929,293.

A. B. DICK.

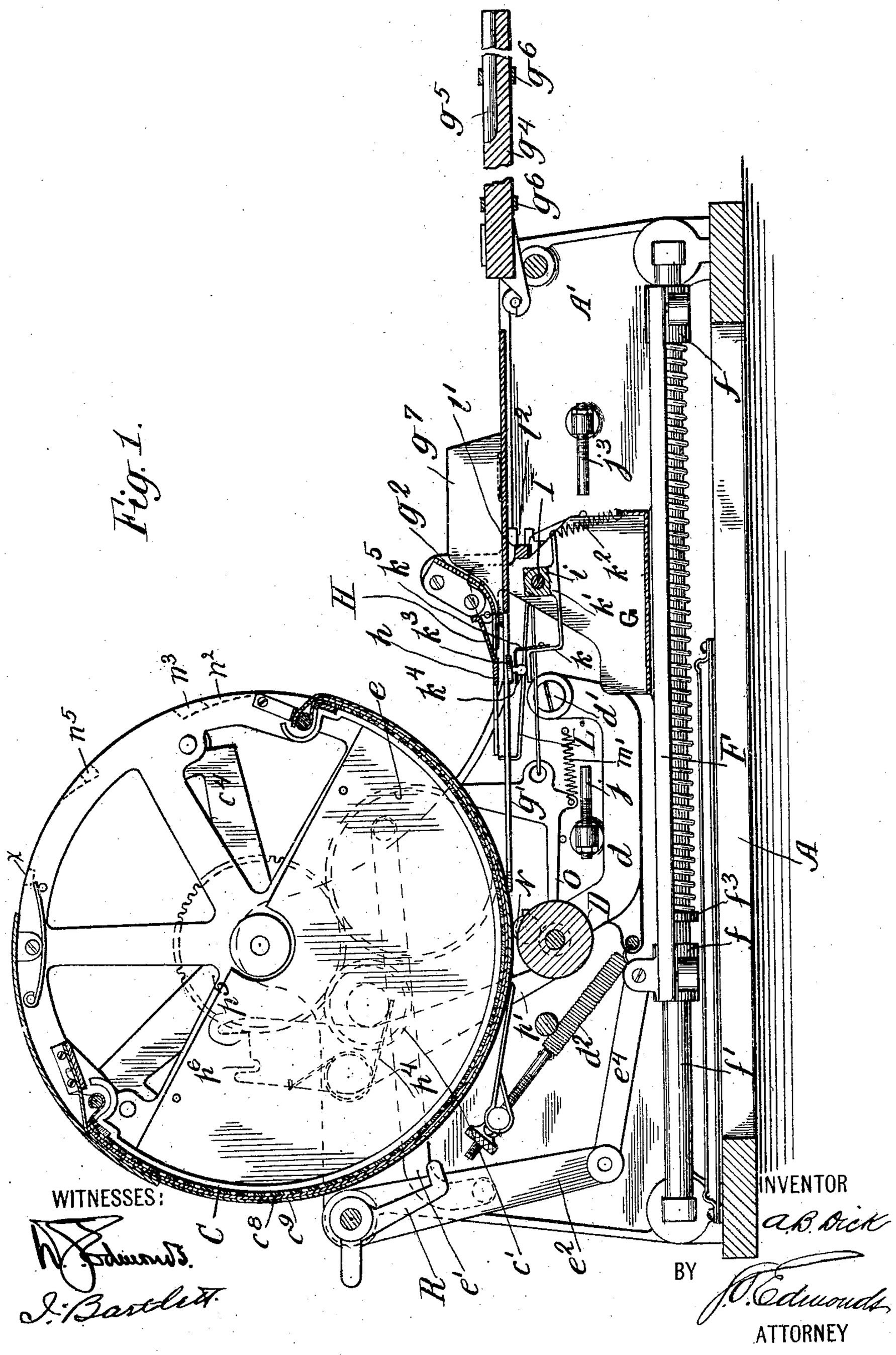
SHEET FEEDING APPARATUS.

APPLICATION FILED AUG. 18, 1908.

