

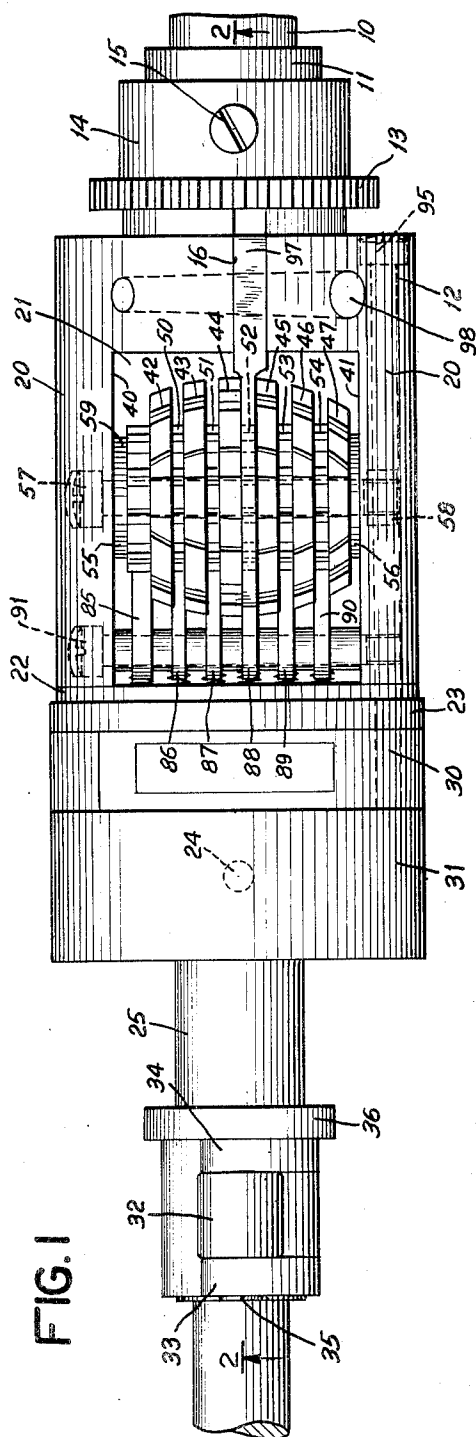
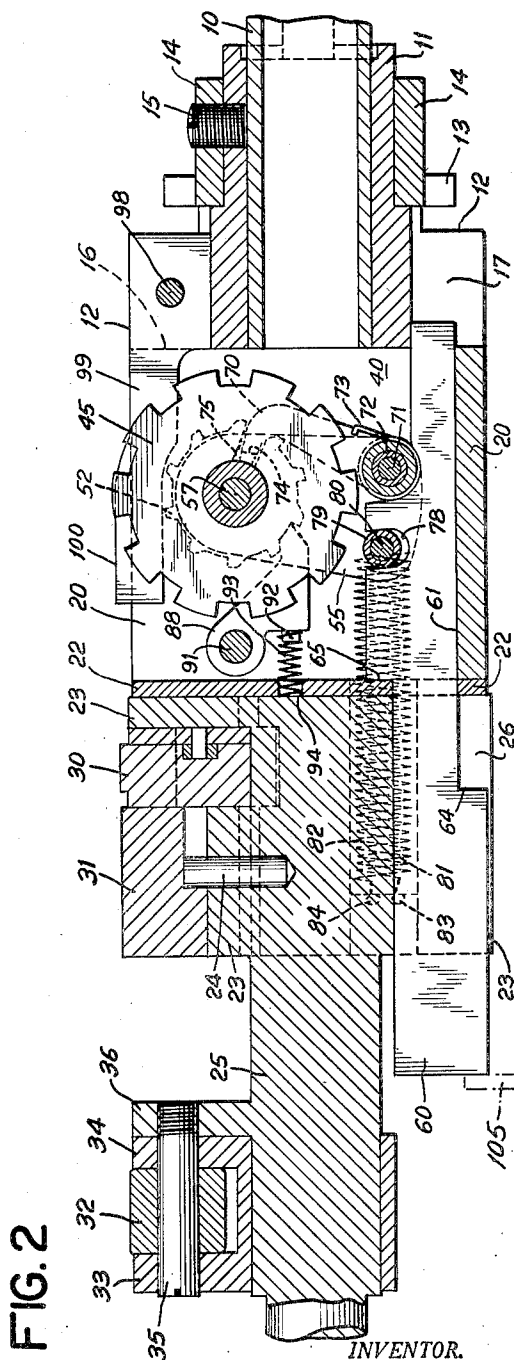
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ROTARY NUMBERING MACHINE

