(No Model.) 4 Sheets—Sheet 1.

W. W. COLLEY.

MACHINE FOR NUMBERING PAPER.

No. 362,145. Patented May 3, 1887.

FIG. 1.

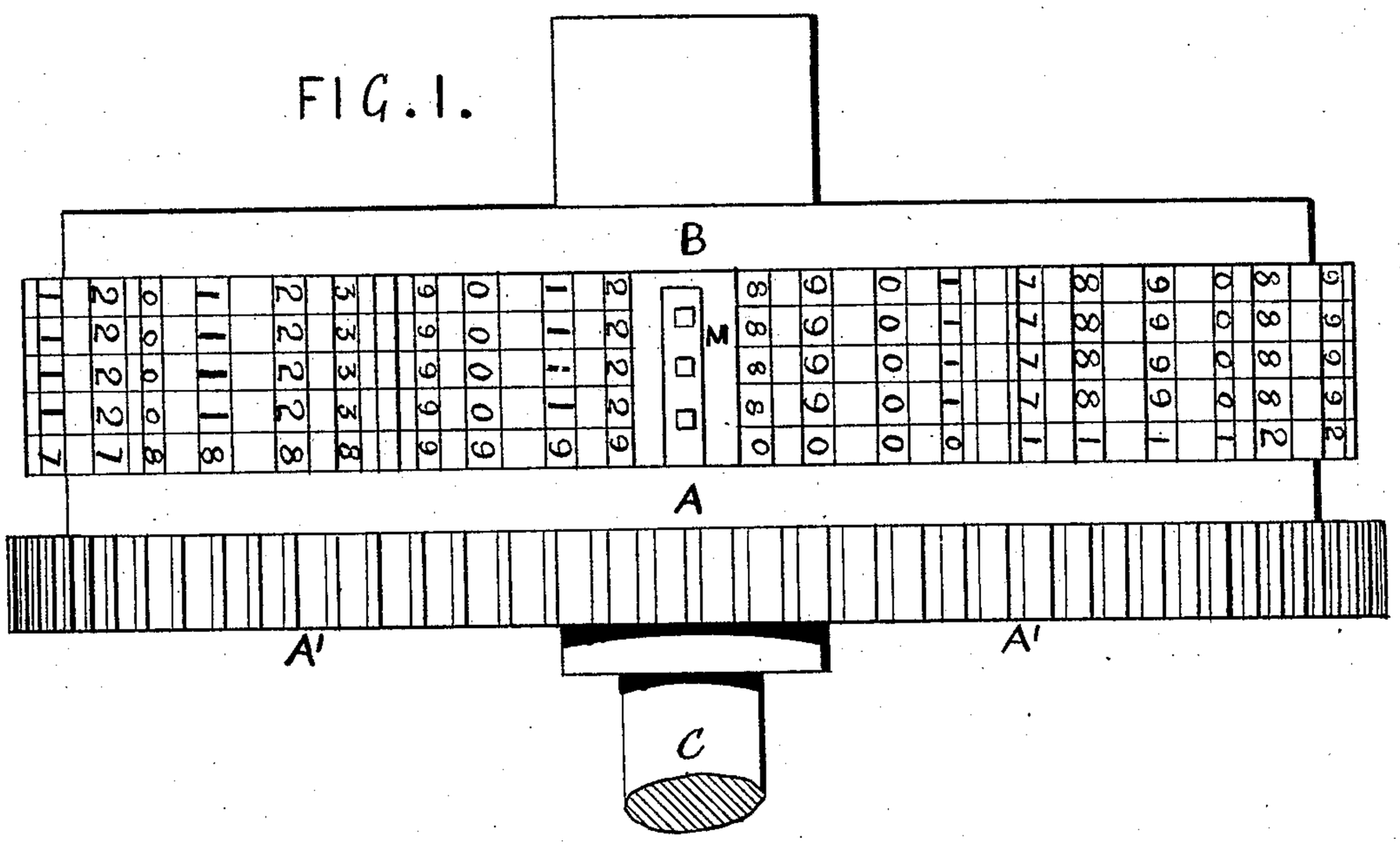

FIG. 2.

