(No Model.) 3 Sheets—Sheet 1.

N. F. OLSON.

AUTOMATIC NUMBERING MACHINE.

No. 283,016. Patented Aug. 14, 1883.

Fig. 1.

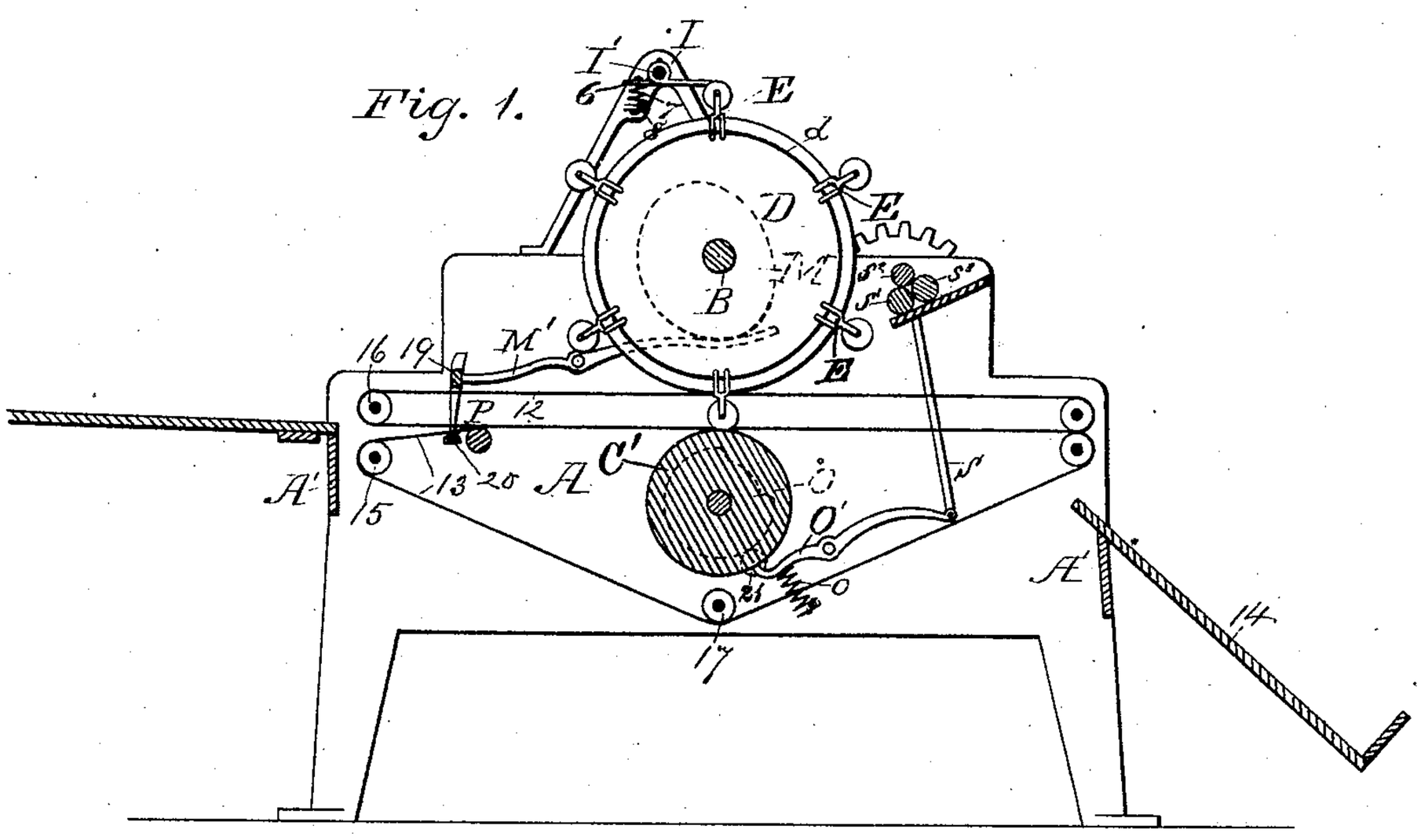

Fig. 7.