Patented July 27, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

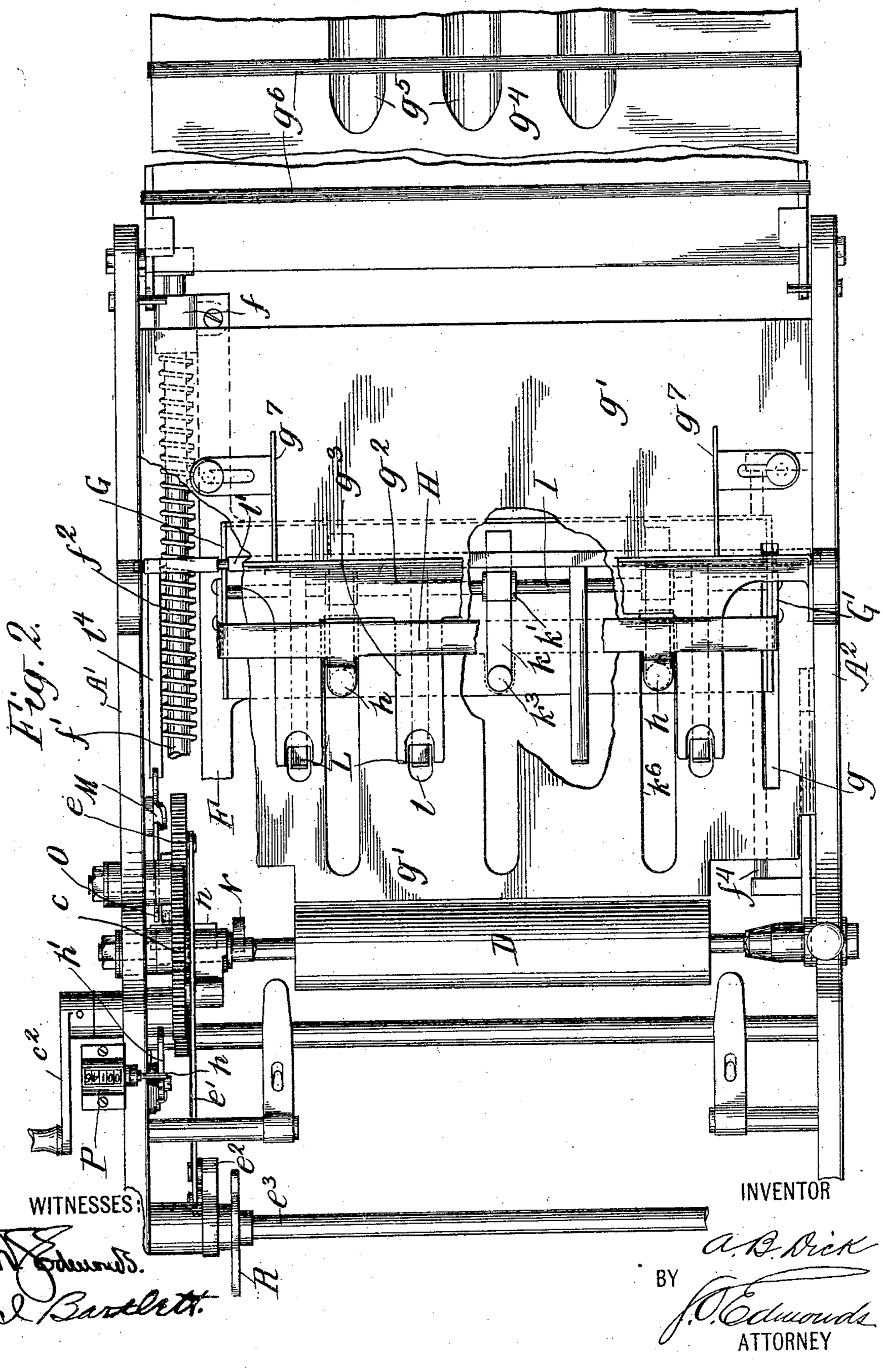

Fig. 2.

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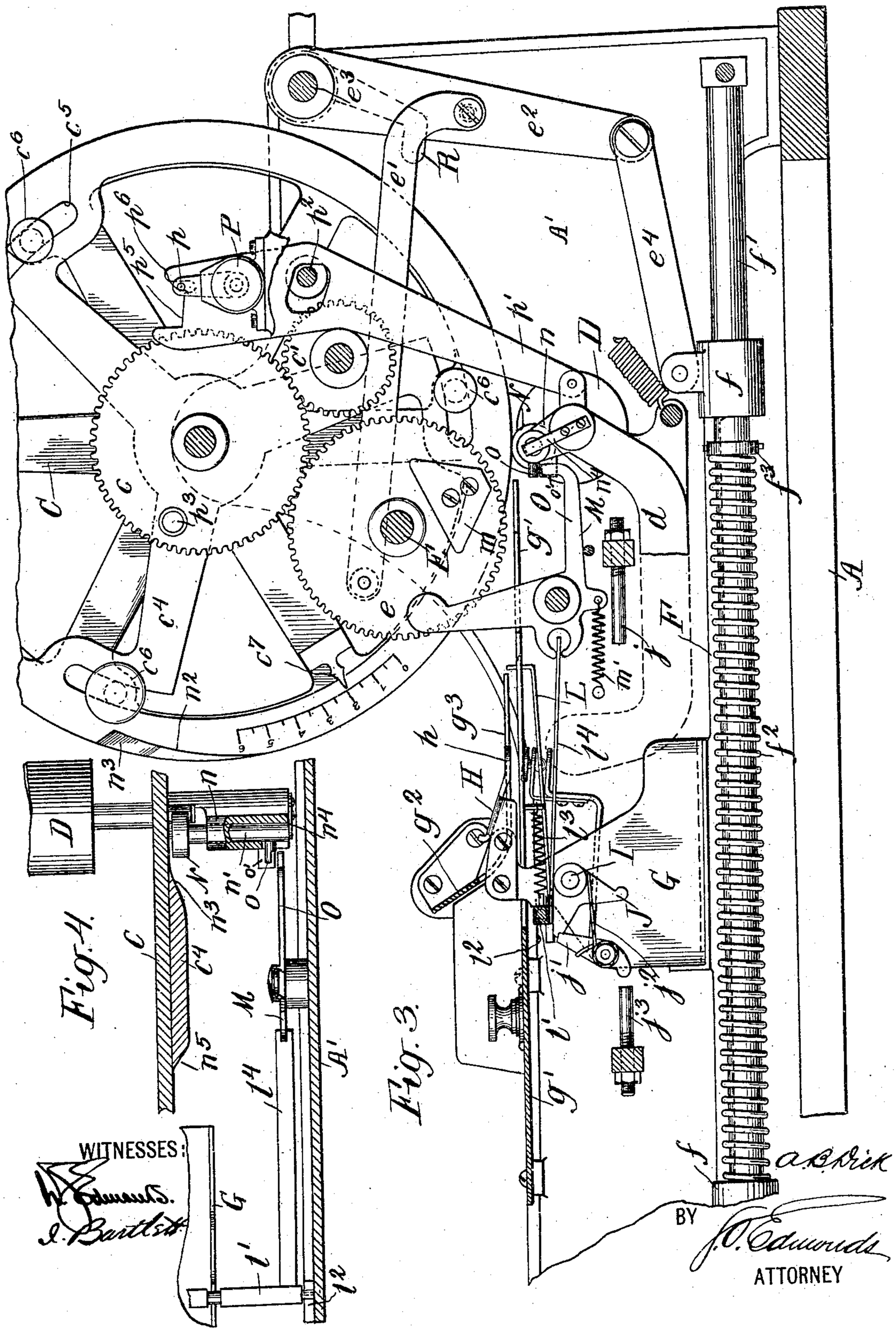
3 SHEETS—SHEET 3.



ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT B. DICK, OF LAKE FOREST, ILLINOIS, ASSIGNOR TO A. B. DICK COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-FEEDING APPARATUS.