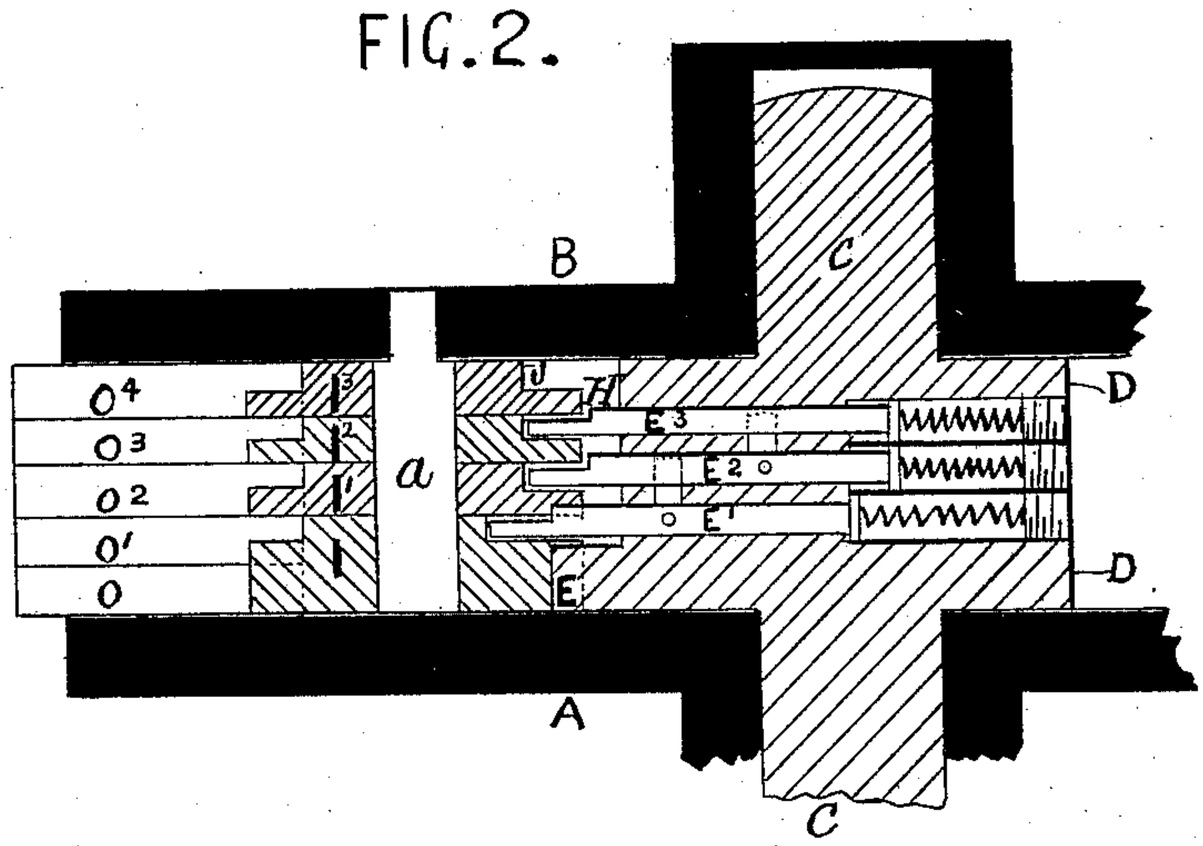

FIG. 3.

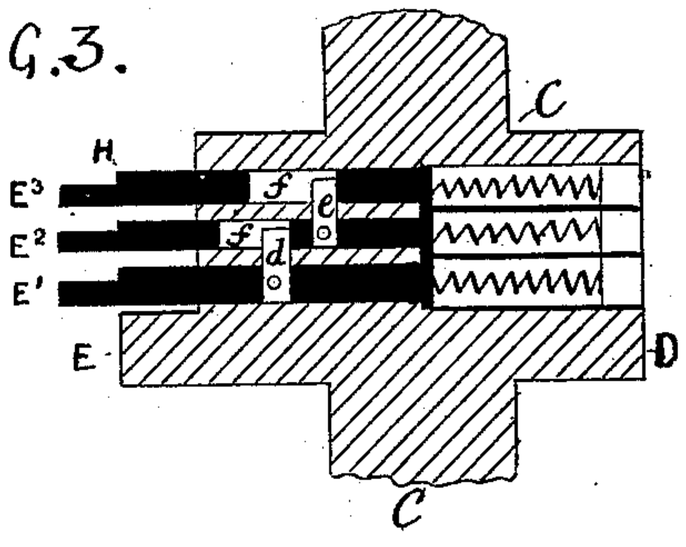

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FIG. 4.