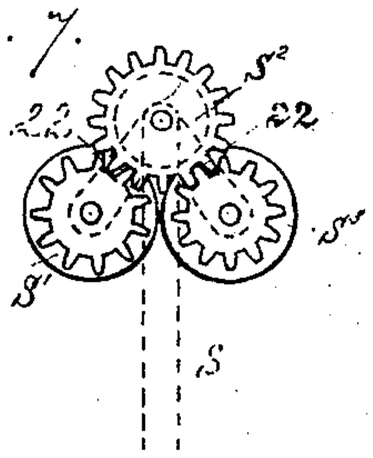

Fig. 2.

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(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

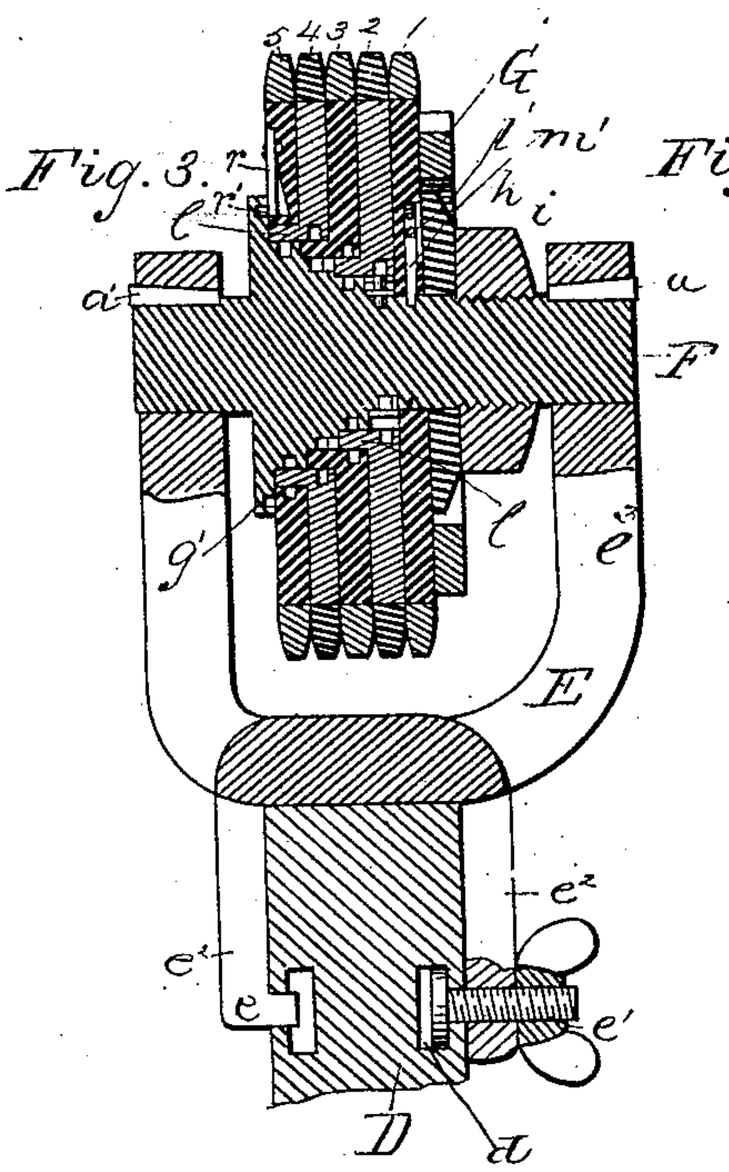


Fig. 4.

