, the gravity locking device consists simply of a short section of cylindrical shape, which, by reason of the form of parts, and the dimensions of the space 26, is suitably retained in position therein for effective operation. In Fig. 10, the gravity locking device 30 consists of a ball, the operation being the same. The platen and the rollers 16 are preferably covered with rubber or equivalent material to increase the frictional contact.

31 and 32 are rollers mounted on the carriage and sufficiently contacting to carry a sheet of paper between them in feeding the same forward until it reaches the point where it is grasped by the contact with the roller 16 of the platen and to retain the paper in proper relative position as the carriage is moved longitudinally. One of said rollers is provided with a knob 33 extending from the end of the carriage by means of which their operation may be controlled. 34 is a sheet of suitable material for guiding paper between said rollers, and onward to the point between the platen and the friction rollers. The carriage is longitudinally movable across the machine in a well known manner, and may be thus adjusted as desired. When the friction rollers 16 are in contact with the platen, it is the friction sufficient to hold the latter in its adjusted position during the operation of the device. As shown, the carriage carrying the platen is mounted upon connecting bars 35, 35, one of which, as, for example, the lower one shown in Fig. 4, rests in a grooved roller 36, while the upper one may be retained in suitable guides 37. The paper-rolls 31 and 32 are mounted in the frame of the carriage as stated and are thus movable longitudinally with the platen. A bar 38 (Fig. 2) serves to connect the bearings of the roller 16, so that by pressing upon said bar the tendency of the springs 19′ (see Figs. 2 and 4) will be overcome and the friction rollers thus separated from the platen. Upon releasing the bar from the restraint of the hand of the operator, the friction rollers normally contact with the platen.

The mode of operation is as follows: A sheet of paper is passed along the guide 34 until it reaches the rollers 31 and 32 where it is adjusted. By turning the knob 33, the paper is fed between the rollers and up to a point between the friction rollers 16 and the platen, the friction rollers being held backward by means of the cross-bar 38, during such operation when the paper is suitably adjusted, as desired, the friction rollers are released, and the paper is firmly held between them and the platen. The pointer 20 is moved along the graduated scale to the point desired, depending upon the space desired between the rows of figures or equivalent characters. By this action, the cam 14 is operated, permitting the arm *a* a greater or less limit of rotary or swinging movement, as desired. If, for example, considerable space is desired between the characters printed, the cam will be turned in the direction indicated by the arrow (Fig. 4) to such point as desired to secure the spacing required, it being understood that the vertical movement of the bar 15 is limited by the position of the cam 14, by reason of the bell-crank construction before described. After the controlling keys (not shown) are set as desired, the operating lever 6 is actuated, operating the bars carrying type, and releasing the coöperating hammers. During this operation the cam 11 has been rotated, permitting the bar 15 to move downward its limit of movement the rollers 16 following the surface of the platen as a base

and constantly holding the paper in position on the platen. After the printing operation is completed, and as the parts are returning to their normal positions, the higher portion of the cam 11 comes in contact with the roller 18 carried by the bar 15, moving the latter and the friction rolls upward and rotating the platen 17, in the direction indicated by the arrow, the desired distance. When it is desired to shift the carriage longitudinally the operator depresses the bar 38 thus separating the rollers 16 from contact with the paper and platen, when the latter is free and may be moved as desired. The paper will be maintained in proper relative position by means of the rollers 31—32.

It is obvious immaterial modifications may be made without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the particular form and construction of the parts shown.

What I claim as new, and desire to secure by Letters Patent is:

1. Paper feeding means for computing machines and the like, comprising a longitudinally movable carriage, paper feeding mechanism comprising two coöperating parts arranged to engage the paper between them, one mounted upon and movable with said carriage, and the other rotatably mounted upon the frame of the machine and transversely movable relative to the other part to advance the paper, and reciprocating means for operating said paper feeding mechanism.

2. In a device of the kind described, a longitudinally movable carriage, and a platen mounted thereon, in combination with reciprocating engaging means mounted independently of said carriage arranged to cooperate with said platen to engage the paper between said platen and the engaging means, and mechanism for operating said engaging means to move said paper.