No. 929,293. Specification of Letters Patent. Patented July 27, 1909.

Application filed August 18, 1908. Serial No. 449,010.

To all whom it may concern:

Be it known that I, ALBERT B. DICK, a citizen of the United States, residing at Lake Forest, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Sheet-Feeding Apparatus, of which the following is a specification.

This invention relates to apparatus for feeding sheets successively to printing, folding and similar machines, and particularly to stencil-duplicating machines having a stencil-carrying drum and a pressure-roller between which the sheets are fed.

The object of the invention is to effect certain improvements in the construction of devices for this purpose to the end that an apparatus is provided which is simple in construction, which is uniform and reliable in operation and with which accurate registration may be obtained .

In accordance with the invention, paper-stops are provided for arresting a sheet in feeding position, these stops being movable to inoperative position to permit the sheets to pass them, and means are employed for forwarding the sheets from this feeding position to the member or members which are to act upon the sheets. When a sheet is moved to carry its edge into coaction with a stop, it frequently happens that the sheet is buckled slightly, and, on being released, the sheet flattens out under its own weight and in doing so moves a slight distance away from the stop. As this movement takes place in some cases only and as the amount of the movement varies, the position of the impressions or folds received by the sheets varies and the registration of the printed matter or folds with other matter on the sheet is therefore poor. One object of this invention is to overcome this objectionable characteristic of machines of this class and this is accomplished by providing means for moving the sheets rearwardly or away from the member which is to act thereon after the sheets have been fed forward and released. This is preferably done by moving the paper stops against which the sheets are fed to carry the sheets a slight distance in a direction opposite to that in which they are moved to bring them into coaction with the stops. When the stops are moved thus, the sheet slides over the surface of its support and as a result of this movement, when the stops come to rest the edge of the sheet is always in contact therewith.

Another object of the invention is to provide means whereby the presence of a sheet in feeding position controls the operation of the devices which act upon the sheet. In a stencil-duplicating machine having a stencil-carrying drum and pressure-roller, the presence of a sheet may be made to control the position of the pressure-roller so that when no sheet is fed the roller will be held out of coaction with the drum and its surface will not receive ink from the drum. The operation of a cyclometer register may also be made dependent upon the feeding of a sheet so that this register will record, not the number of operations of the members adapted to act upon the sheets, but the number of sheets which are fed to these members. This and other features of the invention will be more fully disclosed hereinafter and definitely set forth in the claims appended hereto.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which—

Figure 1 is a central section of the machine, Fig. 2 is a plan view of the same, broken away in part, with the stencil-carrying drum removed, Fig. 3 is a view of a portion of the operating mechanism of the machine adjacent to one of the side-frames of the machine, and Fig. 4 is a detail view hereinafter referred to.

Referring to these drawings, the machine consists of a base A on which are mounted side-frames A′ A². The stencil-carrying drum C is mounted for rotation in bearings formed in these side-frames and has a gear *c* adapted to be affixed to one end thereof and meshing with a pinion *c′* secured on a stub-shaft mounted for rotation in the side-frame A′ and carrying an operating handle c^2. The gear *c* is loose on the stub-shaft at one end of the stencil-carrying drum C and is secured in any suitable manner to a circular spider c^4 provided with arc-shaped slots c^5 through which screws c^6 are adapted to extend, the ends of these screws entering threaded openings in the head of the drum C. The spider c^4 has a scale marked thereon as shown in Fig. 3 and an index c^7 is secured to the head of the drum in position to coact with this scale. The drum C is adapted to have an ink-pad c^8 and a stencil-

sheet c^9 secured about the cylindrical surface thereof in the usual manner. The pressure-roller D is adapted to coact with the cylinder C to effect the printing, this roller being mounted for rotation in the ends of arms d which are pivotally mounted at d' upon the side-frames of the machine. Springs d^2, each connected at one end to an arm d and at the other to the adjacent side-frame, act on the arms in a direction to carry the roll D upwardly into coaction with the cylinder C.

Mounted for rotation upon a stub-shaft E extending inwardly from the side-frame A′ is a gear e meshing with the gear c. A link e' is pivotally connected eccentrically to the gear e at one end and at its other end is pivotally connected to an arm e^2 secured to and extending downwardly from a shaft e^3 mounted for rotation in the side-frames of the machine. The lower end of the arm e^2 is connected by means of a link e^4 to a frame F having two sleeves f formed thereon through which extends a rod f' mounted upon the inner side of side-frame A′. A spring f^2 is coiled on rod f' and is secured to the rod at one end by a collar f^3. The other end of spring f^2 bears upon one of the sleeves f of the frame F so that this spring normally presses frame F to the left in Fig. 3 and in this way insures uniform operation by preventing back-lash. The frame F is extended across the machine and its edge adjacent to the side-frame A^2, is provided with a groove adapted to receive a rod f^4 mounted upon the inner side of the side-frame A^2 so that the frame F is guided in its reciprocating movement by the rods f' and f^4.

Mounted upon the frame F adjacent to opposite edges thereof are two gripper-carriers G, G′ which extend upwardly through slots g in a sheet-metal plate g' forming part of the feed-board of the machine and mounted upon side-frames. The side-frames of the machine above the plate g' are connected by a sheet-metal plate g^2 provided with fingers g^3 extending forwardly parallel to and a slight distance above the plate g', the forward ends of these fingers being bifurcated as shown in Fig. 2. Secured to the gripper-carriers is a sheet-metal plate H having projections h extending forwardly therefrom, their ends being disposed parallel to and a slight distance above the plate g'. These projections h constitute the upper gripper-jaws.

Extending between the gripper-carriers G, G′ below the plate g' and mounted for rotation in the carriers is a shaft I having square blocks i secured thereon corresponding in number to the upper gripper-jaws h. The lower gripper-jaws k consist of sheet-metal pieces bent as shown in Fig. 1 and each provided with integral, upwardly-turned ears k' lying one on either side of one of the blocks i and having openings through which the shaft I extends. The rear end of each of these jaws is connected by a spring k^2 to the frame F. At its forward end each of the lower gripper-jaws k is provided with a pad k^3, on the bottom of which is a stem provided with a spherical head k^4 (Fig. 1) lying between the end of the sheet-metal piece k and a piece k^5 affixed thereto in order that the pad can turn in any direction so that its face will be parallel to the face of the corresponding upper gripper-jaw.