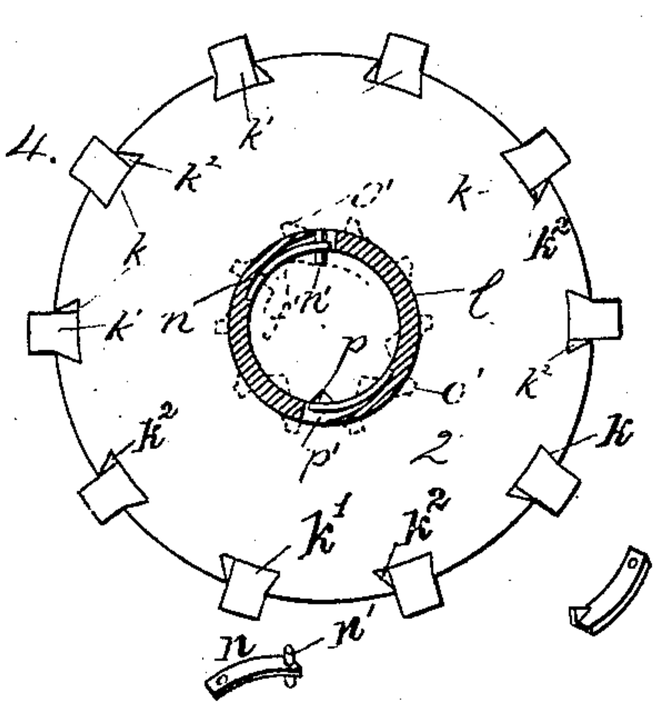


Fig. 5.

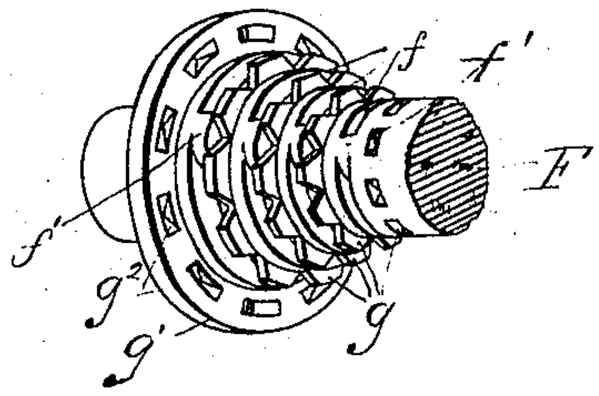
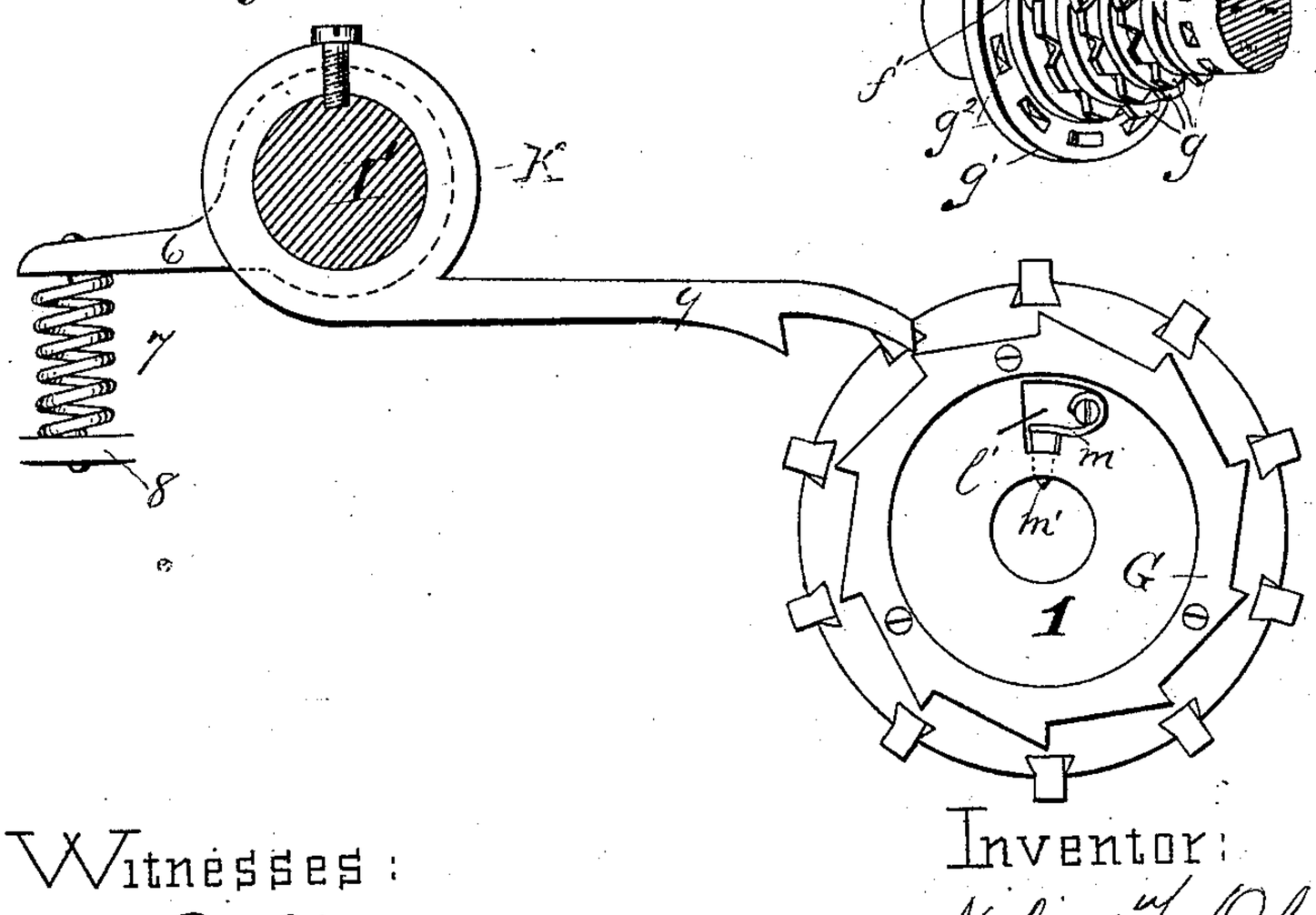