3. In a device of the kind described, a rotatable platen limited to rotate in one direction only, and means for feeding and guiding a sheet of paper in contact therewith, in combination with one or more friction rollers yieldingly maintained in normal contact with the platen to maintain a sheet of paper between said friction rollers and the platen and to rotate the platen, said rollers being limited to rotate in a direction the reverse of that of the platen, and means for moving said rollers upward and downward in contact with the platen.

4. In a device of the kind described, a rotatable platen, means for limiting the movement thereof to one direction and reciprocating paper holding means movable in a direction in opposition to the movement of the platen adapted to maintain the paper in proper feeding relation to said platen, in combination with mechanism for reciprocating said paper holding means to advance the paper at each operation of said mechanism.

5. In a device of the kind described, a rotatable platen, means for limiting the rotation thereof to one direction, means for feeding and guiding a sheet of paper in contact therewith, in combination with one or more friction rollers normally in contact with the platen to maintain a sheet of paper between the said friction rollers and the platen, and in contact with the latter, means for limiting the rotation of the rollers to a direction in opposition to that of the platen, and means for reciprocating the rollers in contact with the platen.

6. In a device of the kind described, the combination of a rotatable platen, means for limiting the rotation of the platen to one direction, a friction roller, means for limiting the rotation of said roller to a direction the reverse of that of the platen, means for yieldingly maintaining said roller in contact with the platen to engage a sheet of paper between said roller and the platen and for actuating the platen, a bar upon which the roller is mounted, means for reciprocating said bar, and means for guiding and feeding the paper to the point of contact between said friction roller and the platen.

7. In a device of the kind described, a rotatable platen, in combination with a reciprocating bar provided with a friction roller arranged to normally contact with the platen to maintain a sheet of paper between the two and rotate the platen, means for reciprocating said bar, and means for varying the distance of reciprocation at will.

8. In a device of the kind described, a longitudinally movable carriage provided with a rotatable platen, means for limiting the rotation of the platen to one direction, a rock shaft mounted in the frame of the machine provided with a bell crank lever, means for varying the movement of said lever at will, one arm of said lever carrying a longitudinally movable bar, provided with a friction roller limited in its rotation to a direction the reverse to that of the platen, and means for guiding and feeding a sheet of paper to a point of contact between said friction roller and the platen, and cam mechanism arranged to reciprocate said bar.

9. In a device of the kind described, a rotatable platen, means for limiting the rotation of the platen to one direction, in combination with a longitudinally reciprocating bar provided with a friction roller limited in its rotation to a direction the reverse of that of the platen, said roller being yieldingly maintained in contact with the platen to maintain a sheet of paper between the two and to actuate the platen, means for reciprocating said bar, means for varying

the longitudinal movement thereof at will, and means for guiding and feeding the paper to the point of contact between said friction roller and platen.

10. In a device of the kind described, a rotatable platen, provided with means limiting its rotation to one direction, in combination with a longitudinally reciprocating bar provided at its free end with a friction roller yieldingly maintained in proximity with the platen, to maintain an interposed sheet of paper between the two and by its movement to rotate the platen, said roller being restricted in its rotation to a direction the reverse of that of the platen, the opposite end of the bar being arranged in line with a cam rotatable at each operation of the device, means for limiting the longitudinal movement of the bar at will, and means for guiding and feeding the paper to the point of contact between said friction roller and the platen.

11. In a device of the kind described, a rotatable platen, provided with means for limiting its rotation to one direction only, and guiding means for a sheet of paper adjacent to the platen, in combination with a longitudinally movable bar provided at its free end with a friction roller yieldingly maintained in contact with the platen to maintain a sheet of paper between them and by its movement to rotate the platen, said roller being restricted to rotate only in a direction the reverse of that of the platen, the opposite end of the bar being connected to one arm of a bell-crank lever and in line with a cam rotatable with each operation of the printing mechanism, and means for regulating the movement of the other arm of the bell-crank lever, whereby the longitudinal movement of the bar may be varied at will.

12. In a device of the kind described, a longitudinally movable carriage provided with a rotatable platen, means for limiting the rotatable movement of the platen to one direction, in combination with a rock-shaft mounted in the frame of the machine provided with a pair of bell-crank levers, means for varying the movement of said levers at will, one arm of each of said levers carrying a longitudinally movable bar, the two arms being connected at their upper end, and each provided with a friction roller limited in its rotation to a direction the reverse to that of the platen, cam mechanism adapted to reciprocate said bar, and means for guiding and feeding the paper to a point of contact between said friction rollers and the platen.