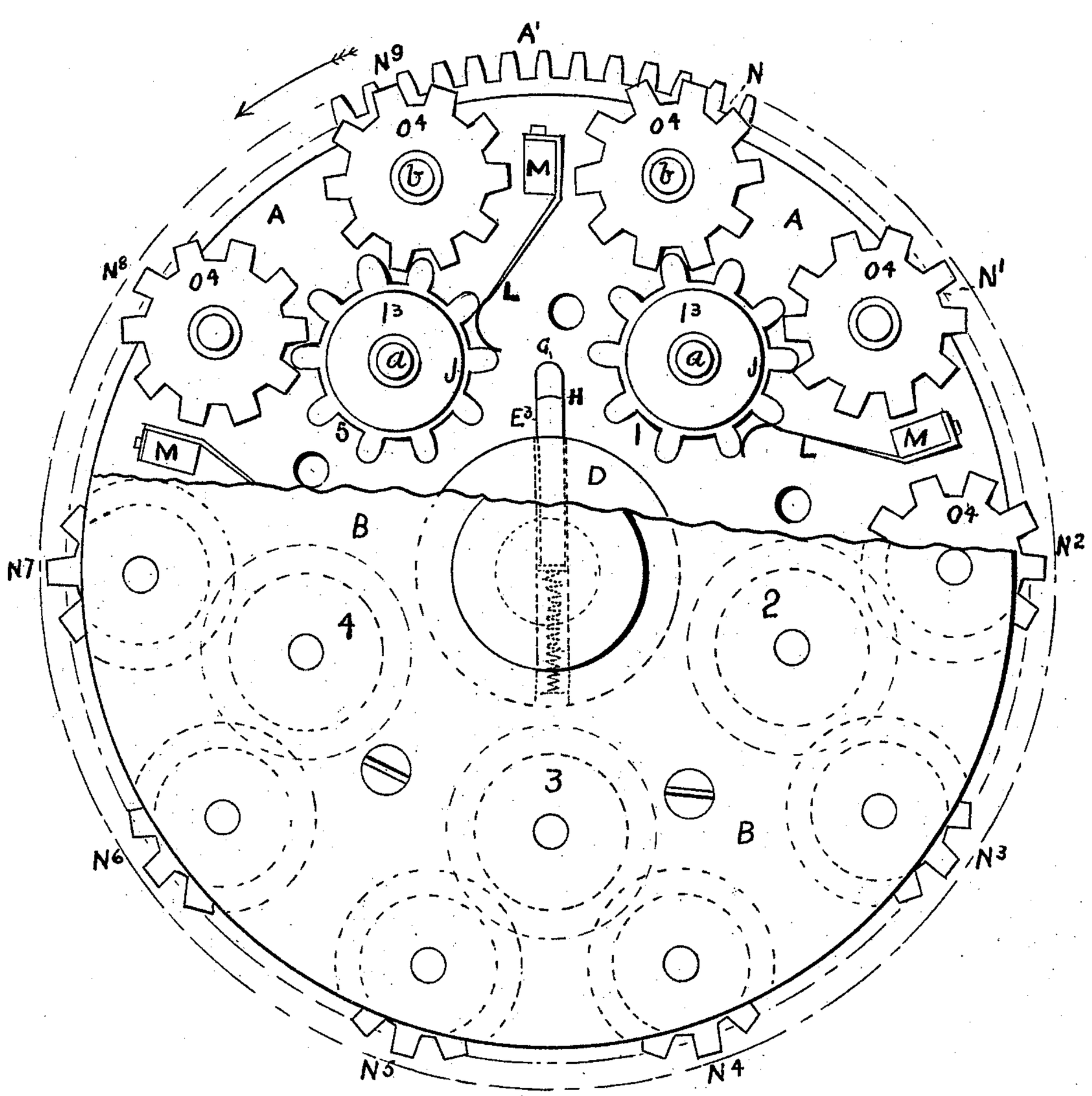

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FIG. 5.