Secured to the shaft I near one end thereof is a member J (Fig. 3) having two arms, one of which is adapted to engage an adjustable stop j mounted upon the side-frame A′ in order to rock the member J and the shaft I to which it is affixed. When thus rocked, the member J is adapted to be held in position by a latch j' pivotally mounted upon the gripper-carrier G and acted upon by a spring j^2 to cause its upper end to turn toward the member J. The lower end of the latch j' is adapted to engage an adjustable stop j^3 mounted upon the side-frame A′. As shown in Fig. 3, member J is provided with a notch into which the upper end of latch j' is adapted to enter. When the frame F and the gripper-carriers move rearwardly, the latch j' engages the stop j^3 and is rocked on its pivot to carry its end out of the notch in member J and the springs k^2 acting on the lower gripper-jaws may then turn those jaws and the shaft 5 and member J to project the ends of the lower gripper-jaws through slots k^6 in the plate g' and into engagement with the upper gripper-jaws h or a sheet extending between the jaws. When frame F and the carriers are moved forwardly, the member J engages stop j and the shaft I and member J are rocked against the tension of the springs k^2 to such a position that the spring j^2 may turn latch j' to carry its end into the notch in member J and thus hold member J and shaft I against the tension of springs k^2. When shaft I is thus rocked, the blocks i thereon act on the lower gripper-jaws to turn them in a direction to carry their operative ends downwardly through the slots k^6 in plate g''.

In order to arrest the movement of the sheets in feeding position, in which position they are picked up by the grippers and carried to the printing-member, a plurality of stops L are provided having upwardly-turned ends which project through openings l in the plate g' under the spaces between bifurcations of the arms g^3. The stops L are secured to a bar l' extending between the side-frames of the machine and having their ends rounded and movable in slots formed on the inner sides of the side-frames, as shown at l^2 in Figs. 1 and 3. Bar l' has springs l^3 connected thereto and to pins de-

pending from plate g' so that the springs tend to move the bar and the stops toward the printing-member to the position in which the stops are shown in Fig. 2, in which position the bar is arrested by the closed ends of the slots l^2. The gripper-carriers G, G' are so shaped that their edges engage bar l' during the rearward movement of the gripper-carriers just before the carriers reach the end of that movement so that bar l' and the stops carried thereby move with the grippers and gripper-carriers during a small portion of the return movement of the bars at the end of that movement. The stops L are movable to operative and inoperative positions by the rocking of bar l', this rocking movement being effected by an arm l^4 secured to bar l' at one end and having the other end entering a notch in a member M pivotally mounted upon the side-frame A'. This member M is provided with an upwardly extending arm, the end of which lies in the path of a cam m secured upon gear e. A spring m' acts on member M to turn it on its pivot in a direction to carry stops L to the operative position, the movement of member M being arrested by a stop on the side-frame.

The feed-board of the machine consists of a board g^4 additional to the sheet-metal plate g' and mounted upon the side-frame of the machine with its upper surface in substantially the same plane as the surface of plate g'. Board g^4 has a plurality of depressions g^5 therein running lengthwise thereof and extending to the rear edge of the board. Also rubber bands g^6 may be provided extending around board g^4. Adjustable side-guides g^7 may be provided upon the plate g' to coact with the lateral edges of the sheets.

The periphery of the circular spider c^4 serves as a cam to position the pressure-roller D underlying the stencil-carrying drum. For this purpose the arm d adjacent to the side-frame A' is provided with an offset n in the form of a sleeve (Fig. 4) forming a bearing for a rod n' on the end of which is a roller N adapted to coact with the periphery of the spider c^4. When roller N is bearing on the periphery of spider c^4 the arms d are depressed against the tension of the springs d^2 to such extent that the pressure-roller is out of operative relation to the drum C. In the periphery of spider c^4 is a depression n^2 (Figs. 1 and 3) and as roller N runs along the inclined wall of this depression the pressure-roller rises to its operative position. This depression n^2 in spider c^4 is provided with an inclined side-wall n^3 (Figs. 3 and 4) and as this inclined side-wall engages the side of the roller N the roller is moved laterally against the tension of a leaf-spring n^4 bearing against the end of rod n'. A second depression n^5 (Figs. 1 and 4) is provided in the periphery of spider c^4 beyond the depression n^2 and when this depression n^5 comes opposite roller N the roller will, unless it is held against such movement, move laterally under the pressure of spring n^4 to carry it back into position for coaction with the periphery of spider c^4. Thus, if rod n' and roller N are not held against lateral movement under the tension of spring n^4, roller N will be moved into depression n^5 and ride up the inclined bottom wall thereof upon the periphery of spider c^4 upon which it will travel throughout the rotation of the cylinder C, until depression n^2 comes around again and the pressure-roller D will be held in its depressed or inoperative position. However, when rod n' and roller N are held against lateral movement into the depression n^5, roller N will remain at one side of the spider c^4 throughout the revolutions of the cylinder and the springs d^2 will hold roller D upwardly in coaction with the cylinder. The holding and releasing of rod n' and roller N is controlled by the sheets fed forwardly by the grippers so that when a sheet is fed between the cylinder and pressure-roller the latter, when it moves upwardly, will be allowed to remain in the upward or operative position, but when no sheet is fed forwardly by the grippers, the roller D will be held in the lower or inoperative position. On the rod n' is a pin o passing through a slot in the sleeve n. The member M is provided with an arm O extending laterally and provided with an upwardly turned end adapted to coact with the pin o. Offset n may have a projection o' formed thereon lying at the side of the end of arm O and serving to brace the arm against lateral strain.