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ROTARY NUMBERING MACHINE

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11 Claims. (Cl. 101-76)

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This invention is a continuation in part of application Ser. No. 656,883, filed March 25, 1946, and issued July 25, 1950, as Patent No. 2,516,721. The invention relates to a compact numbering machine for printing numbers on checks, tickets or the like at high speed.

A feature of the invention is the provision of a numbering device of compact, simplified construction which is easily assembled or taken apart and which is capable of operating at high speed.

Another feature of the invention is the provision of a numbering machine of durable construction in which the mechanism is mounted in a rugged tri-partite cylindrical structure of relatively small diameter which permits intermittent high speed operation of the device.

Still another feature of the invention is a simplified arrangement in which the number wheels are mounted on a single screw which is removable from the exterior of the device to permit easy removal or installation of the number wheel assembly.

Other objects and features will be found in the following description, given with the aid of the accompanying drawings, of which

Fig. 1 is a front elevational view of a preferred embodiment of the invention; and

Fig. 2 is a longitudinal section taken there-through.

Referring now to the drawings: According to a preferred embodiment of the invention, a sleeve 10 is driven from a suitable source of power, which in the case where the device is intermittently operated, will be the driven member of a suitable friction clutch, not shown. A sleeve 11, provided with a large flange 12 at one end which forms one end of a recess or housing for the numbering mechanism fits over sleeve 10. A gear 13 for operating a counter, not shown, is formed with a hub 14, which together with sleeve 11 is fastened to the inner driven sleeve 10 by a screw 15. Flange 12 is formed with open oppositely disposed slots 16 and 17 extending in an axial direction shown in elevation in Fig. 2 which will be referred to later on.

A number wheel housing 20 generally cylindrical in shape except for an open-sided recess 21 in which the numbering mechanism is mounted has one end disposed against the face of flange 12 which forms a closure therefor. The opposite end of housing 20 rests against a relatively thin circular plate 22 formed with a number of openings for holding pawl springs which will be described below.

One face of a wide hub 23 fastened by pin 24

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to a shaft 25 concentrically disposed with respect to sleeve 10 rests against the opposite surface of plate 22. A slot 26 formed in hub 23 is in register with slot 17 in flange 12. Optionally, and forming, per se, no part of the invention, detachable printing dies such as date die 30 may be mounted in suitable recesses formed in hub 23. Another die 31 for printing any desired matter may be detachably mounted in a recess alongside the date die.

A stop roller 32 adapted to cooperate with a known type of stationary start-stop mechanism is mounted between arms 33 and 34 of a detachable stop arm assembly. Roller 32 turns on the shank of a screw 35 which is threaded into an opening therefor in an arm 36 formed integrally with shaft 25.

The outer surface of number wheel housing 20 is cylindrical and of the same diameter as flange 12 except that a wide deep longitudinal recess is formed therein having flat, parallel, opposed side walls 40 and 41. A feature of the invention is the simplified arrangement for mounting the numbering wheels in the recess. Six number wheels 42-47 are shown in the present embodiment of the invention. Each number wheel has a ratchet wheel fixed thereto, the ratchet wheels being numbered 49 to 54. The wheels are assembled between oscillatory end plates 55 and 56, and the whole assembly which just fits between side walls 40 and 41 of the recess is mounted to turn on the shank of a screw 57 which is inserted into a countersunk opening therefor on the outside of housing 20. Screw 57 extends across the recess between side walls 40 and 41 and is held by a nut 58 disposed in a counter-bored opening below the outer surface of housing 20.