Fig. 6.



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(No Model.) 3 Sheets—Sheet 3.

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AUTOMATIC NUMBERING MACHINE.

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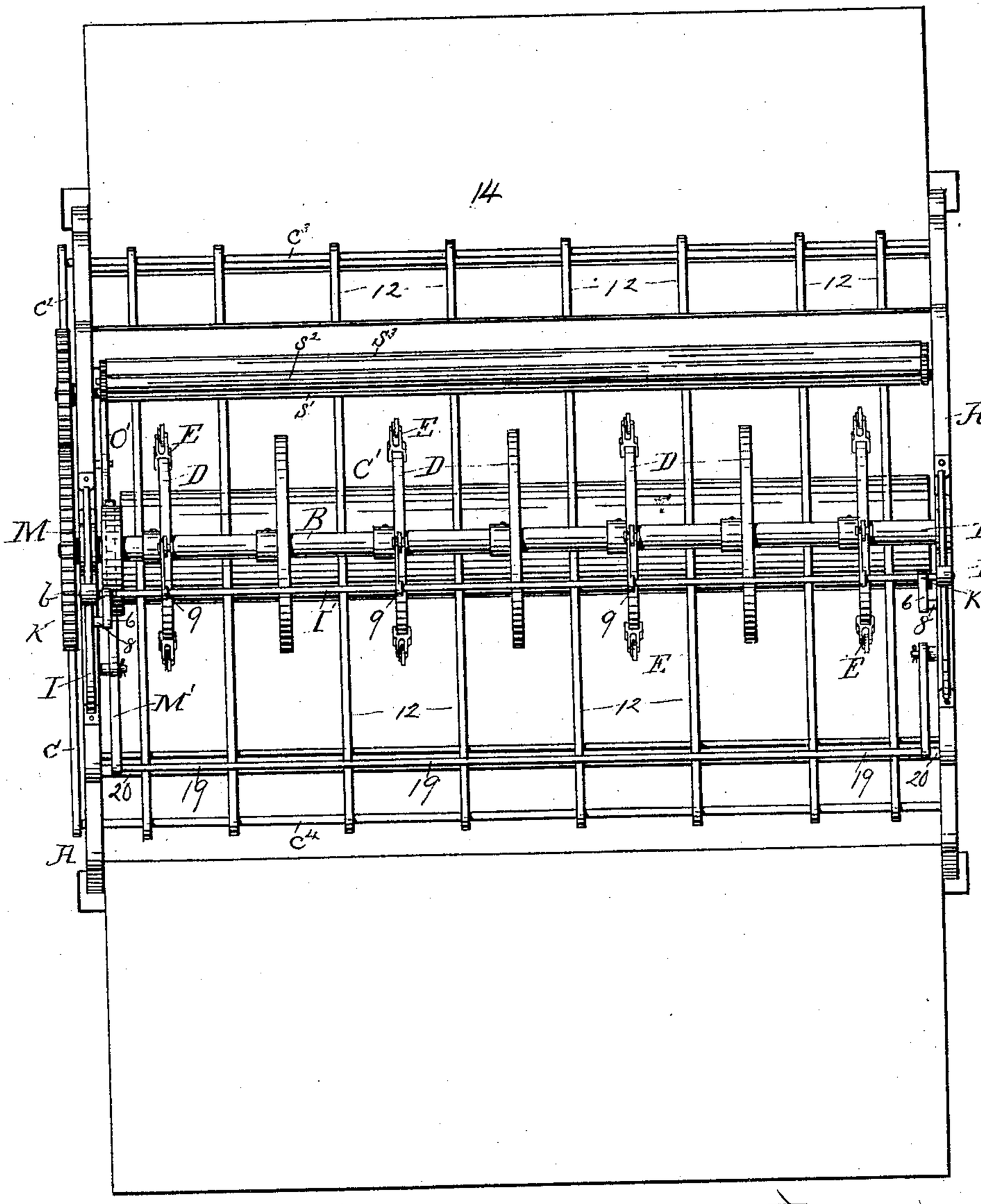
Fig. 8.