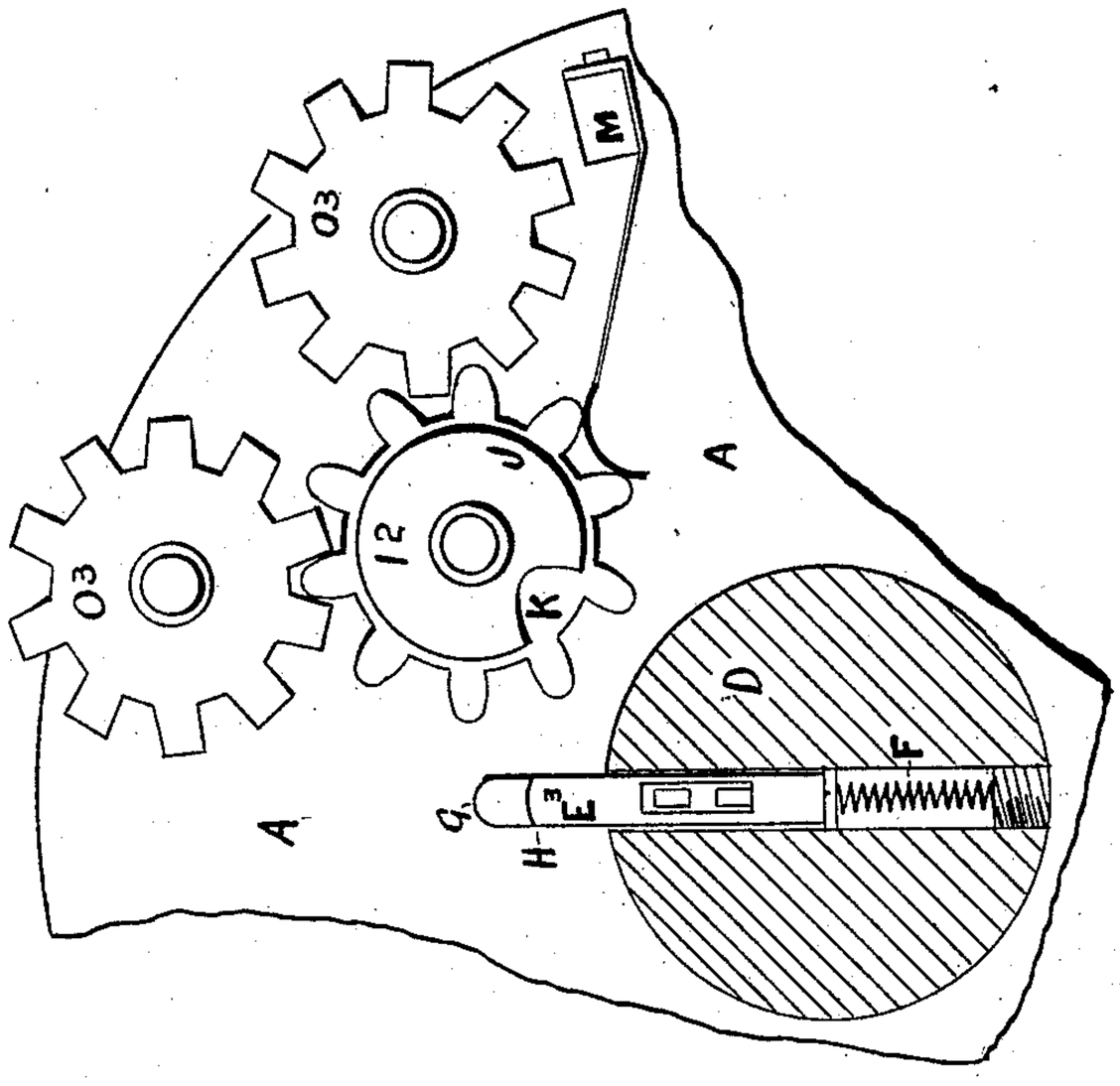
