F. B. REDINGTON.

COUNTING MACHINE.

APPLICATION FILED AUG. 27, 1906.

900,954. Patented Oct. 13, 1908.

FIG. 1

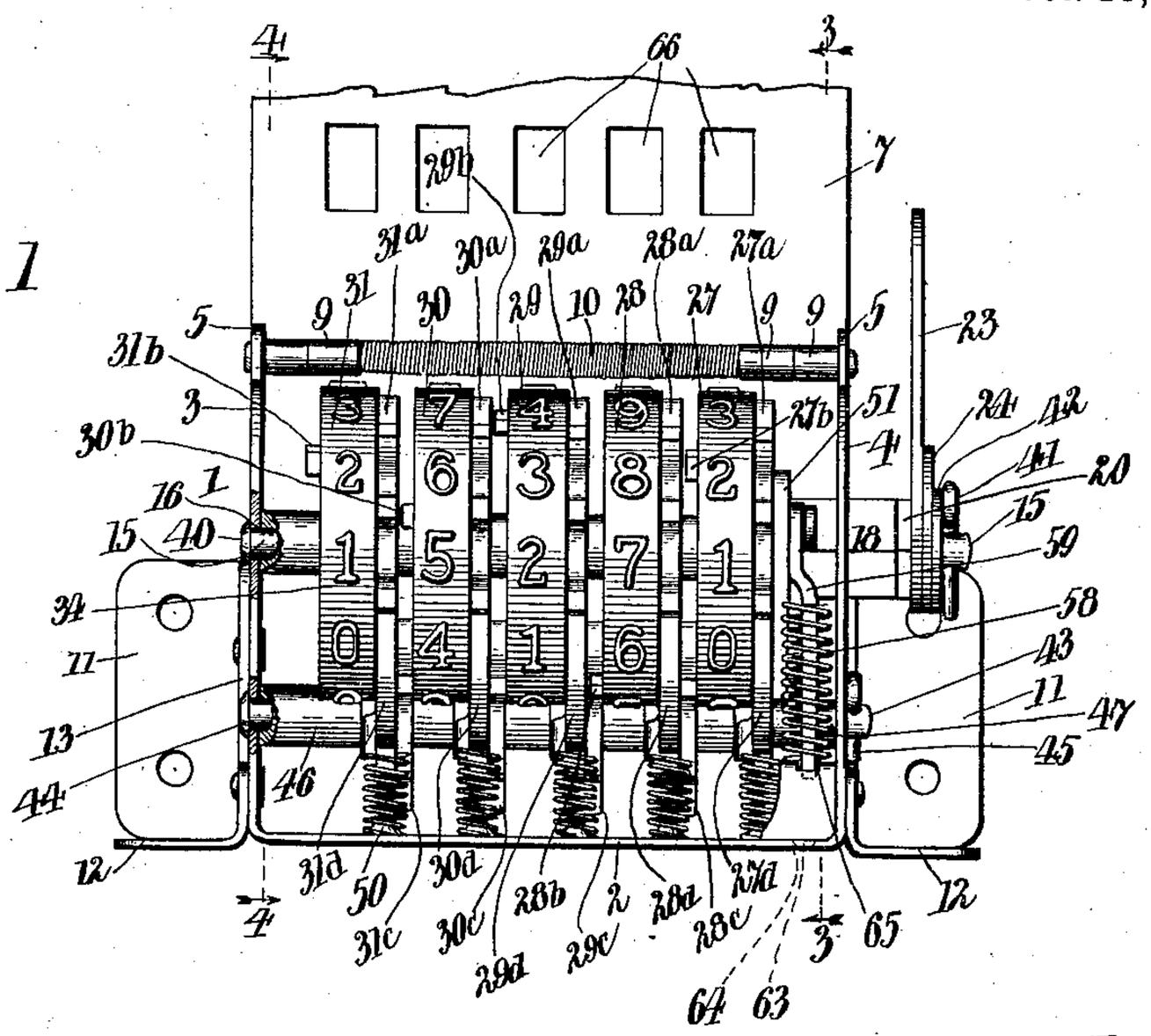