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UNITED STATES PATENT OFFICE.

NILS F. OLSON, OF CHICAGO, ILLINOIS.

AUTOMATIC NUMBERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,016, dated August 14, 1883.

Application filed September 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, NILS F. OLSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Numbering-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a multiple numbering-machine that will number a whole sheet of checks, tickets, &c., with ten, fifteen, or more numbers *en route* through the machine instead of printing one number at a time, as is done by machines now in general use. My machine may be run by steam, hand, or foot power, saves a great deal of time, and is easy to work as compared with the old machine, which the operator runs by a treadle, and in which he must at the same time locate the impression of every number by sight, aided only by a pointer, thus necessarily rendering the work hard, tedious, and slow. My invention obviates these objections by means of a series of circular plates arranged and adjusted laterally on a shaft, and having on their periperies a series of figure-disks, which may be readily fixed in any position desired by thumb-screw clamps. The figure-disks are automatically operated by spring-actuated stops or fingers, which intercept the ratchet projecting from the units-disks, and urge it forward the desired number of points, substantially as hereinafter more fully described, and as illustrated in the drawings, in which—

Figure 1 is a vertical longitudinal section of my invention. Fig. 2 is an end view of the same. Fig. 3 is a transverse vertical section of the numbering-disks, showing the manner of securing them in position and how the carrying-frame is movably secured on the periphery of the large circular plates. Fig. 4 is a side elevation of the units numbering-disk having the ratchet attached. Fig. 5 is a perspective view of the stepped and stationary axis on which the numbering-disks revolve. Fig. 6 shows the adjustable pawl or finger for operating the ratchet. Fig. 7 is an end view of the inking-rollers, showing how the motion is imparted from one to the other, and showing in dotted lines the manner of attaching the connecting-rod thereto. Fig. 8 is a plan view of my invention.

In the drawings, A A represent the side and A′ A′ the end frames of my machine, which, when properly secured, make a rectangle or square. Pursuing a central and transverse course from one side frame to the other, and properly journaled in or near the top edges of the same, is the drive-shaft B, actuated by belt and pulley on the end of the same, or by other suitable mechanism. On this shaft B, just within and contiguous to the pulley, is a gear-wheel, *b*, which meshes with the gear-wheel *b′* on the end of the cylinder-shaft C, which is of the same diameter. The shaft C carries the cylinder C′, arranged on a perpendicular line immediately below the drive-shaft. The gear-wheel *b* also meshes with the pinion b^2 on the end of the principal inking-roller shaft, which communicates its motion to the other inking-rollers, substantially as shown in Fig. 7, and as hereinafter more fully described. On the end of the shaft C, just beyond the gear *b′*, is a pulley, *c*, which, by means of the belt *c′* and cross-belt c^2, actuates the tape-roller shafts c^3 c^4.

From the foregoing description it will be perceived that the shafts B and C make the same number of revolutions at the same time, and that the speed of the whole machine is regulated by that of the driving-shaft.