13. In a device of the kind described, a rotatable platen limited to rotate in one direction, actuating mechanism therefor comprising a movable bar provided with a friction roller arranged to contact with the platen and limited to rotate in the reverse direction, means for actuating said bar, means for limiting the movement of said bar at will, and indicating means arranged to indicate the range of movement thereof.

14. In a device of the kind described, a reciprocating bar provided with friction rollers and means for reciprocating said bar at each operation of the machine, a bell-crank lever having one arm connected to said bar and the other arm extended in line with a cam member carried on a shaft, a pointer mounted on said shaft and a graduated scale arranged to co-act with the pointer to indicate the range of reciprocation of the bar.

15. In a device of the kind described, a rotatable platen having a recessed part, a coöperating part provided with a recessed part to form a cam space, in combination with a gravity locking member coöperating with said parts, said member loosely positioned in said cam space and limiting the rotation of the platen to one direction only.

16. In a device of the kind described, a rotatable platen provided with means for limiting the rotation thereof to one direction only, in combination with a reciprocating part provided with a friction roller normally yieldingly maintained in contact with the platen, and means limiting the rotation of said friction roller to a direction the reverse of that of the platen.

17. In a device of the kind described, a rotatable platen provided with a part arranged in proximity to a fixed part, the two being constructed to provide a cam recess between them, and a gravity locking device loosely positioned in said recess to limit the rotation of the platen in one direction only, in combination with a reciprocating roller coöperating with a fixed part, the two being constructed to provide a cam recess between them, and a gravity locking device loosely positioned in said recess, the parts being arranged to limit the rotation of the friction roller to a direction opposite to that of the platen.

18. In a device of the kind described, a rotatable platen, having one end recessed to form one part of a cam space in connection with a coöperating recessed part, arranged in proximity thereto and forming the opposite part of the cam space, in combination with a bodily movable member loosely positioned in said cam space, to limit the rotation of the platen in one direction only.

19. In a device of the kind described, a rotatable platen recessed at one end, a stationary coöperating part provided with an extension recessed to form a cam space and positioned in said recessed platen end, in combination with a gravity locking member loosely positioned in said space and coöperating with said extension and recessed

platen end and limiting the rotation of the platen to one direction only.

20. A paper feeding device for adding machines, comprising a longitudinally movable paper carriage provided with a platen, said platen being rotatable, and means for limiting the rotation thereof to one direction only, in combination with a reciprocating member in frictional engagement with the paper on said platen to advance the same at each operation of the printing mechanism, and means for guiding and feeding the paper to the point of contact between said reciprocating member and the platen.

21. In a device of the kind described, a longitudinally movable carriage, a platen mounted thereon, and limited to rotate in one direction only, a feed roll normally in contact with the platen and limited to rotate in the opposite direction therefrom, said feed roll being mounted in reciprocating bearings, and means for intermittently reciprocating said bearings, in combination with a pair of supplemental rollers arranged to engage a sheet of paper between them and advance the same between the platen and the feed roll, and means for manually rotating said rollers to adjust the position of said paper.

22. In a device of the kind described, a longitudinally movable carriage, and a rotatable platen mounted thereon, in combination with reciprocating engaging means mounted independently of said carriage, arranged to coöperate with said platen to engage the paper between the platen and the engaging means, and means including a cam for operating said engaging means to move said paper.

23. In a device of the kind described, a longitudinally movable carriage, and a rotatable platen mounted thereon, in combination with reciprocating engaging means, said engaging means being also rotatable in a direction reverse to the rotation of the platen, resilient means arranged to normally hold said engaging means in position to cooperate with said platen to engage the paper between the platen and said engaging means, and means for operating said engaging means to move said paper.

24. In a device of the kind described, a longitudinally movable carriage, and a rotatable platen mounted thereon, in combination with reciprocating engaging means mounted independently of said carriage, resilient means arranged to normally hold said engaging means in position to coöperate with said platen to engage the paper between the platen and the engaging means, and means for operating said engaging means to move said paper.