FIG. 2

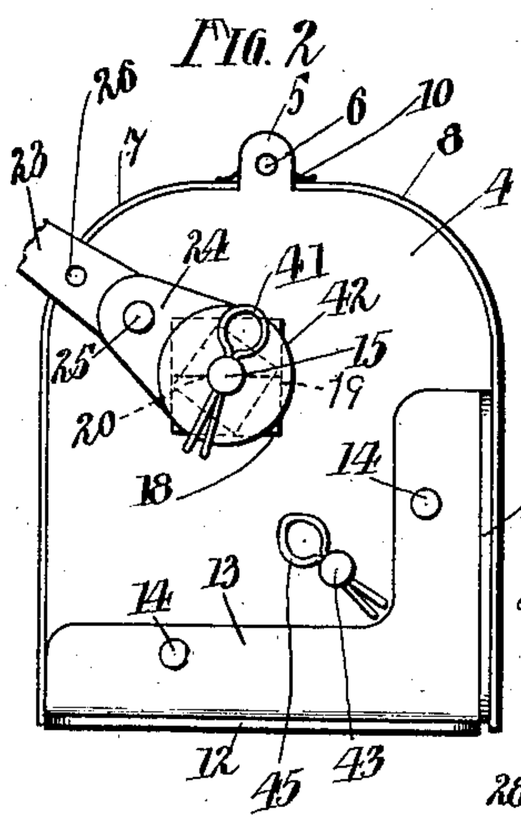


FIG. 3

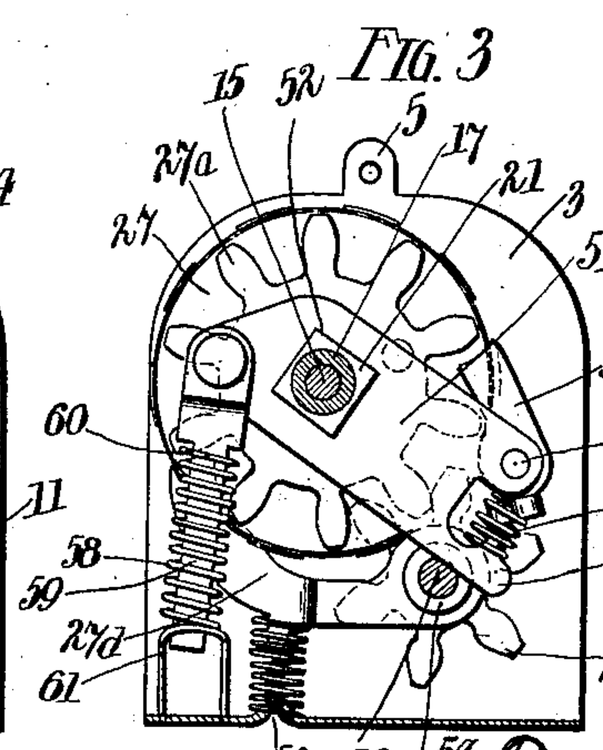
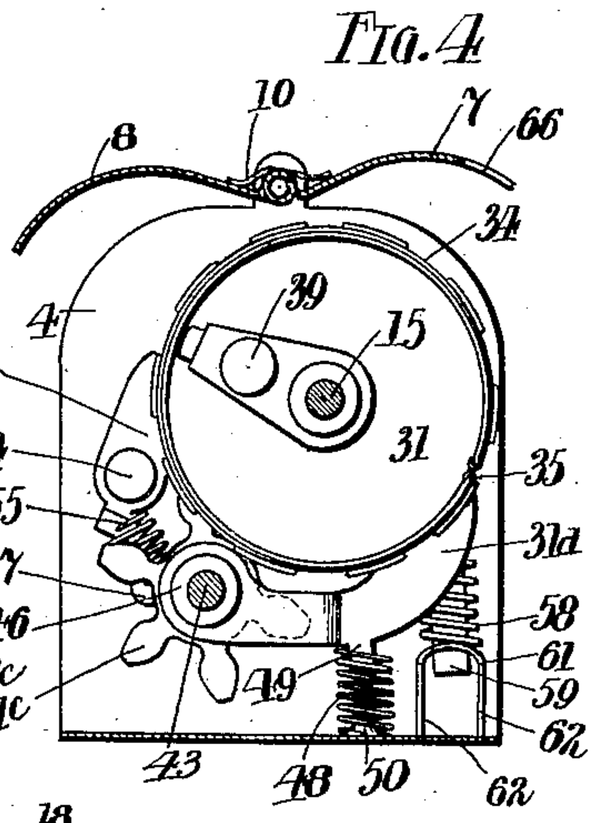