The number wheels vary in diameter progressively from the middle wheels toward the end wheels. The characters on the wheels are formed on suitably bevelled surfaces so as to present, jointly, when in printing position a curved arrangement of characters of slightly greater diameter than the housing 20.

The number wheels are operated by a slide or plunger 60 having an outer portion which extends beyond and reciprocates in slot 26 in hub 23, and an offset portion 61 which extends through an opening in plate 22 and along the inner rear surface of the housing, midway between the walls 40 and 41 thereof, the opposite end of the slide being guided by the slot 17 in flange 12. Slide 60 is free to move back and forth in the slots 26 and 17 within the limits imposed by the engagement of a shoulder 64 on the outer edge of the slide

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with one surface of plate 22, and the engagement of a second shoulder 65 formed in offset relation with shoulder 64 on the opposite edge of the slide which engages the opposite surface of plate 22. A suitable stationary cam indicated generally by reference character 105 is used to actuate slide 60 in the known manner as the assembly rotates.

Slide 60 passes through the housing behind the number wheel assembly and is used to oscillate the end plates 55 and 56 disposed on screw 57 at opposite ends of the number wheel assembly by means now to be described.

Between end plates 55 and 56, an assembly of pawls 70, one for each ratchet wheel, is mounted on a spindle 71 riveted at opposite ends to the end plates. The pawl assembly is of a well known type in which the pawls are all fixed to a sleeve 72 free to turn on the spindle. A spring 73 tends to hold the noses of the pawls in engagement with their respective ratchet wheels. A known carry-over arrangement may be used in which the noses 74 of the pawls are of progressively greater length, the effective length of the pawl for the units wheel being the greatest. Between the digits 9 and 0 on the respective number wheels, except that for the highest order, the notches 75 between the ratchet teeth vary progressively in depth, the depth of the depression between the 9 and 0 teeth on the units wheel being the greatest. With this arrangement, as the units wheel is stepped along, the long nose of its ratchet pawl is effective to prevent the noses of any of the higher order pawls from engaging and operating their ratchets. However, when the nose of the units pawl drops into the deep notch between the ratchet wheel teeth after the digit 9, the pawl assembly will turn sufficiently for the ratchet wheel 50 of the tens wheel 43 to be engaged and advanced one step by its pawl. This same operation will occur until the tens wheel is turned past 9. Then, when the units wheel passes 9, the deep notches of both of these wheels will be lined up with the noses of their respective pawls, and on the next operation, the pawl assembly will be turned sufficiently by its spring 73 to bring the pawl for the third or hundreds wheel 44 into engagement with its ratchet 51 and advance the same one step. After the deep notch between the 9 and 0 teeth of the hundreds ratchet is reached and becomes aligned with those of the lower orders, the pawl assembly will turn further on its pivot and on the following step, the ratchet 52 for the thousands wheel will be advanced one step, and so on.

Adjacent the number wheel assembly, plunger 60 has a notch 78 formed in its edge. A sleeve 79 disposed between end plates 55 and 56 is positioned in the notch. The sleeve is free to turn on a long pin 80 riveted at its ends to the respective end plates. This arrangement provides a driving connection between the slide 60 and the pawl and ratchet mechanism. It will be seen from the drawings that as slide 60 is moved back and forth in its guideway that the end plates 55 and 56 will be oscillated first in one direction and then the other on bearing screw 57 and this movement is used to operate the pawl and ratchet mechanism of the number wheels.

The slide 60 is retracted normally to the position shown in Fig. 2 where shoulder 65 of the slide rests against the surface of plate 22, by a pair of long retractile springs 81 and 82 attached to the end plates. These springs are disposed in spaced long holes drilled in hub 23. One end of each spring is connected to respective end plates

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55 and 56 while the opposite ends of the springs are fastened respectively to pins 83 and 84 disposed transversely of the holes encasing the springs.