Placed upon and adjustable laterally on the shaft B is a series of circular plates, D, each of which is provided with annular T-mortises *d*, arranged directly opposite each other in either side or face, near the peripheries of the same. These mortises are adapted to receive the feet *e* or the clamping device *e′* on the lower extremities of the legs e^2 of the frame E, straddling and riding on the periphry of the said plates, as shown in Fig. 3.

Permanently secured by keys *a a*, in or near the upper ends of the arms e^3 of the frames E, is the stepped and fixed axis F, each step of which is provided with a circumferential groove, *f*, having in it a cam-surface, *f′*, and a series of ten serrations, *g*, immediately ad-

jacent to said groove. The cam-surface f' should only occupy a little over one-tenth of the circumference of the step in which it is located, and should gradually rise, so as to lift the pin moving over it without creating undue opposition from friction, and should terminate abruptly, so as to precipitate the said pin back into the groove again, as hereinafter more fully set forth. Immediately contiguous to the step of the greatest diameter is a flange, g', having a series of ten angular incisions, g^2, in its inner face, the whole of which is shown in Fig. 5.

Revolving on and around the fixed axis F is a series of disks, 1, 2, 3, 4, and 5, held thereon by a washer, h, and nut i on one side and the flange g' on the other. These disks are all of the same diameter, and have cut in their peripheries a series of ten dovetail mortises, k, which receive the dovetail tenons or shanks of the type k', which are rigidly held in place by the wedges k^2, thus rendering it possible to remove the figure-type k' from the disks when they become worn or damaged, and replaced without necessitating a comparatively large expenditure for a whole cluster of disks and their concomitant parts, as is now the case. Each of the said disks, excepting the last one—that is, the one next the flange g'—has an annular flange, l, projecting at right angles to it from and surrounding the central aperture of the same. Disk 1 has a suitable recess, l', in its outer face, in which is set a volute spring, m, (secured therein by a stub-screw,) pressing downward on the stop m', the lower or inner end of which is conical. Said stop is placed in a radial perforation, having a beveled seat which extends from the recess l' to the first step in the fixed axis, and it is adapted to enter the corresponding recesses or serrations, g, in the same. Arranged diametrically opposite the spring-actuated stop, in a suitable recess in the annular bearing-surface of the flange l of said disk, is a spring, n, conforming to the curvature of the circumference of said bearing-surface, and provided with a pin, n', passing at right angles through its free end, which is adapted to move in the groove f, having the cam-surface f', in the manner hereinbefore described, and substantially as shown in Fig. 4.

On the outer face of the disk 1 is the ratchet G, secured in place by stub-screws, and provided with ten serrations corresponding in position to the ten type. These serrations are engaged by a pawl or finger, which urges them forward one or more points at a time, as will be hereinafter explained. The spring-actuated stop enters the corresponding recesses g one at a time, so as to regulate the exact distance the disks move, which, it will be understood, should be divisible in every instance by one-tenth the circumference of said disks. When the units-disk has completed a revolution and is about to commence another, the spring-actuated pin n' will be urged over the cam-surface f', and projected into one of the series of ten holes, o, in the contiguous surface of the tens-disk 2, and will carry said tens-disks forward one point, or a distance sufficient to carry the type fixed in the periphery of the disk forward one-tenth of the periphery described by them. The pin then drops back into the groove and performs its function once during every revolution in the manner just described. Disk 2 has a spring-actuated pin, n', for transmitting its motion to disk 3, which is similar in construction and in every respect like that of disk 2. The spring-actuated stop, however, is different, the spring being flat, holding in its end a conical projecting piece, p, and fitting and operating in a recess, p', made in the annular bearing-surface of the flange l, diametrically opposite that in which the spring-actuated pin is placed. The projecting piece p enters the serrations of the second step, subserving the same purpose as the spring-actuated stop in the units-disk. Disks 3 and 4, representing the hundreds and thousands column, respectively, are constructed and operate in identically the same manner as disk 2, moving the next successive disk one-tenth of a revolution once during each of its own revolutions. Disk 5, or the last of the series of disks, does not have to communicate its motion to any successive disk. It is therefore minus the flange and the spring-actuated pin for transmitting motion. It is necessary, however, with this, as well as the other disks, to devise some stop-motion. This I accomplish by a flat spring, r, placed in a suitable recess in its outer face, which has on its free inner end a conical-shaped piece, r', which enters the incisions g^2 in the contiguous surface of the flange g'.