FIG. 4



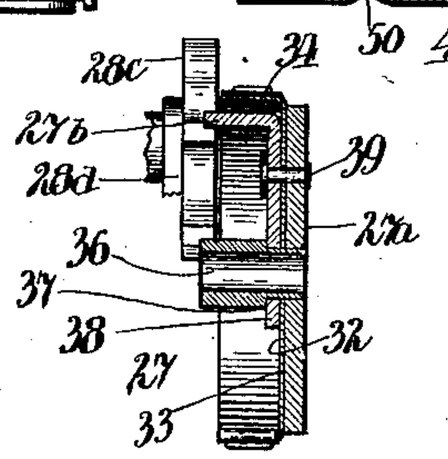


FIG. 5

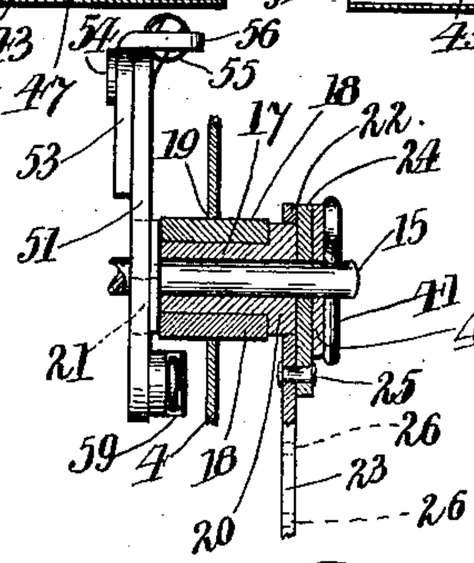


FIG. 6

WITNESSES

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COUNTING-MACHINE.

No. 900,954. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed August 27, 1906. Serial No. 332,106.

To all whom it may concern:

Be it known that I, FRANK B. REDINGTON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Counting-Machines, of which the following is a specification.

One of the objects of this invention is the simplification of the mechanism of registers or counting machines with a view to improved accuracy in operation and durability.

Another object of the invention is the production of an improved digit disk or wheel for registers.

A further object is the provision of improved means for communicating movement from one digit disk to the next succeeding disk in the series.

A further object is the arrangement and construction of the parts of a counting machine with special reference to facility in assembling the machine.

The invention also relates to an improved casing for counting machines.

The invention further refers to the production of a counting machine comprising almost entirely sheet-metal stampings, with a view to lightness and cheapness.

In the accompanying drawings, Figure 1 is a front elevation of a counting machine embodying the features of my invention, the front cover being raised to expose the mechanism to view. Fig. 2 is an end elevation of said counting machine. Fig. 3 is a transverse sectional view through said machine, taken on the plane of dotted line 3 3 of Fig. 1. Fig. 4 is a similar sectional view on dotted line 4 4 of Fig. 1. Fig. 5 is a central section through one of the digit disks. Fig. 6 is a fragmental section on the plane of the main shaft.