By reference to Fig. 4 it will be seen that the lateral movement of roller N and rod n effected by the inclined wall n^3 carries pin o over the end of the arm O to a position at the side of that arm away from the drum C so that if arm O moves upwardly while pin o is in this position the pin and roller will be held thereby against returning to their former positions. When the cam m passes the upwardly extending arm of member M, spring m' will turn member M and the stops L to the positions in which they are shown in Fig. 3 if no sheet has been fed forward by the grippers, and in this position of member M, the end of arm O will be below the pin o and hence will not hold rod n' and roller N against lateral movement. However, if a sheet has been fed forward past the stops L by the grippers, then when member M is released by cam m, spring m' will turn member M and stops L a less extent since the stops will be arrested in their upward movement by the sheet which has been forwarded over the ends thereof, and when the stops are thus arrested, the end of arm O will be at one side of the pin o and will preclude lateral movement of the pin, the rod n' and the roller N under the tension of the spring n^4.

Mounted on the side-frame A′ is a cyclometer register P for recording the printed sheets, this being actuated by an oscillating arm carrying a pin p. A lever p' is pivotally connected at one end to an offset on the arm d and has a slot therein through which a headed pin p^2 on frame A′ extends. The upper end of the lever is adapted to be engaged by a pin p^3 on the gear c to turn the lever on its pivot, the lever being returned to its initial position by a spring p^4 (Fig. 1) and being guided in this movement by a pin p^2. In the upper end of lever p' is a wide notch p^5 and a narrow notch p^6. When the pressure-roller D is depressed, lever p'' is carried to such position that pin p is in the wide notch p^5 and then as the lever is rocked by pin p^3, the register will not be operated since the movement of lever p' is not great enough to carry the walls of the wide notch into engagement with pin p. But when the pressure-roller is raised to operative position as a sheet is passed into the machine, lever p' is carried upward until pin p is in the narrow notch p^6; then as lever p' is actuated by pin p^3 and spring p^4 the register will be operated also by the walls of notch p^6 engaging and operating pin p. Thus, the register will keep a record of all the sheets imprinted upon but will not be operated when drum C is rotated but no sheet is fed thereto.

Mounted on shaft e^2 so as to be movable thereon is a latch R one end of which is adapted to enter a depression in the drum C to lock the drum against rotational movement.

The operation of the machine will now be described: The sheets of paper to be imprinted upon are placed upon the feed-board adjacent to the rear edge thereof and sheets are taken successively from the top of the pile and passed forward manually until the movement of the sheet is arrested by the coaction of its forward edge with the stops L. The construction of the feed-board is such that the removal of individual sheets from the top of the pile is greatly facilitated, this being due to the provision of the depressions in the face of the feed-board extending to the rear edge of the board. As the stencil-carrying cylinder is rotated by handle e^2, the frame F, carriers G, G′ and the grippers will be reciprocated so that the grippers move forward once for each revolution of the cylinder. As the grippers move rearwardly the lower grippers k are held in the depressed position below the surface of the feed-board since shaft I and member J are held in the position in which they are shown in Fig. 3 by the latch j' and the blocks i on shaft I hold the grippers k in the depressed positions. As the grippers approach the end of this rearward or return movement the carriers G, G′ engage rod l' and move the latter therewith a short distance against the tensions of springs l^3, thus carrying the stops L rearwardly with the grippers a short distance. In this movement the stops move the sheet which has been fed forward into coaction therewith over the surface of the feed-board so that when the stops come to rest the edge of the sheet will be in engagement with the stops regardless of whether or not the sheet was accurately positioned in feeding it forward manually while the stops were in their forward position. At the end of this rearward movement of the carriers, grippers and stops, the latch j' engages stop j^3 and is rocked thereby against the tension of its spring to release member J, and shaft I being thus released, the springs k^2 turn the gripper-jaws k together with blocks i, shaft I and member J to carry the ends of the grippers upwardly through the slots k^6 in the feed-board and the gripper-jaws k grip the sheet between them and the upper gripper-jaws h. The forward movement of the carriers and grippers then begins, the grippers carrying with them the sheet held between them until the forward edge of the sheet passes over the pressure-roller D and between the latter and the drum C. Immediately after the gripper-jaws grip the sheet and before the forward movement of the sheet begins the cam n engages member M and turns the latter against the tension of spring m' thus rocking rod l' by means of arm l^4 in order to depress the stops L below the surface of the feed-board. When the forward movement of the grippers and sheet has carried the forward edge of the sheet past the ends of stops L, cam m permits member M to be returned by spring m' so that the stops L are projected upwardly through openings l in contact with the under side of the sheet so that a second sheet may be fed forward manually immediately and while the first sheet is being fed forward mechanically and will be arrested in proper position by the stops L.

Just before the forward edge of the sheet is projected over the pressure-roller the depression n^2 comes around into coaction with roller N and the roller is en aged by the inclined side-wall n^3 and moved laterally thereby against the tension of spring n^4. Roller N is held in the position to which it is moved thus by the straight-wall beyond the inclined wall n^3 when member M is returned to its initial position by spring m'. As a sheet is passing between stops L and projections q^3, the movement of the stops and of member M is restricted and member M comes to rest in such position that the end of arm O is in the same horizontal plane with pin o. As the rotation of drum C continues the depression n^5 comes opposite roller N but the roller cannot move into this depression since pin o engages the end of arm O and the latter holds the pin and roller against such movement. Therefore

roller N instead of riding on the periphery of cam c^4 will lie at one side of the cam and the springs d^2 hold the pressure-roller D upwardly to press the sheet into coaction with the stencil, the roller N then overlapping the edge of the cam c^4 somewhat. The further rotation of the drum causes the sheet to be imprinted upon in the usual manner. If at any time no sheet is fed forward by the grippers the return movement of stops L will be continued beyond the point at which the stops were arrested by the sheet and member M will be rocked to such a position that the end of arm O is carried below pin *o* so that when depression n^5 comes opposite roller N the roller will move into the depression and ride up the inclined bottom-wall thereof, and in so doing, the roller will depress the ends of arms *d* and thus carry the pressure-roller to inoperative position so that it will not receive ink from the drum.