By the mechanism just described a perfect-acting automatic numbering device is made, which is positive and accurate in its operation. It is not, however, necessary to limit myself to five disks, as it is obvious more can be used by increasing the number of steps of the fixed axis and a corresponding number of intermediate disks; but in all cases the first and last disks must remain substantially as shown and described.

Mounted on the end frames, A A, are the V-shaped frames I, having suitable bearings in or near their apexes for the rock-shaft I'. On said rock-shaft, just within its bearing at either end, are the collars K, having feet 6 6, extending horizontally therefrom, which, together with a spring, 7, fastened at one end near the extremity of said foot and at the other end in the lug 8, projecting from said frame I, are utilized to regulate the motion of said rock-shaft. Adjustable laterally on the rock-shaft by means of set-screws passing through the boss of the same into a longitudinal slot in said shaft is the series of pawls 9, which correspond in numbers to the plates D, and are arranged in such position as to intercept the ratchet of each respective numbering device arranged on the periphery of said plate D. These pawls have one or more engaging-points, adapted to

intercept the ratchet, of such a curvature that when the first engaging-point has caught in a serration and urged the ratchet forward one point the apex of the following and succeeding serrations will raise the pawl, so that the first engaging-point will release the serration it engaged with and allow the ratchet to continue its revolution. If, though, for any reason, or from any desired arrangement or system of numbering, it is necessary to skip several numbers it can be done by making a pawl with a corresponding number of engaging-points of a curvature similar to the first, and in a position to intercept a like number of serrations of the ratchet as it moves in its greater orbit. Thus one pawl will operate all the numbering devices arranged on one plate. The numbering devices have a planetary movement, having, as will be seen, the motion of the circular plates and an independent motion of their own.

12 and 13 are the series of tapes which carry the paper from the feed-board over the lower cylinder to the inclined box-shaped delivery 14. The lower series of tapes, 13, are arranged so that the rollers 15 nearest the feed-board are placed four or five inches below the rollers 16 of the upper series of tapes, thus forming a safe means of ingress for the paper as it is fed from the feed-board. As it is desirable to bring the upper and lower tapes together before they reach the point where the paper receives the impression of the figure-type as it passes over the cylinder, I place a series of rollers, 17, on a horizontal line with the top of said cylinder, between the same and said rollers 15 and 16, thus accomplishing the desired effect. As it is necessary that the lower tapes should travel around the cylinder, I place a series of rollers immediately below the same, which can be adjustable vertically to render them serviceable as belt-tighteners.

Near either end of the drive-shaft, within its bearings, are cams M, which operate the levers M′, fulcrumed at or about their centers of length, and provided with a vertical rectangular plate, 19, connecting their outer and free ends, which have vertical slots in it to allow the passage of the tapes. This arrangement of mechanism furnishes a feed-stop, P, which operates vertically, and when down rests upon a transverse flattened bar or plate, 20, secured in the end frames.

If desired, the levers M′ may be extended so as to operate between the feed-board and the rollers 15 and 16, thus avoiding the difficulty of adjusting the slots in the plate 19 to the position of the tapes, which it is to be understood are adjustable laterally.

Located in a similar position on the cylinder-shaft as the cams M are on the drive-shaft are the cams O. These cams have, bearing and revolving against their peripheries, a friction-wheel, 21, journaled in the ends of the levers O′. These levers are fulcrumed so as to give the end opposite to that carrying said friction-wheels the greatest throw, and it has pressing upward against the end nearest the cams O, the expansion-spring, thus keeping the friction-wheels contantly in contact with the peripheries of the cams. Connected or pivoted to the ends of the levers O′ farthest from the cams are the connecting-rods S, which extend upward, and are pivoted to the upper of the three inking-rollers S′, S², and S³, said upper roller being connected to the lower ones by links 22, substantially as shown in dotted lines in Fig. 7.