In the present embodiment of this invention the mechanism is completely inclosed within a casing 1 formed of sheet metal. The casing comprises the bottom wall 2 and the end walls 3 and 4 integral with said bottom wall. At the upper ends of the end walls 3 and 4 are perforated ears 5 for the reception of a pintle 6 pivotally supporting the front cover 7 and the rear cover 8. Each of said covers forms one side wall and one-half of the top wall of the casing 1, and is mounted upon the pintle 6 by means of bearing eyes 9 integral with said covers. A coiled spring 10 surrounding the pintle 6 bears at its ends upon the covers 7 and 8 and tends to hold them closed. The covers 7 and 8 may be raised to permit inspection or lubrication of the mechanism. The casing 1, in this instance, is arranged to be secured upon a suitable support, such as a part of the frame of the machine whose output is to be registered, by means of a pair of perforated flanges 11 and 12 at each end of the casing, said flanges being formed integral with a flange 13 secured to the end walls 3 and 4 of the casing 1 by rivets 14 or in any other suitable way.

The mechanism of the register comprises a supporting shaft 15, one end of which lies within an opening 16 in the end wall 3. The other end of the shaft 15 extends through a tubular rock shaft or sleeve 17 which lies within a two-part bearing block 18. The bearing block 18, in the present instance, is square in cross-sectional outline, and fits within a square opening 19 in the end wall 4. Upon the outer end of the tubular shaft 17 is formed a square collar 20, and upon the inner end a similar collar 21. The collar 20 is adapted to lie within a square opening 22 in the end of an operating arm 23. Outside the arm 23 is a cap plate 24 lying against the end of the collar 20 and secured to the arm 23 by a rivet 25, said cap plate being perforated for the passage of the supporting shaft 15. Holes 26 are formed at intervals in the length of the arm 23 to permit of connecting said arm with some moving part of the machine whose movements are to be registered.

Upon the supporting shaft 15 are rotatably mounted a plurality of digit disks, each bearing upon its periphery the nine numerals and cipher. The counting machine herein shown is adapted to register to and including 99,999, and hence comprises a units-disk 27, a tens-disk 28, a hundreds-disk 29, a thousands-disk 30 and a ten-thousands-disk 31. Fixed concentrically to each digit disk is a gear wheel 27^a, 28^a, 29^a, 30^a and 31^a, respectively, the functions of which will appear hereinafter, each of said gear wheels having ten gear-teeth. Each digit

disk also has fixed thereto a finger 27^b, 28^b, 29^b, 30^b and 31^b, respectively. The disk 31 is provided with the finger 31^b merely for the sake of uniformity in construction, said finger having no function, as will be seen later herein. The construction of the digit disks and the manner of connecting them with their gear wheels and fingers are shown in Fig. 5. The digit disk is stamped from sheet metal and comprises the disk portion 32 and the peripheral flange 33. Instead of forming the numerals directly upon the peripheral flange 33, they are embossed upon a strip 34 of metal and the latter placed about the flange 33 and secured thereon by passing the ends of said strip 34 through a slot 35 in the flange 33 and clenching said ends upon the inner side of said flange, as shown in Fig. 4. The digit disk and its gear wheel are provided with a tubular hub 36, which hub is reduced in diameter at one end, forming an annular shoulder 37. The fingers 27^b—31^b have perforated inner ends 38, and the digit disk, its gear wheel and its finger, are secured to the hub 36 by mounting them upon the reduced portion of said hub, riveting or expanding the outer end of said reduced portion, as shown in Fig. 5, and setting a rivet 39 within registering openings in said finger, disk and gear wheel. The hubs 37 of the digit disks 27—31 are of such length as completely to fill the space between the end wall 3 and the collar 21 of the tubular shaft 17. Said disks, the shaft 15, the shaft 17, the bearing block 18 and the operating arm 23 are held from displacement by forming a rivet head 40 upon the end of the shaft 15 outside the end wall 3 and passing a cotter pin 41 through the opposite end of the shaft 15 outside the arm 23, a washer 42 being interposed between said arm and said cotter pin.