If it is desired to change the position of the impressions received by the sheets with relation to the edges of the sheets, this can be readily done by merely adjusting the time of reciprocation of the grippers with respect to the rotation of the drum C. To do this it is only necessary to turn latch R on shaft e^3 to the position to carry its end into the depression *x* in the drum C in order to lock the drum against rotation, then loosen the screws c^6 so that spider c^4 may turn relatively to the drum, and then operate the handle c^2. Such operation of the handle when drum C is held against rotation turns spider c^4 relatively to the drum and when the proper relative positions of the drum and spider are obtained the screws c^6 may be tightened up again and the latch R moved to inoperative position. The number of sheets imprinted upon in the operation of the machine is recorded by the cyclometer P, the operation of which is dependent upon the position of the pressure-roller as above explained, which, in its turn, is dependent upon the feeding of sheets between the drum and pressure-roller; thus the cyclometer is not operated when the drum is rotated and no sheet is fed thereto.

One important feature which is characteristic of the mechanism above described is that accurate registration of the impressions received by the sheets with matter previously printed thereon is obtained. This is due principally to the movement of the sheets away from the drum by the rearward movement of the paper-stops L, since in this way the effect of any movement of the sheet as it is released by the hand of the operator is offset. The springs f^2 acting upon the frame of the gripper-carriers also aid in securing good registration, since by preventing back-lash they help in securing uniform operation.

What I claim is:—

1. Sheet-feeding apparatus comprising a printing member, a feed-board from which sheets are forwarded to said member, devices for positioning a sheet upon said board, including means for arresting the movement of the sheet over the board and means for reciprocating said means to move the sheet in a direction opposite that in which it is moved to carry it into coaction with said member, and sheet-forwarding devices for forwarding the sheet from the position to which it is moved by said first-named means to said printing member, substantially as set forth.

2. Sheet-feeding apparatus comprising a printing member, a feed-board, means for positioning a sheet upon said board by arresting the movement of the sheet over the board and moving the sheet in a direction opposite that in which it is moved to carry it into coaction with said member, said means including a stop coacting with the forward edge of the sheet and means for reciprocating said stop, and sheet-forwarding devices for forwarding the sheet from the position to which it is moved by said means to said printing member, and means for moving said stop to operative and inoperative positions, substantially as set forth.

3. Sheet-feeding apparatus comprising a printing member, a feed-board, means for positioning a sheet upon said board by arresting the movement of the sheet over the board and moving the sheet in a direction opposite that in which it is moved to carry it into coaction with said member, said means including a stop coacting with the forward edge of the sheet, means movable independently of said stop for forwarding the sheet, and means for moving the stop to inoperative position to permit the sheet to pass the stop and for returning it to operative position immediately after the edge of the sheet has passed the stop and while the body of the sheet is passing it to arrest the movement of a second sheet fed over said board, substantially as set forth.

4. Sheet-feeding apparatus comprising a printing member, a feed-board, a stop for arresting the movement of the sheet fed over said board, means for reciprocating the stop to move a sheet in a direction opposite that in which the sheet is moved to carry it into coaction with the stop, means for moving the stop to operative position for coaction with the edge of a sheet and to inoperative position to permit the sheet to pass, and sheet-forwarding devices operating upon a sheet after the sheet has been moved by the stop for forwarding the sheet from the position to which it is moved by the stop to said printing member, substantially as set forth.

5. Sheet-feeding apparatus comprising a printing member, a feed-board, a stop for arresting the movement of a sheet fed over

said board, means for moving the stop to operative and inoperative positions, means for moving the stop in a direction opposite that in which the sheet is moved to carry it into coaction with the stop, and means supported independently of said stop movable relatively thereto and operating upon a sheet only after the sheet has been moved by the stop for forwarding the sheet from the position to which it is moved by the stop to said printing member, substantially as set forth.

6. Sheet-feeding apparatus comprising a printing member, a feed-board, a stop for arresting the movement of a sheet fed over said board, means for moving said stop backward in a direction opposite that in which the sheet is moved to carry it into coaction with the stop, and means for forwarding the sheet from the position to which it is moved by the stop to said member, the movement of said forwarding means being independent of the movement of said stop except during the backward movement of the stop when the stop and forwarding means move together, substantially as set forth.

7. Sheet-feeding apparatus comprising a rotary printing member, a feed-board, means adjacent to said member for positioning a sheet upon said board including devices for arresting the movement of a sheet over the board and for moving the sheet in a direction opposite that in which it is moved to carry it into coaction with said member, and means reciprocating adjacent to said member for forwarding the sheet from the position to which it is moved to said member, substantially as set forth

8. Sheet-feeding apparatus comprising a rotary printing member, a feed-board, means adjacent to said member for positioning a sheet upon said board including devices for arresting the movement of a sheet over the board and for moving the sheet in a direction opposite that in which it is moved to carry it into coaction with said member, gripper-jaws, and means for reciprocating the gripper-jaws to feed the sheet from said position to said member, substantially as set forth.

9. Sheet-feeding apparatus comprising a feed-board, a stop for arresting the movement of a sheet fed over said board, means for moving the stop to inoperative position to permit the sheet to pass the stop and for returning it to operative position immediately after the edge of the sheet has passed the stop and while the body of the sheet is passing it to arrest the movement of a second sheet fed over said board, means for moving the stop in a direction opposite that in which the sheet is moved to carry it into coaction with the stop, and means movable independently of said stop for forwarding the sheet, substantially as set forth.

10. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, and means for moving the stop to move a sheet in a direction opposite to that in which it is moved by the gripper-jaws, substantially as set forth.

11. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, and means for moving the stop with the gripper-jaws during a portion of the return movement thereof, substantially as set forth.

12. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, means for moving the same to operative and inoperative positions, and means for moving the stop to move a sheet in a direction opposite to that in which it is moved by the gripper-jaws, substantially as set forth.

13. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, means for moving the same from operative to inoperative position to permit a sheet to pass the stop, means for returning the stop to operative position immediately after the edge of the sheet has passed the stop to arrest a second sheet fed into coaction therewith, and means for moving the stop to move a sheet in a direction opposite to that in which it is moved by the gripper-jaws, substantially as set forth.