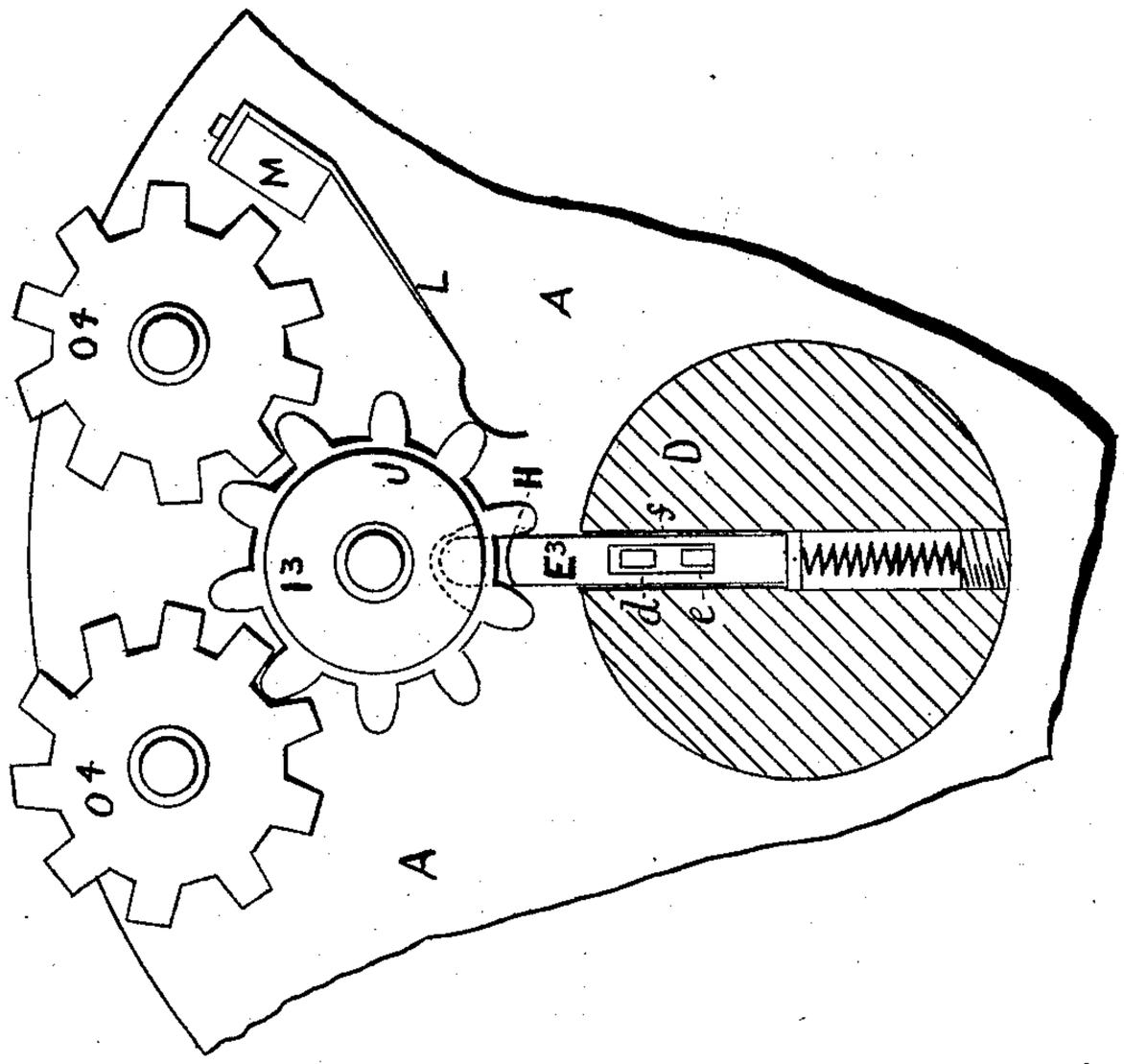