25. In a device of the kind described, a rotatable platen, rotatable paper holding means adapted to hold the paper in proper printing and feeding position relative to said platen, means for limiting the rotation of the platen, and holding means to one direction and in opposition to one another, and resilient means for normally maintaining said paper holding means in position, in combination with mechanism for reciprocating said paper holding means to advance the paper at each operation of said mechanism.

26. In a device of the kind described, a rotatable platen, rotatable paper holding means adapted to maintain the paper in position adjacent to said platen, means for limiting the rotation of the platen and holding means to one direction only and in opposition to one another, in combination with mechanism for reciprocating said paper holding means to advance the paper at each operation of said mechanism, and means for adjusting the distance moved by said paper at each operation as desired.

27. In a device of the kind described, a longitudinally movable carriage and a platen mounted thereon limited to rotate in one direction only, in combination with a feed roller limited to rotate in the opposite direction from the platen and normally in contact therewith, said feed roller being mounted in reciprocating bearings, and means for reciprocating said bearings.

28. In a device of the kind described, printing mechanism, a longitudinally movable carriage and a platen mounted thereon limited to rotate in one direction only, in combination with a coöperating feed roll, limited to rotate in the opposite direction, said feed roll being mounted in reciprocating bearings, and means controlled by the operation of the printing mechanism for intermittently reciprocating said bearings.

29. In a device of the kind described, printing mechanism, a longitudinally movable carriage and a platen mounted thereon limited to rotate in one direction only, in combination with a part arranged in its movement to contact with the platen to rotate the same, said part being mounted upon a reciprocating support, and automatic means for intermittently reciprocating said support at each operation of the printing mechanism.

30. In a device of the kind described, a longitudinally movable carriage and a platen mounted thereon limited to rotate in one direction only, in combination with a part arranged in its movement to contact with the platen to rotate the same, said part being mounted upon a reciprocating support, printing mechanism, and means dependent upon the operation of the printing mechanism for intermittently reciprocating said support at each operation of the device.

31. A paper feeding device for adding

machines, comprising a longitudinally movable paper carriage provided with a rotatable platen, means for limiting the rotation of the platen to one direction, printing mechanism, in combination with a reciprocating member arranged to frictionally engage the paper to advance the same a previously indicated distance at each operation of the printing mechanism, and means for guiding and feeding the paper to the point of contact between said reciprocating member and the platen.

32. In a device of the kind described, a longitudinally movable carriage and a rotary platen mounted on a horizontal axis, supported on the carriage, means for limiting the rotation of said platen to one direction, a friction roller mounted on a horizontal axis arranged at one side of the platen adapted to engage a sheet to be printed between the platen and roller, printing mechanism to coöperate with the paper, means for limiting the rotation of the friction roller to a direction in opposition to that of the platen, and means whereby the roller may move vertically relative to the platen in contact therewith.

33. In a device of the kind described, a longitudinally movable carriage, and a rotary platen mounted on a horizontal axis supported on the carriage, a friction roller mounted on a horizontal axis arranged at one side of the platen, adapted to engage a sheet to be printed, between the platen and roller, printing mechanism to coöperate with the paper, means for limiting the rotation of the platen and roller to relative reverse directions, means for moving the roller into and out of contact with the platen, and said roller being movable vertically while in contact with the platen.

34. In a device of the kind described, a longitudinally movable carriage, and a movable platen mounted thereon, in combination with reciprocating engaging means, means arranged to normally hold said engaging means in position to coöperate with said platen to engage a sheet of paper between the platen and said engaging means, means for moving said engaging means while in frictional engagement with the platen and the interposed paper to move the platen and the engaged paper, and means for feeding the paper to the point of contact between said friction engaging means and the platen.

35. In a device of the kind described, a longitudinally movable carriage, and a rotary platen mounted thereon, in combination with reciprocating engaging means, resilient means arranged to normally hold said engaging means in position to coöperate with said platen to engage the paper between the platen and said engaging means, means for moving said engaging means while the paper is held thereby against the platen, to rotate the platen and move the engaged paper therewith, and means for feeding the paper to the point of contact between said engaging means and the platen.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

DANIEL W. SHIEK.

Witnesses:
JOHN W. HILL,
CHARLES I. COBB.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."