S′ is the drive-roller, receiving its motion from the drive-shaft in the manner hereinbefore described. The motion of the roller S′ is imparted to the upper roller, S², and by it transmitted to roller S³. Thus, when the connecting-rod is pulled downward by the action of the lever O′, the three rollers are brought to bear on the ink-plate, getting a fresh supply of ink, which they supply to the numbering devices as they travel past.

Having described my invention, its operation will be readily understood. The paper is fed from the feed-board until its edge abuts against the stop, which, when it is raised off the bar upon which it rests, allows the paper to be carried between the tapes over the cylinder, at which point it receives the impression of the number represented by the engaging row of figures, and continues to move onward between the tapes out into the delivery-box. The numbering devices revolve with the circular plates, upon the periphery of which they are fastened, and with each revolution receive a fresh coating of ink, and are urged forward one or more units at a time by the pawls engaging the ratchets attached thereto.

I do not wish to be understood as limiting myself to the exact arrangement of mechanism shown—as, for instance, the placing of the inking-rollers, &c., on the other side of the circular-plates—for it is obvious changes of the kind may be made without departing from the principle of my invention.

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

1. A numbering device consisting of several disks having figure-type inserted in their peripheries, revolving around a fixed and stepped axis, each step of which is provided with a circumferential groove, in which is a cam-surface, and a series of serrations or their equivalents, which are adapted to be engaged by a spring-actuated pin and a spring-actuated stop, respectively, in the manner hereinbefore described.

2. A disk having an annular flange or boss, in the bearing-surface of which are two segmental recesses, arranged diametrically opposite each other, and are adapted to receive the spring-actuated pin and the spring-actuated stop, respectively, as and for the purpose set-forth.

3. A frame for holding the numbering device, provided with two vertical arms having bearing-places in their extremities for the fixed axis and merging into a common seat, which

is adapted to ride and be adjustable on the periphery of a large circular plate, as hereinbefore specified, by means of legs extending downward from said seat on either side of said plate, said legs being provided alternately with inward-projecting feet and clamping devices adapted to enter corresponding circumferential T-grooves in said plates.

4. The disk 1, having a ratchet affixed to its outer surface, a recess in which is a volute spring pressing downward on a stop whose lower or inner end is adapted to enter the serrations in the fixed axis, and a spring-actuated pin fitting and operating in a segmental recess in the annular bearing-surface of the flange of said disk.

5. Disk 5, or the disk representing the highest column of figures, having a radial recess, in which is a flat spring holding a conical piece on its inner end, adapted to enter corresponding recesses in the contiguous flange of the fixed axis, and provided with a series of ten holes in its annular bearing-surface, as and for the purpose specified.

6. In a numbering device, the means for transmitting motion from one to the next successive disk, consisting of the spring-actuated pin *n'*, located in a suitable recess in the bearing-surface of the annular flange of one disk, the groove *f* in the contiguous engaging-surface of the fixed axis, in which said pin *n'* travels, having a cam-surface, *f'*, and the holes *o* in that part of the bearing-surface of the next successive disk engaging the outer surface of the annular flange of the disk immediately preceding it and surrounding the course of the pin *n'*.

7. The combination of the numbering devices and the frames carrying the same with the circular plates D, having circumferential grooves *d*, by means of which said numbering devices and their frames are adjustable on their peripheries, said plates D being adjustable laterally.

8. An automatic multiple numbering-machine consisting of a number of rotating circular disks placed side by side and adjustable laterally on a suitable shaft, each of which is provided with a suitable number of numbering devices adjustable on their peripheries, tapes for intermittently and consecutively conveying the paper to be numbered within the reach of said numbering devices, and a cylinder suitably arranged in conjunction with said disks and numbering devices, so as to sustain and afford a backing to the paper receiving an impression from said numbering devices.

9. The combination of a number of rotating circular disks placed side by side and adjustable laterally on a shaft, a number of numbering devices adjustable on the peripheries of each of the said disks, and a number of pawls, as described, adjustable laterally on a rock-shaft, corresponding in number and position to said disks, so as to actuate the numbering devices mounted thereon.

In testimony that I claim the foregoing as my own I hereunto affix my signature in presence of two witnesses.

NILS F. OLSON.

Witnesses:
JAMES H. COYNE,
FRANK D. THOMASON.