Mounted in the end walls 3 and 4 of the casing 1 is a supporting shaft 43 held from longitudinal movement by means of a rivet head 44 at one end and a cotter pin 45 at the other. Upon the shaft 43 are loosely strung pinions 28^c, 29^c, 30^c and 31^c for the gear wheels 28^a, 29^a, 30^a and 31^a. Loosely mounted upon said shaft 43 and alternating with said pinions are pawls 27^d, 28^d, 29^d, 30^d and 31^d for the gear wheels 27^a—31^a, respectively. Each of said pawls is provided with a hub 46 secured to its pawl in substantially the same way as the hubs 36 are affixed to the gear wheels 27^a—31^a. The portion of the shaft 43 within the casing 1 is completely occupied by the pinions 28^c—31^c, the pawls 27^d—31^d and their hubs 46 and a special filler sleeve 47. The pawls 27^d—31^d extends forwardly and upwardly into position to engage the teeth of the gear wheels 27^a—31^a, and are held in engagement with said teeth by coiled springs 48 interposed between the lower side of said pawls and the bottom wall 2 of the casing 1. The springs 48 are held from displacement by studs 49 formed upon the pawls and by projections 50 punched up from the bottom 2. (Figs. 1 and 3.) When the gear wheels 27^a—31^a are rotated (by means hereinafter described) the pawls yield to permit the teeth of said gear wheels to pass the points of the pawls, thus compressing the springs 48. As soon as the gear tooth has passed the point of the pawl said spring exerts its force to complete the movement of the gear and to place the pawl under the next succeeding gear tooth.

The units-disk 27 is rotated by means of a lever 51 having a square opening 52 therein to receive the square collar 21 of the tubular rock shaft 17. Said lever carries at its rear end a pawl 53 pivotally mounted upon a rivet 54, the forward end of which pawl is normally held in position to engage the teeth of the gear wheel 27^a by means of a coiled spring 55 bearing at its ends upon the angular rear end 56 of said pawl and an offset portion 57 of said lever 51. The lever 51 and the operating arm 23 are restored to initial position after each registering movement, by a coiled spring 58. Said spring surrounds a guide pin 59 pivoted to the end of the lever 51 and bears at its upper end against shoulders 60 on said pin. The lower end of the spring 58 rests upon a step 61 pressed from sheet metal and comprising two legs 62 supported upon the bottom 2 of the casing 1 and held from displacement by lugs 63 on said legs entering openings 64 in said bottom. An opening 65 in the step 61 receives the lower end of the guide pin 59 and permits said pin to move downward as the lever 51 is moved by the operating arm 23. The downward movement of the operating arm 23 is limited by the impingement of the lower end of the pin 59 upon the bottom 2 of the casing, which movement is sufficient to cause a tenth-revolution of the digit disk 27; however, in practice the arm 23 is not given its greatest possible movement, but only enough to force a tooth past the point of the pawl 27^d, the latter then completing the movement of the tooth.

The movement of the units-disk 27 is communicated at proper intervals to the tens-disk 28, and so on throughout the series of digit disks, by means of the gears 27^a—31^a, the fingers 27^b—30^b and the pinions 28^c—31^c. Said pinions are wider than the gear wheels, as shown in Fig. 5, and extend past the sides of said gear wheels into position to be engaged and rotated by the out-turned ends of the fingers 27^b—30^b. A sight opening 66 is formed in the cover 7 in front of each digit disk to permit the registration to be observed.

In assembling the parts of this counting

machine the lever 51 is forced upon the collar 21 of the tubular shaft 17, the two-part bearing block 18 is placed about said shaft, and said shaft and bearing block inserted into the opening 19 in the end wall 3. The operating arm 23 is then placed upon the collar 20 of the shaft 17, the shaft 15 inserted through the opening 16 in the end wall 3, the digit disks, with their gear wheels and fingers, are strung upon said supporting shaft, the end of said shaft is passed through the tubular shaft 17, and the washer 41 and cotter pin 40 are placed upon the shaft 15. The shaft 42, the pinions 28^c—31^c and the pawls 27^d—31^d are then assembled and the various springs put in place.

