June 6, 1950 F. J. ROUAN ET AL 2,510,350

POSTAGE PRINTING AND METERING DEVICE

Filed Oct. 18, 1947 3 Sheets-Sheet 1

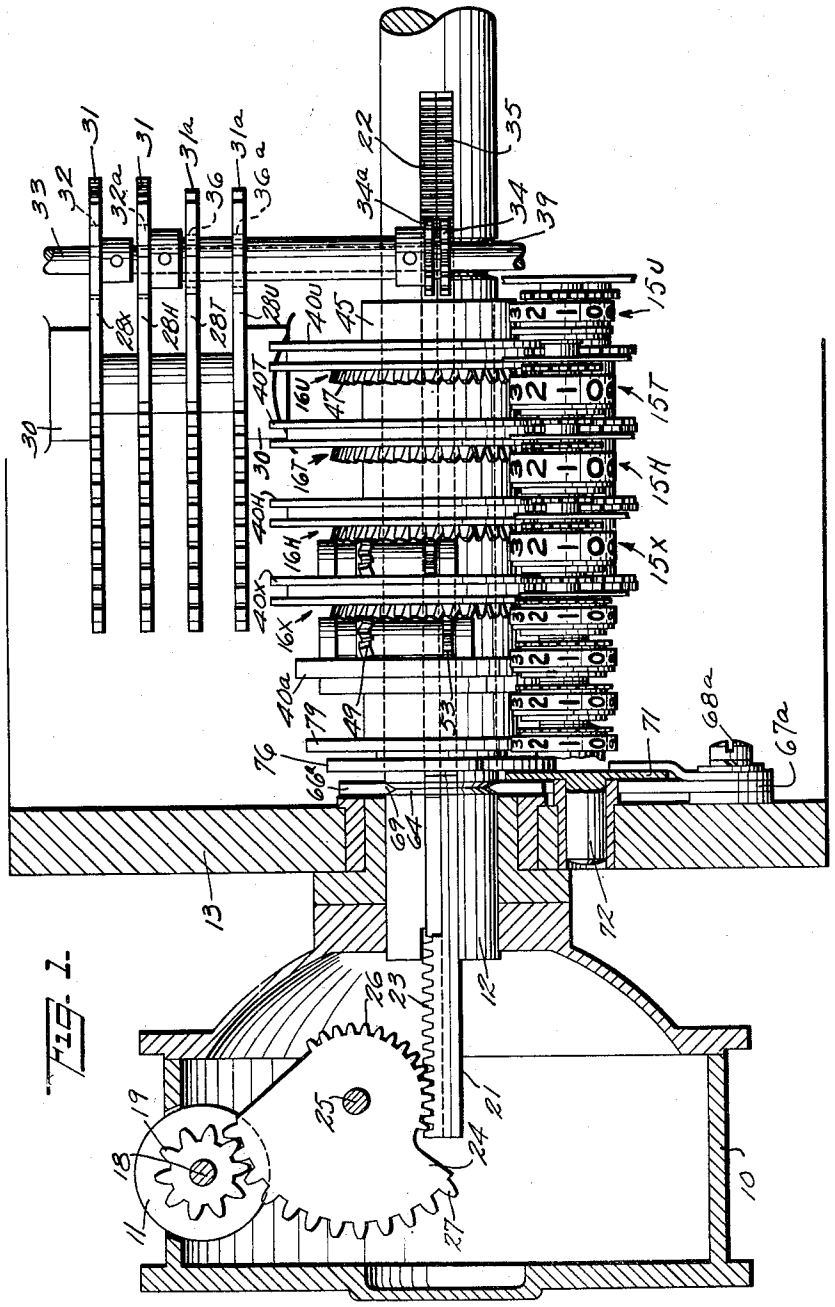

FIG. 1.