Individual holding pawls 85 to 90 are provided for the respective ratchet wheels. The pawls are separated by suitable spacers which together with the pawls are mounted on a screw 91 which extends across the recess for the number wheel mechanism. Each pawl is provided with a pin 92 extending into one end of a compression spring 93 which extend into individual openings 94 formed in plate 22. The springs are easily mounted on assembly of the device by inserting them in their proper holes where their open ends slip over the respective pawl pins 92. The springs are compressed when the face of hub 23 is assembled to plate 22.

From the foregoing it will be understood that the structure of the invention comprises three parts, the flanged sleeve 11—12, the number wheel housing 20 and the hub and shaft 23—25. These parts are held together by long screws 95, one of which is shown in the drawings. The heads of screws 95 are disposed in counter bored recesses in flange 12 and extend through the structure in suitable openings, their ends being threaded into hub 23. With this arrangement, on removal of the screws, three such screws being usually employed, the three parts of the structure may be separated, and as easily put together again. The number wheel mechanism is easily connected with operating slide 60. All that is necessary is to place the roller 79 in the notch 78 in the slide.

An arrangement for punctuating the printed numerals by printing a long thin line between the respective groups of three numbers is provided. This punctuating device which is optional comprises an arm 97 having one end fastened in slot 16 in flange 12 by a taper pin 98. Arm 97 projects in an axial direction and is formed with a portion 99 which extends between number wheels 44 and 49 but clear of the same. An edge 100 of the arm extends outwardly in register with the surface of the digits on the number wheels when in printing position and therefore will cause a narrow line to be printed between the adjacent digits.

The stationary cam 105 for operating slide 60 is not shown in detail because it is thought the operation of a relatively movable slide by a stationary cam is well known. However, it will be understood that the cam may be designed to operate the slide during a considerable part of the angular movement of the device during each revolution thereof which will permit smoother operation of the pawls than the usual arrangement where a rotating pawl operating arm is struck against a stationary stop.

While the device is designed primarily for intermittent unidirectional operation, it will be understood that it will operate just as well when used with continuously driven apparatus. Furthermore, assuming a correctly positioned operating cam 105 is provided, the numbering mechanism will operate correctly irrespective of the direction of its rotation. This is a feature not found in other numbering devices which have to be designed for either right hand or left hand operation, depending on requirements.

What is claimed is:

1. In a numbering machine, a substantially cylindrical body supported for rotation on its axis including end portions provided with co-aligned

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slots and a central portion having an open sided recess formed therein, a set of number wheels provided with individual ratchets disposed in the recess, a member extending across the recess for supporting the number wheels, a holding pawl for each ratchet, a member extending across the recess for supporting the pawls, a pair of plates mounted on the first mentioned member on opposite sides of the number wheels, an operating pawl assembly for the number wheels supported between the plates, a spring loaded slide formed with a notch disposed in the slots for oscillating the plates and thereby operating the number wheels, a roller mounted between the plates and resting in the notch for detachably coupling the slide to the plates, a plurality of long screws connecting the end portions for holding the structure together and means for actuating the slide during each rotation of the cylindrical body.

2. In a numbering machine, a substantially cylindrical body supported for rotation on its axis including end portions provided with co-aligned slots and a central portion having an open sided recess formed therein, a set of number wheels provided with individual ratchets disposed in the recess, a screw insertable from the exterior of the central portion and extending across a recess for movably supporting the number wheels, a holding pawl for each ratchet, a screw insertable from the exterior of the central portion and extending across the recess for removably supporting the holding pawls, a pair of plates mounted respectively on the first mentioned screw on opposite sides of the number wheels, an operating pawl assembly for the number wheels mounted between the plates, a spring loaded slide formed with a notch disposed in the slots and extending through the recess for oscillating the plates and thereby the number wheels, a roller mounted between the plates and resting in the notch for detachably coupling the slide to the plates and means for actuating the slide during each rotation of the cylindrical body comprising a relatively stationary cam disposed in the rotary path of an end portion of the slide.