14. Sheet-feeding apparatus comprising the combination of a feed-board, a gripper-jaw mounted above and movable parallel to the plane of the feed-board, a gripper-jaw movable toward and away from said jaw to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, and means for moving the stop to move a sheet in a direction opposite to that in which it is moved by the gripper-jaws, substantially as set forth.

15. Sheet-feeding apparatus comprising the combination of a feed-board, a gripper-jaw mounted above and movable parallel to the plane of the feed-board, a gripper-jaw movable toward and away from said jaw to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, and means for moving the stop with

the gripper-jaws during a portion of the return movement of said jaws, substantially as set forth.

16. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a paper-stop mounted for movement in the direction in which said jaws are movable, a spring for moving the stop in one direction, and means for causing said gripper-jaws to move said stop against the tension of the spring during a portion of the return movement of said jaws, substantially as set forth.

17. The combination of a stencil-carrying drum, a pressure-roller coacting therewith, gripper-jaws, means for operating said jaws to cause them to grip and release a sheet, a single means for rotating said drum and for reciprocating said jaws to cause the jaws to feed a sheet in one direction and then return to initial position, a stop, means for moving the stop to move a sheet in a direction opposite to that in which it is moved by the gripper-jaws, and means for effecting an adjustment the time of reciprocation of the gripper-jaws with respect to the rotation of said drum, substantially as set forth.

18. The combination of a stencil-carrying drum, a pressure-roller coacting therewith, gripper-jaws, means for operating said jaws to cause them to grip and release a sheet, a single means for rotating said drum and for reciprocating said jaws to cause the jaws to feed a sheet in one direction and then return to initial position, paper-stops, means for moving the same to operative and inoperative positions, means for moving the stops to move a sheet in a direction opposite to that in which it is moved by the gripper-jaws, and means for effecting an adjustment of the time of reciprocation of the gripper-jaws with respect to the rotation of said drum, substantially as set forth.

19. The combination of a stencil-carrying drum, a pressure-roller coacting therewith, a feed-board, a gripper-jaw mounted above and movable parallel to the plane of the feed-board, a gripper jaw movable toward and away from said jaw to grip and release a sheet, a single means for rotating said drum and for reciprocating said gripper-jaws to cause said jaws to feed a sheet in one direction and then return to initial position, paper-stops, means for moving said stops from operative to inoperative position to permit a sheet to pass the stops and for returning the stops to operative position immediately after the edge of the sheet has passed the stops to arrest a second sheet fed into coaction with the stops, means for moving the stops to move the sheet in a direction opposite to that in which it is moved by the gripper-jaws, and means for effecting an adjustment of the time of reciprocation of the gripper-jaws with respect to the rotation of said drum, substantially as set forth.

20. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed a sheet in one direction and then return to initial position, a stop, a cam-mechanism for moving the stop to operative and inoperative positions, said mechanism permitting movement of the stop independently thereof, and means for moving the stop while in operative position to move a sheet in a direction opposite to that in which it is moved by said gripper-jaws, substantially as set forth.

21. The combination of a stencil-carrying drum, a pressure-roller coacting therewith, reciprocating gripper jaws for feeding sheets between the drum and roller, means for moving said jaws relatively to cause them to grip and release a sheet, a single means for rotating said drum and reciprocating said jaws, and means for effecting an adjustment of the time of reciprocation of the gripper-jaws with respect to the rotation of the drum including a lock for holding the drum against rotation and means for disconnecting the drum from said rotating means therefor, substantially as set forth.

22. The combination of a rotary printing member, a feed-board, means for positioning a sheet on said board including means for arresting the movement of a sheet over the board and for moving the sheet in a direction opposite that in which it is moved to carry it into coaction with said member, means for forwarding a sheet from the position to which it is moved by said means to said member, a single means for rotating said member and operating said forwarding means, and means for effecting an adjustment of the time of operation of said forwarding means with respect to the rotation of said member, substantially as set forth.

23. The combination of a rotary printing member, a stop for positioning a sheet, means for moving the stop in a direction to move a sheet away from said member, means movable relatively to said member for forwarding a sheet from the position to which it is moved by said means to said member, a single means for rotating said member and operating said forwarding means, and means for effecting an adjustment of the time of operation of said forwarding means with respect to the rotation of said member, substantially as set forth.

24. The combination of a rotary printing member, means for positioning a sheet and moving the sheet away from said member, sheet-forwarding devices, means for reciprocating said forwarding devices to forward a

sheet from the position to which it is moved by said means to said member, a single means for rotating said member and operating said reciprocating means for the sheet-forwarding devices, and means for effecting an adjustment of the time of reciprocation of said forwarding devices with respect to the rotation of said member, substantially as set forth.

25. Sheet-feeding apparatus comprising a rotary printing member, means adjacent to said member for positioning a sheet and moving the sheet in a direction away from said member, and means operating between said moving means and said member for forwarding a sheet from the position to which it is moved to said member, substantially as set forth.

26. Sheet-feeding apparatus comprising a rotary printing member, a stop adjacent to said member for positioning a sheet, means for moving the stop to carry the sheet in a direction away from said member, and means movable relative to said member and operating between said moving means and said member for forwarding a sheet from the position to which it is moved to said member, substantially as set forth.

27. Sheet-feeding apparatus comprising a rotary printing member, a stop adjacent to said member for positioning a sheet, means for moving the stop to carry the sheet in a direction away from said member, and means reciprocating adjacent to said member for forwarding the sheet from the position to which it is moved to said member, substantially as set forth.

28. Sheet-feeding apparatus comprising the combination of gripper-jaws, means for operating the same to grip and release a sheet, means for reciprocating the gripper-jaws to feed the sheet in one direction and then return to initial position, a stop for positioning the sheet, and means for moving the stop to carry the sheet from such position in a direction opposite that in which it is moved by said gripper-jaws, substantially as set forth.