FIG. 6.



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(No Model.) 4 Sheets—Sheet 4.

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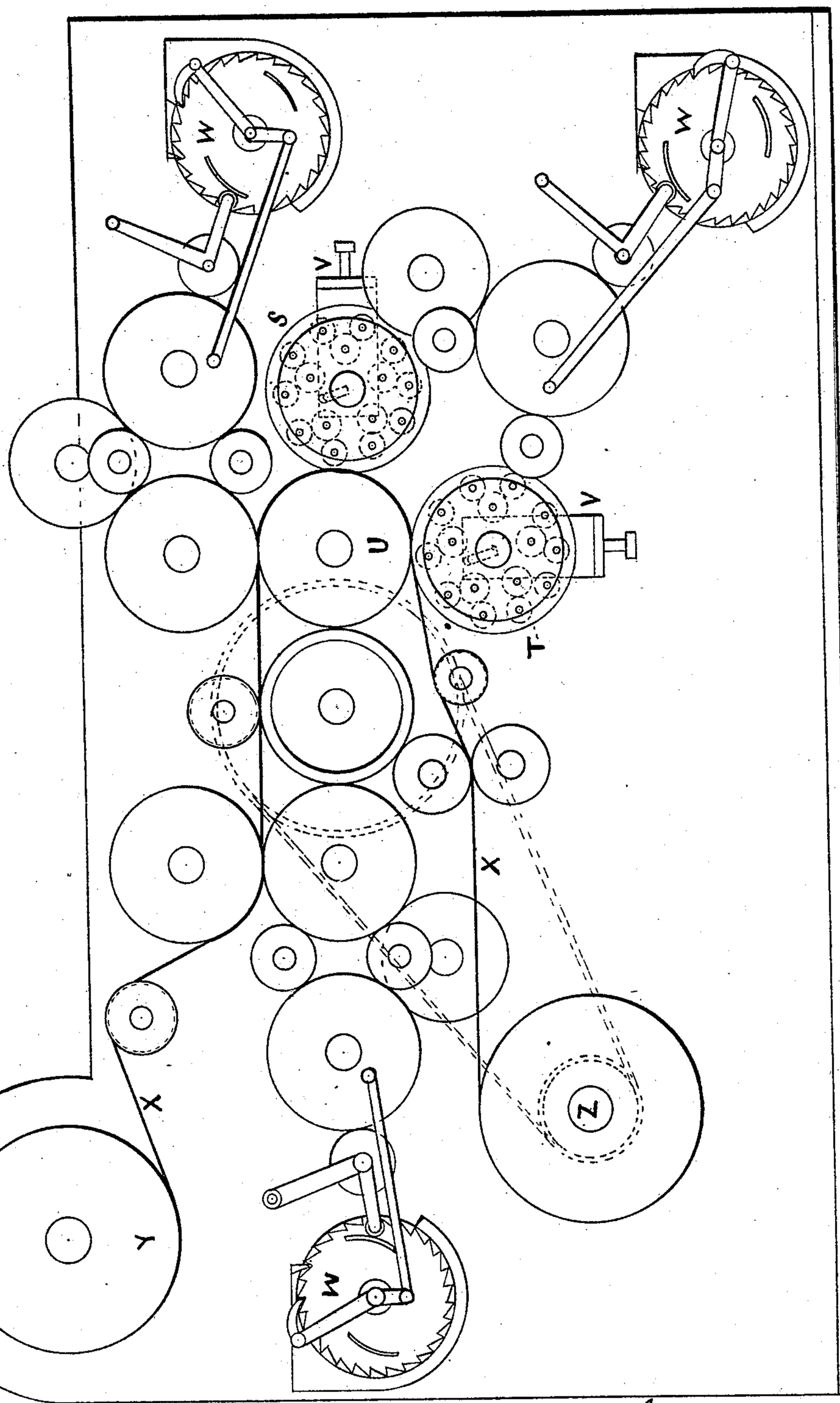

FIG. 7.

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UNITED STATES PATENT OFFICE.

WALTER WILLIAM COLLEY, OF CAMBERWELL, LONDON, COUNTY OF SURREY, ENGLAND.

MACHINE FOR NUMBERING PAPERS.

SPECIFICATION forming part of Letters Patent No. 362,145, dated May 3, 1887.

Application filed December 29, 1885. Serial No. 187,013. (No model.) Patented in England July 14, 1885, No. 8,539; in France December 18, 1885, No. 173,014; in Belgium December 23, 1885, No. 71,355; in Germany January 13, 1886, No. 37,013, and in Canada July 16, 1886, No. 24,509.

To all whom it may concern:

Be it known that I, WALTER WILLIAM COLLEY, a subject of the Queen of Great Britain, residing at Camberwell, London, England, have invented an Improved Revolving Machine for Printing Consecutive Numbers, (for which, jointly with Morris Hart, I have obtained a patent in Great Britain, No. 8,539, bearing date July 14, 1885; France, No. 173,014, bearing date December 18, 1885; Belgium, No. 71,355, bearing date December 23, 1885; Germany, No. 37,013, bearing date January 13, 1886, and in Canada in my own name alone, No. 24,509, bearing date July 16, 1886,) of which the following is a specification.

The machine for printing consecutive numbers constructed and operating according to this invention may be used with various printing-machines, but is most advantageously used in conjunction with a web ticket-printing machine; and it consists, essentially, in an improved manner for actuating the wheels printing the units of various numbers during the revolution of machine, and also in such a machine of certain novel arrangements to facilitate the working, all as hereinafter explained; and illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved machine; Fig. 2, a sectional side elevation of part of Fig. 1; Fig. 3, a detail sectional view of part embodied in Fig. 2; Fig. 4, a plan of Fig. 1, with part of upper plate removed to show internal arrangement; Figs. 5 and 6, detail views of Fig. 4 during working of machine. Fig. 7 represents a side elevation of web ticket-printing machine, showing my improved machine used therewith.

According to this invention "sets" of wheels having their periphery cut into ten equal divisions to form ten teeth are mounted concentrically in two circles in a suitable frame arranged to revolve. The outer circle of wheels consists of ten sets of five wheels in each set, and have the periphery of their teeth formed with type-units. The inner circle consists of five sets of four spider-wheels in each set, the lower wheel being twice as thick as the upper three, making the height of the sets the same as the outer sets. The whole of the wheels in both sets revolve independently of each other on suitable axles. The outer wheels gear with and are actuated by the inner wheels, and the latter by means placed within their circle.