3. In a numbering machine, a substantially cylindrical body having a recess formed therein adapted to rotate about its axis, a bearing member extending across the recess supported by the walls thereof, a set of number wheels provided with individual ratchets mounted for rotation on the member, a pair of plates disposed respectively on the bearing member on opposite sides of the set of number wheels, an actuating pawl assembly for the number wheels supported between the plates, a spring loaded actuating member for the plates comprising a sliding member, guide means supporting the slide member for reciprocation comprising aligned longitudinal slots formed in the cylindrical body in parallel offset relation to the axis thereof and a stationary cam for operating the sliding member during each revolution of the cylindrical body.

4. In a numbering machine, a tripartite substantially cylindrical body supported for rotation on its axis including end portions provided with co-aligned slots, and a central portion coaxially assembled therebetween having an open sided recess formed therein, a removable bearing member extending through the side walls of the recess and across the recess, a set of number wheels provided with individual ratchets mounted for rotation on the member, a pair of plates supported for oscillation respectively disposed on opposite sides of the set of number wheels, actu-

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ating pawls for the number wheel ratchets supported between the plates, and an actuating slide for the plates disposed in the slots, a driving connection between the plates and slide effective when the slide is reciprocated to rock the plates and thereby cause the pawls to operate the number wheels, and means including a stationary cam disposed in the rotary path of the slide for engaging and reciprocating the slide during each revolution of the cylindrical body.

5. In a numbering machine, a substantially tripartite cylindrical body supported for rotation on its axis, including end portions provided with aligned slots, and a central portion having an open sided recess formed therein, a plurality of number wheels disposed in the recess, a screw insertable from the outside of the central portion extending across the recess for removably supporting the number wheels, a pair of spring loaded plates mounted respectively on the screw for rocking movement on opposite sides of the number wheels, an operating pawl assembly for the number wheels supported between the plates, a slide mounted for axial movement in the slots and coupled with the plates for rocking the plates and thus actuating the pawl assembly to index the number wheels, and a stationary cam disposed in the rotary path of the slide for engaging and reciprocating the slide during each revolution of the cylindrical body.

6. In a numbering machine, a substantially tripartite cylindrical body supported for rotation on its axis including end portions provided with aligned slots and a central portion secured therebetween having an open sided recess formed therein, a set of number wheels disposed in the recess, a screw insertable from the exterior of the central portion extending across the recess for rotatably supporting the number wheels, a pair of plates mounted for rocking movement on the screw on opposite sides of the number wheels, an operating pawl assembly for the number wheels supported between the plates, a slide formed with a notch disposed in the slots for rocking the plates to operate the pawl assembly, a roller mounted between the plates and resting in the notch for detachably coupling the slide to the plates and means for actuating the slide during each revolution of the cylindrical body, the arrangement being such that the number wheels, plates and pawls may be removed as a unit from the recess by removing said screw.

7. In a numbering machine adapted to be easily taken apart and assembled, a substantially cylindrical body supported for rotation on its axis including end portions provided with aligned slots and a central portion having an open sided recess formed therein, a set of number wheels provided with individual ratchets disposed in the recess, a screw extending across the recess through the side walls thereof for supporting the number wheels, a holding pawl for each ratchet, a screw extending across the recess through the side walls thereof for supporting the pawls, a pair of plates mounted for oscillating movement on the first mentioned screw on opposite sides of the number wheels, an operating pawl assembly for the number wheels supported between the plates, a spring loaded slide formed with a notch disposed in the slots for oscillating the plates and thereby causing the operating pawls to operate the number wheels, a roller mounted between the plates and resting in the notch for detachably coupling the slide to the plates and means for displacing the slide during each rotation of the cylindrical

body, the arrangement being such that the number wheels, plates and pawls may be removed as a unit by removing the first mentioned screw and the holding pawls may be removed by removing the second mentioned screw.