In operation, oscillating movement is communicated in any suitable way from the machine whose movements are to be registered, to the operating arm 23. Upon the downward movement of said arm the rear end of the lever 51 is raised, the pawl 52 on said lever engaging and driving before it a tooth of the gear wheel 27^a and consequently rotating the units-disk 27 through one-tenth of a revolution. Upon the tenth partial rotation of the units-disk 27 the finger 27^b engages the pinion 28^c and rotates said pinion the distance of one tooth. The tens-disk 28 being fixed to the gear 28^a meshing with said pinion, said tens-disk is accordingly rotated through one-tenth of a revolution. For every revolution of the units-disk 27 the tens-disk 28 is thus given a tenth-revolution. Upon the tenth partial rotation of the tens-disk 28 its finger 28^a engages the pinion 29^c and causes a tenth-revolution of the hundreds-disk 29. The rotations of one disk are thus communicated to the next succeeding disk to register the total number of oscillations of the arm 23, the progress of the registration being noted through the sight openings 66. If it be desirable to cancel a previous record and return the digit disks to the initial position, said disks may be individually rotated by hand to bring the numerals 9 into line behind the sight openings, and the operating arm 23 then oscillated to rotate all of the disks through one-tenth of a revolution.

While I have described the present embodiment of my invention with considerable particularity, I recognize the fact that many changes may be made in said embodiment without departing from the spirit and scope of the invention as defined in the appended claims, and therefore do not wish to limit myself to the precise details herein set forth.

I claim as my invention:

1. A counting machine comprising a digit disk, a gear wheel and a finger, and a hub for said disk and gear wheel, said hub having a reduced portion on which said digit disk and gear wheel are mounted, the outer end of said hub being riveted to hold said disk and gear wheel in place, and additional means for securing said finger, digit disk and gear wheel together.

2. A counting machine comprising a digit disk, a gear wheel and a finger, and a hub for said disk, finger and gear wheel, said hub having a reduced portion on which said digit disk, finger and gear wheel are mounted, the outer end of said reduced portion being riveted, and a rivet passing through said finger, digit disk and gear wheel.

3. A counting machine comprising a casing having an opening therein, a shaft, a split bearing block adapted to receive said shaft and to lie in said opening, and operating members rigidly mounted upon the ends of said shaft, the bearing opening of said block being smaller than said shaft ends.

4. A counting machine comprising a casing having an opening therein, a shaft having angular collars at its ends, a separable bearing block adapted to receive said shaft and to lie in said opening, and operating members rigidly engaging said angular collars.

5. A counting machine comprising a casing having a non-circular opening therein, a shaft having non-circular collars at its ends adapted to pass through said opening, a two-part bearing block adapted to embrace said shaft between said collars, said block being adapted to fit within said opening, and operating members rigidly engaging said collars.

6. A counting machine comprising a casing, a supporting shaft mounted in said casing, means at one end of said shaft outside of said casing for limiting endwise movement of said shaft, a plurality of digit disks loosely mounted on said shaft, a bearing block supported in said casing, a tubular shaft surrounding said supporting shaft and lying within said bearing block, an operating arm on one end of said tubular shaft, a disk-rotating lever also mounted on said tubular shaft, and means on the end of said shaft opposite to the first mentioned end, for holding said parts against said limiting means.

7. A counting machine comprising a casing, a shaft supported in the walls of said casing, a plurality of digit disks on said shaft, a tubular shaft surrounding the first mentioned shaft, a split bearing block surrounding said tubular shaft and lying within an opening in one of the walls of said casing, a disk-rotating lever attached to said tubular shaft within the casing, and an operating arm attached to said tubular shaft outside of said casing.

8. A machine comprising a casing having a non-circular opening therein, a supporting shaft, a tubular shaft surrounding said supporting shaft, and a two-part bearing block

surrounding said tubular shaft and immovable longitudinally of said tubular shaft, said bearing block fitting non-rotatably within the non-circular opening in said casing.

9. The combination, with a casing having an opening therein, of a tubular shaft having non-circular collars at its ends adapted to pass through said opening; a split bearing block adapted to embrace said shaft between said collars, said block being adapted to fit within said opening; operating members rigidly engaging said collars; and a shaft mounted in said tubular shaft.

FRANK B. REDINGTON.

Witnesses:
L. L. MILLER,
GEORGE L. CHINDAHL.