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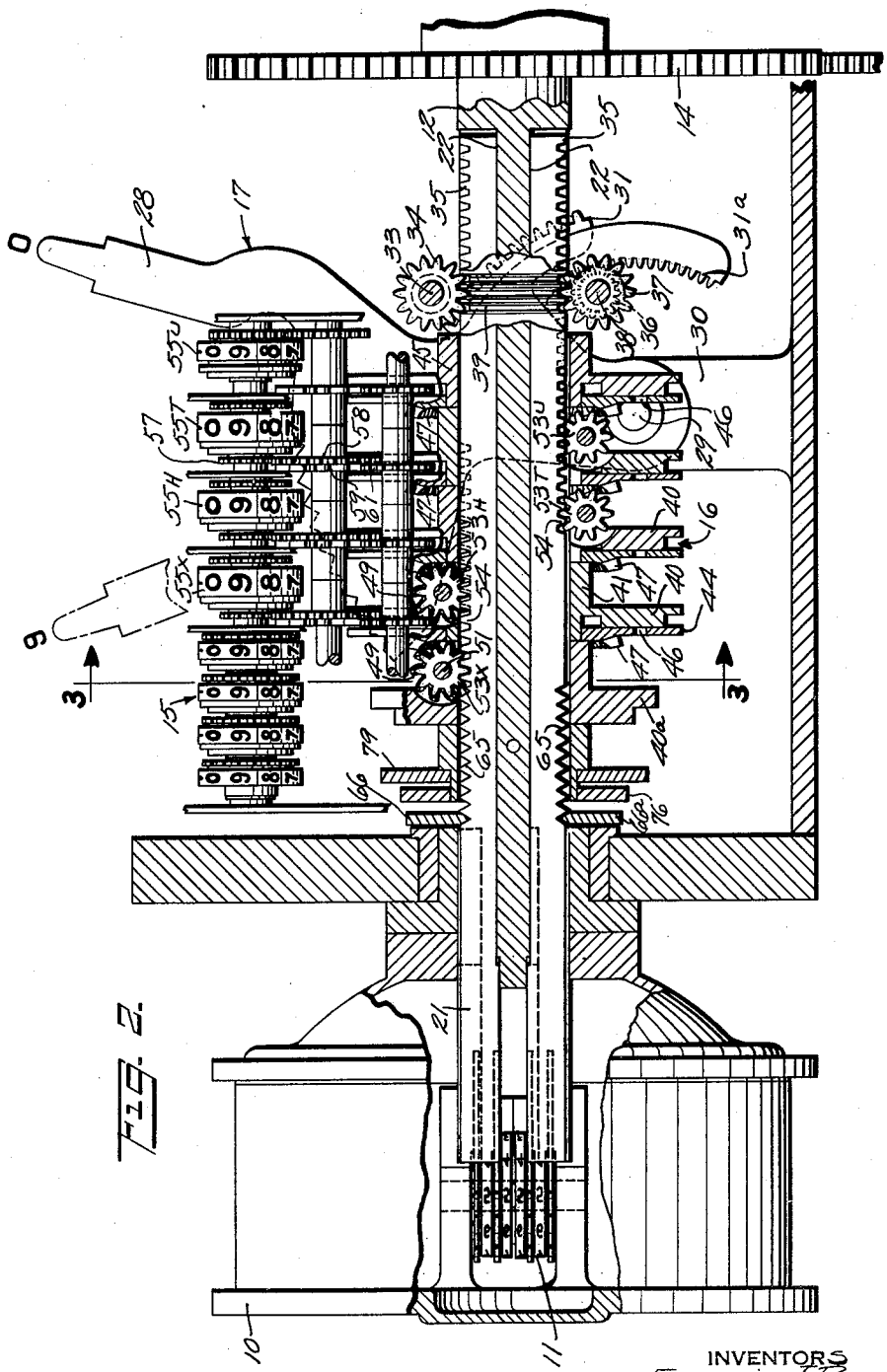

FIG. 2.

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Filed Oct. 18, 1947 3 Sheets-Sheet 3

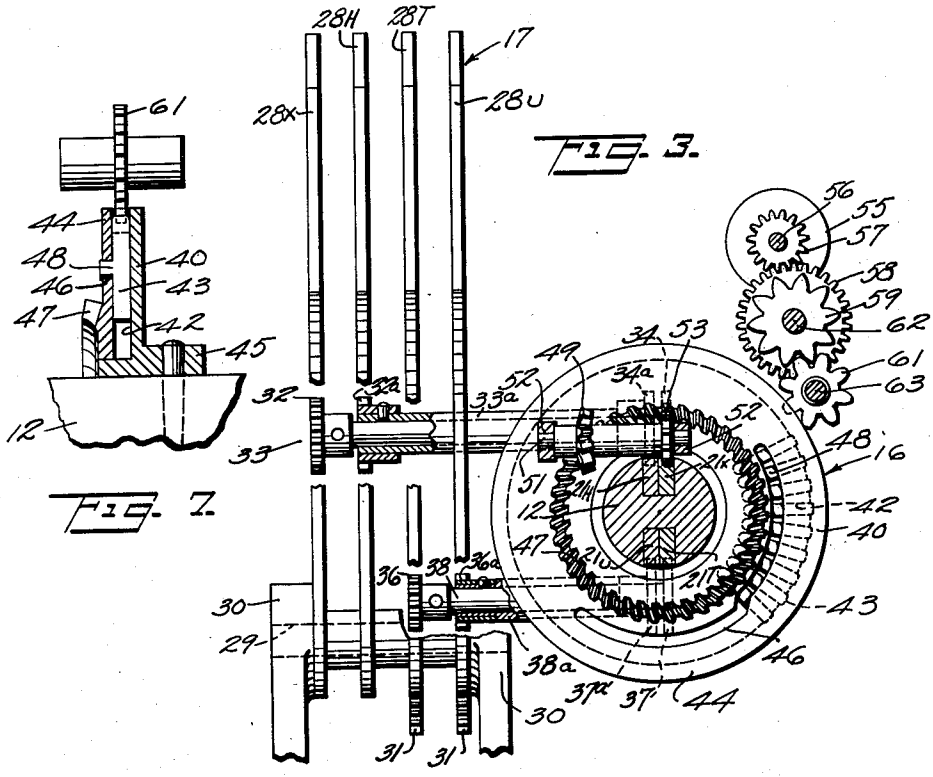

FIG. 3.