Referring to the drawings, A and B represent two plates to form a frame, suitably held together, A being considered the bottom, and B the top. Keyed to A is a gear-wheel, A′. This frame revolves on a fixed spindle, C, formed with a boss, D, coming between center of plates A B. In this boss D, at bottom is fitted a projecting fixed tappet or tooth, E, and above E, in a straight line, three depressible tappets, E′ E^2 E^3, the part entering being formed with a collar, against which a spiral spring, F, presses, which holds out the tappets in a working position. The tappets and spring are inserted at opposite side of boss, and the entrance closed by screw. The outside end of depressible tappets is formed with an oval flat bearing-point, G, and a shoulder or step, H, above point G.

Arranged in a circle round boss D are the five sets of spider-wheels 1 2 3 4 5, each set being composed of four wheels I I′ I^2 I^3. The bottom wheel, I, is twice as thick as the other wheels, I′ I^2 I^3, and arranged to turn unit and ten wheels of outer sets, as hereinafter described. Each of these spider-wheels has ten teeth, and they revolve independently of each other on suitable axles, *a*, secured in plate A, and supporting, by aid of shoulder, plate B. These wheels have each an upper boss, J. Those on wheels I I′ I^2 have a notch or opening, K. These wheels are held by springs L, with bow ends, the springs being secured at other end by screw to stud M, attached to plate A. Outside the sets of spider-wheels is a circle of ten sets of numbering-wheels, N N′ N^2 N^3 N^4 N^5 N^6 N^7 N^8 N^9. Each wheel has ten thick teeth provided with type-units. Each set consists of five separate wheels, O O′ O^2 O^3 O^4, revolving independently of each other on suitable axles, *b*, secured in plate A. The upper shoulder of this axle helps to support plate B. Wheel O prints the units, O′ the tens, O^2 the hundreds, O^3 the thousands, and O^4 the tens of thousands.

The spider-wheels I I′ I² I³ gear with the outside wheels, O O′ O² O³ O⁴, one set of spider-wheels gearing with two sets of outer wheels, so that moving a spider-wheel one tooth, or a tenth of a revolution, moves two outside wheels correspondingly. The four upper wheels have the periphery of their teeth formed with type-units 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. The bottom wheel, O, of each set has ten type-units of the same number on the periphery of its teeth. Thus the bottom wheel, O, of set N has ten 0's, wheel O of set N′ has ten 1's, and so on up to set N⁹, which has ten 9's.

On the machine moving round in direction of arrow, a tooth of bottom spider-wheel, I—say of set 1—strikes against fixed tappet E, causing the wheel to turn one tooth, or one-tenth of a revolution, correspondingly turning the unit and ten wheels O and O′ of sets N and N′. The same operation takes place on each spider-wheel I striking E and producing numbers from 00010 to 00019. When the machine has completed one revolution, wheel I of set 1 again strikes against fixed tappet E on the machine moving round, causing wheel I to turn another tooth, and correspondingly turning the unit and ten wheels O and O′ of sets N and N′ from 00010 and 00011 to 00020 and 00021, and so on until 00099 has been produced.

During the foregoing revolutions of machine the depressible tappets E′ E² E³ have been pressed in every time the bosses J on wheels I I′ I² have come against the points G, thereby enabling the shoulder H to clear teeth of wheels I′ I² I³, the shoulder being on same plane as teeth of wheels.

In the foregoing operations spider-wheels I have completed nine-tenths of a revolution on their axles, which brings the notch K in bosses round to a position to admit point G, of depressible tappet E′ (see Fig. 5) on revolution of the machine continuing. The point G entering notch K, prevents this tappet E′ being pressed in, which causes a tooth of spider-wheel I′ to come against side of recessed shoulder H, (see Figs. 2 and 6,) thereby causing wheels I, on revolution of machine continuing, to move round one tooth, moving wheels O² one-tenth of a revolution and bringing forward type-unit 1, so that the next impressions will be 00100 from set N and 00101 from set N′.