8. In a numbering machine, a tripartite substantially cylindrical body adapted to rotate on its axis including end portions provided with aligned slots and a central portion having a recess formed therein extending beyond the bottoms of the slots, a bearing screw extending through the recess walls and across the recess, a set of number wheels provided with individual ratchets mounted for rotation on the bearing screw, a pair of plates disposed respectively on the bearing screw for rocking movement on opposite sides of the set of number wheels, actuating pawls for the number wheels supported between the plates, an actuating slide formed with a notch disposed in the slots extending through the rear of the recess behind the number wheels adjacent the rear inner surface of the recess which surface retains the slide in the slots, means for reciprocating the slide in the slots during each revolution of the cylindrical body, and a driving connection between the slide and the plates including the notch in the slide by which the plates are rocked by the slide as it is reciprocated.

9. In a numbering machine, a tripartite cylindrical body adapted to rotate about its axis including a central member formed with an open sided recess extending the length thereof, a bearing screw insertable from the exterior of the central member extending across the recess in a plane at right angles to said axis, a set of number wheels rotatably mounted on the bearing screw, a pair of plates rockably mounted on the bearing screw respectively on opposite sides of the number wheels, a pair of rods disposed between the plates and riveted to the plates forming with the plates a rigid structure, a pawl assembly for operating the number wheels supported by a first of the rods, a pair of end members each with a slot formed therein respectively secured with the slots in alignment to opposite ends of the central member thereby forming a closure for the opposite ends of said recess, a slide formed with a notch therein disposed for reciprocatory movement in the slots extending through the recess at the rear of the number wheels, a sleeve disposed in the notch in the slide and supported for rotation on the second of the rods which connect the rocking plates to form a driving connection between the slide and the plates by which the slide when reciprocated rocks the plates and causes the pawls to actuate the number wheels.

10. In a numbering machine, a tripartite cylindrical body adapted to rotate about its axis including a central member formed with an open sided recess extending the length thereof, a bearing screw insertable from the exterior of the central member extending across the recess in a plane at right angles to said axis, a set of number wheels rotatably mounted on the bearing screw, a pair of plates rockably mounted on the bearing screw respectively on opposite sides of the number wheels, a pair of rods disposed between

the plates and riveted to the plates forming with the plates a rigid structure, a pawl assembly for operating the number wheels supported by the first of the rods, a pair of end members each with a slot formed therein respectively secured with the slots in alignment to opposite ends of the central member thereby forming a closure for the opposite ends of said recess, a slide formed with a notch therein disposed for reciprocatory movement in the slots extending through the recess at the rear of the number wheels, a sleeve disposed in the notch in the slide and supported for rotation on the second of the rods which connect the rocking plates forming a driving connection between the slide and the plates by which the slide when reciprocated rocks the plates and causes the pawls to actuate the number wheels, and a stationary cam disposed in the rotary path of one end of the slide when the cylindrical body is rotating effective to engage and displace the slide during each rotation of the cylindrical body.

11. In a numbering machine, a tripartite cylindrical body adapted to rotate on its axis including a central member formed with an open sided recess extending the length thereof, a bearing screw insertable from the exterior of the central member extending across the recess in a plane at right angles to said axis, a set of number wheels rotatably mounted on the bearing screw, a pair of plates rockably mounted on the bearing screw respectively on opposite sides of the number wheels, a pair of rods disposed between the plates and riveted to the plates forming with the plates a rigid structure, a pawl assembly for operating the number wheels supported by a first of the rods, a pair of end members each with a slot formed therein respectively secured with the slots in alignment to opposite ends of the central member thereby forming a closure for the opposite ends of said recess, a slide formed with a notch therein disposed for reciprocatory movement in the slots extending through the recess at the rear of the number wheels, a sleeve disposed in the notch in the slide and supported for rotation on the second of the rods which connect the rocking plates forming a driving connection between the slide and the plates by which the slide when reciprocated rocks the plates and causes the pawls to actuate the number wheels, a stationary cam disposed in the rotary path of one end of the slide when the cylindrical body is rotating effective to engage and displace the slide during each rotation of the cylindrical body and springs attached to the respective plates for restoring the plates and slide to a normal position of rest on disengagement of the slide from the cam.

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