29. The combination of a printing couple one member of which is adapted to rotate, means for forwarding sheets to said couple successively, means dependent upon the coaction of the parts of said forwarding means with a sheet for making said couple operative or inoperative, a single means for rotating said rotary member and operating said forwarding means, and means for effecting an adjustment of the time of operation of said forwarding means with respect to the rotation of said member, substantially as set forth.

30. The combination of a printing couple one member of which is adapted to rotate, reciprocating forwarding devices for forwarding sheets to said couple successively, means dependent upon the coaction of the parts of said forwarding devices with a sheet for making said couple operative or inoperative, a single means for rotating said member and reciprocating said forwarding means, and means for effecting an adjustment of the time of reciprocation of said forwarding means with respect to the rotation of said member, substantially as set forth.

31. The combination of a printing couple one member of which is rotary, a stop for arresting a sheet in feeding position, means for forwarding a sheet from the feeding position between the members of said couple, means for moving said stop to inoperative position to permit a sheet to be forwarded past the stop and then returning it to operative position in contact with the sheet, means dependent upon the coaction of the stop when thus returned with a sheet for making said couple operative or inoperative, a single means for operating said forwarding means and rotating said member, and means for effecting an adjustment of the time of operation of said forwarding means with respect to the rotation of said member, substantially as set forth.

32. The combination of a movable member for acting upon a sheet, sheet-feeding apparatus for feeding sheets to said member including means for positioning a sheet and moving the sheet in a direction away from said member, and means dependent upon the coaction of the parts of said apparatus with a sheet for making said member operative or inoperative, substantially as set forth.

33. The combination of a movable member for acting upon a sheet, a stop for arresting a sheet in feeding position, means for actuating said stop to move the sheet in a direction away from said member, means for forwarding the sheets to said member, and means dependent upon said stop for making said member operative or inoperative, substantially as set forth.

34. The combination of a movable member for acting upon a sheet, a stop for arresting a sheet in feeding position, means for actuating said stop to move the sheet in a direction away from said member, means for moving said stop to inoperative position to permit a sheet to be forwarded past the stop and then returning it to operative position in contact with the sheet, means for forwarding the sheets to said member and means dependent upon the coaction of said stop with a sheet for making said member operative or inoperative, substantially as set forth.

35. The combination of a stencil-carrying drum, a pressure-roller coöperating therewith, a feed-board, sheet-forwarding devices, means for reciprocating said devices to forward sheets successively between said drum and roller, means for positioning a sheet for coaction with said devices by arresting the movement of a sheet over said

board and then moving the sheet in a direction opposite that in which it was moved, and means dependent upon the coaction of said forwarding devices with a sheet for positioning said roller with relation to said drum, substantially as set forth.

36. The combination of a printing couple, a stop for arresting a sheet in feeding position, sheet-forwarding devices, means for reciprocating said devices to forward sheets successively to said couple, means for moving said stop to inoperative position to permit a sheet to pass and then returning it to operative position in coaction with a sheet, and means dependent upon the coaction of said stop with a sheet when thus returned for making said couple operative or inoperative, substantially as set forth.

37. The combination of a printing couple, gripper-jaws, means for operating said jaws relatively to cause them to grip and release a sheet, means for reciprocating said jaws to forward sheets successively to said couple and return to initial position, a stop for positioning a sheet for coaction with said jaws, means for moving said stop to permit the sheet to be forwarded past the stop and then returning it to initial position in contact with the sheet, and means dependent upon the coaction of said stop with a sheet when so returned for making said printing couple operative or inoperative, substantially as set forth.

38. The combination of a stencil-carrying drum, a pressure-roller movable toward and away from the same, a stop for arresting a sheet in feeding position, reciprocating gripper-jaws for forwarding the sheet from the feeding position between said drum and roller, means for moving said stop to inoperative position to permit the sheet to be forwarded past the stop, means for returning the stop to operative position in contact with the sheet immediately after the edge of the sheet has been carried past the stop by said gripper-jaws, and means dependent upon the engagement of the stop with the sheet when thus returned for holding the pressure-roller away from the drum when no sheet is fed by said gripper-jaws and for permitting movement of the roller into coaction with the drum when a sheet is fed, substantially as set forth.

39. The combination of a stencil-carrying drum, a pressure-roller, a cam-mechanism operated by the drum for positioning the pressure-roller, a stop for arresting a sheet in feeding position, means for forwarding the sheet from the feeding position between said drum and roller, means for moving said stop to inoperative position to permit a sheet to be forwarded past the stop and then returning it to operative position in contact with the sheet, and means dependent upon the coaction of the stop when thus returned with the sheet for rendering said cam-mechanism operative to hold the pressure-roller away from the drum when no sheet is fed between the drum and roller, substantially as set forth.

40. The combination of a stencil-carrying drum, a pressure-roller movable toward and away from the same, sheet-feeding apparatus for feeding sheets between the drum and pressure-roller, a cam on said drum, a part moving with said pressure-roller, and means dependent upon the coaction of the parts of said apparatus with a sheet for moving said part to operative and inoperative positions in the former of which it is in engagement with said cam, substantially as set forth.

41. The combination of a stencil-carrying drum, a pressure-roller movable toward and away from the same, sheet-feeding apparatus for feeding sheets between the drum and pressure-roller, a cam on said drum, a part moving with said roller and adapted to coact with said cam, said cam being adapted to move said part to inoperative position, means for moving said part to operative position, and means dependent upon the coaction of the parts of said apparatus with a sheet for precluding movement of said part from inoperative to operative position, substantially as set forth.

42. The combination of a rotatable device for acting upon sheets successively, a feed-board, a stop for arresting a sheet fed over said board and for moving the sheet in a direction opposite to that in which it is moved to carry it into coaction with the stop, sheet-feeding apparatus for forwarding sheets to said device, a single means for rotating said device and operating said apparatus, and means for effecting an adjustment of the time of operation of said apparatus with respect to the rotation of said device, substantially as set forth.

This specification signed and witnessed this 10 day of August, 1908.

ALBERT B. DICK.

Witnesses:
R. R. HARRINGTON,
M. H. BURKART.