Tappets E′ and E² are connected by an arm, *d*, fitted to E′, and let into a slot, *f*, in E², so that every pressing in of E′ causes E² to be pressed in without the aid of boss J on wheel I′ striking point G of tappet E². The slot or opening *f* is sufficiently slotted to admit of tappet E² being pressed in (by action of boss J striking point G) without pulling in tappet E′, even when latter has entered notch K on wheel I, and effecting the change on wheel O², so that tappet E′ governs tappet E² on every pressing-in action except that above described. Tappets E² and E³ are connected together by an arm, *e*, in a similar manner, so that the pressing in of tappet E′ draws in E² and E³ at the same time without the intervention of bosses J. When the whole of the tappets are out, the position of the arms *d e* in the slots *f* is as represented at Fig. 3. On ninety-nine revolutions of the machine taking place, the wheels I′ have been revolved nine-tenths of a revolution, bringing notch K round to admit point G of tappet E², which enables a tooth of I² to come against the side of shoulder H on revolution of the machine continuing, thereby moving said wheels round one-tenth of a revolution, moving outer wheels, O³, changing unit 0 to 1, making the next impressions 01000 from set N and 01001 from set N′.

It will consequently be understood that by using five wheels for the type-units in the outer sets 99999 can be printed and the number multiplied by ten for another added wheel. After 99999 have been printed, the next revolution brings the five units 0 of each set to the front, when the numbering commences again.

When the notch K of, say, wheel I² comes around to receive point G of tappet E³, the notches on wheels I and I′ also come round to receive points G of tappets E′ and E², so that the three wheels of each set I′ I² I³ are moved one tooth at the same time, and the bottom wheels, I, by fixed tappet E.

By using this machine in conjunction with a web ticket-printing machine one of the impression-cylinders of such a machine will also do for the consecutive numbering-machine, and when two such machines are used for duplicate numbering they may both use the same impression-cylinder, thus making one impression-cylinder do for three impressions. The usual inking arrangements are used.

Fig. 7 represents a web ticket-printing machine with my invention worked therewith, the same being represented at S T and the impression-cylinder at U. In this arrangement the numbering-machine is carried on an adjustable carrier, V, by the spindle C being attached thereto. W represents the inking-drums supplied by ductor in the usual way, the ink being conveyed to the type by usual inkers by the arrangement represented, which is of an ordinary kind. X represents a ribbon of paper or other suitable material drawn from coil Y, which, after printing, numbering, and perforating, is rewound into coils for use at Z.

I am aware that prior to my invention revolving machines have been proposed for printing consecutive numbers, and used or to be used in conjunction with web ticket-printing machines, and that a patent therefor was granted to Elijah Beach, No. 186,785, of January 30, 1877, and one to Marcus Bebro, No. 248,275, of October 18, 1881, and an English patent to John Melton Black, No. 4,350 of 1883. I therefore make no claim to a revolving machine for printing consecutive numbers alone; but,

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A revolving machine for printing consecutive numbers, consisting of the frame A B, spindle C, with boss D, fixed projecting tooth E, stationary depressible tappets E′ E² E³, connected by bars *d e* and slots *f*, spring F, tappets E′ E² E³ being provided with point G and upper shoulder or step, H, sets of spider gear-wheels 1 2 3 4 5, axles *a*, said wheels being provided with boss J, with notch K, springs L, outer sets of printing-wheels, N to N⁹, and axles *b*, the whole working substantially as hereinbefore described, and represented in the accompanying drawings, for printing consecutive numbers.

2. In a revolving machine for printing consecutive numbers, the stationary depressible tappets E′ E² E³, boss D, spring F, said tappets having bearing-points G and upper shoulder or step, H, the side of such upper shoulder or step engaging at certain times a tooth of a wheel during revolution of machine to move such wheel one tooth, as hereinbefore described, and represented in the accompanying drawings.

3. In a revolving machine for printing consecutive numbers, the five sets of spider-wheels 1 2 3 4 5, gearing with and actuating ten sets of printing-wheels, N to N⁹, each set of spider-wheels actuating two sets of printing-wheels, spider-wheels being held by spring L, and actuated by stationary projecting-tappets against which the teeth strike during revolution of machine, as hereinbefore described, and represented in the accompanying drawings.

4. In a revolving machine for printing consecutive numbers, the combination of the frame A B, spindle C, with boss D, axles *a*, wheels I I′ I² I³, provided with boss J, having notch K, depressible tappets E′ E² E³, formed with point G and upper shoulder, H, and springs F, as and for the purposes hereinbefore described, and represented in the accompanying drawings.

5. In a revolving machine for printing consecutive numbers, the combination of the frame A B, spindle C, with boss D, depressible tappets E′ E² E³, springs F, arms *d e*, and slots *f*, as and for the purposes hereinbefore described, and represented in the accompanying drawings.

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