FIG. 7.

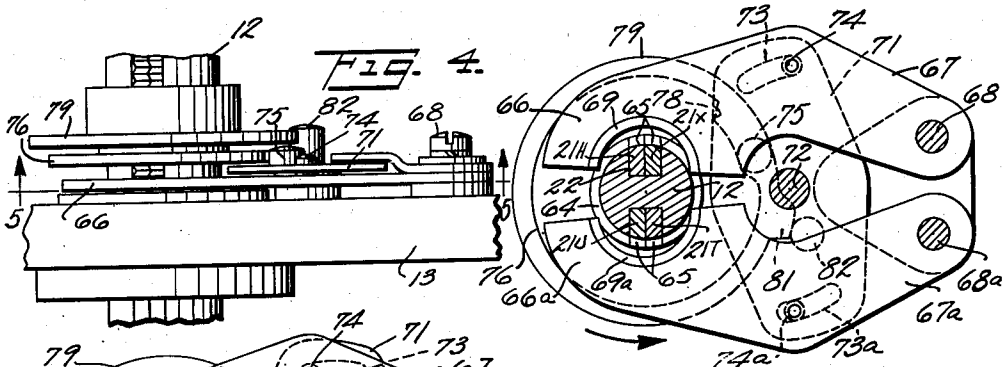

FIG. 4.

FIG. 5.

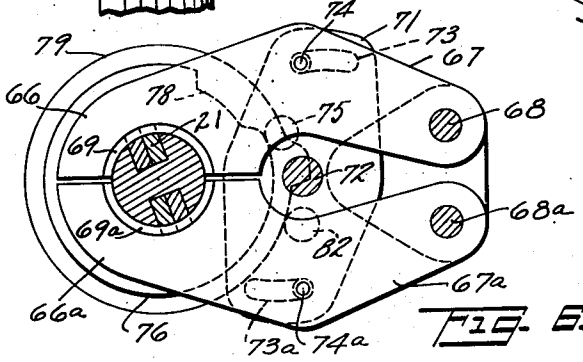

FIG. 6.

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POSTAGE PRINTING AND METERING DEVICE

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Application October 18, 1947, Serial No. 780,684

8 Claims. (Cl. 101—91)

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This invention relates to an improvement in mechanism for use in a rotary postage printing and metering device for the combined selective setting of value type wheels and the setting of register actuator mechanism, and more particularly to means which permit rotation of settable elements with the printing device during a printing cycle of operation while their relative set positions are continuously maintained.

In a meter unit of a postage printing and metering device, the manual setting of a value to be printed and registered is effected before starting a cycle of machine operation. The meter unit includes a housing, wherein the registering mechanism is maintained, also a rotatable printing drum wherein the value type wheels are mounted.

Setting of type wheels and register actuator mechanism is effected by setting levers positioned in the stationary housing. The direct connection between the setting means and rotary drum is broken when the drum starts to rotate but the relative set positions of the parts is continuously maintained.

It is one object of the invention to provide improved connecting elements between elements associated with the setting levers and settable elements associated with the rotatable printing drum, which elements will permit rotation of the printing drum while the relative positions between the setting members and settable members are continuously maintained.

It is another object to provide type wheel setting by means of a toothed rack bar which is longitudinally adjustable within a recess in the drum shaft by means of a manually settable gear, and to provide for movement of a transversely grooved portion of the shaft through teeth of the manually settable gear during a cycle of operation, to maintain alignment of the teeth of said gear with the teeth of the rack bar.

Another object is to combine with a register actuator element of the radially adjustable toothed type which is rotatable with a printing drum shaft, a toothed rack which is longitudinally adjustable within a recess in the printing drum shaft, and to effect adjustment of the teeth of the actuator element by means of a geared connection between the toothed rack and actuator element when said toothed rack is adjusted during the setting of a value in a value printing type wheel.

It is a further object of the invention to include aligner means which is adapted to engage a circular groove in the drum shaft and one of a plurality of grooves in a rack bar during a

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cycle of operation to maintain the rack bar in its pre-set position after it moves out of meshed relation with a settable gear during a printing cycle of operation.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A preferred embodiment of the invention is illustrated in the accompanying drawings, wherein;

Fig. 1 is a plan view showing a value printing and register actuating means in elevation and includes a cross-section through a printing drum;

Fig. 2 is a vertical sectional view through the drum shaft and register actuator mechanism and further includes the registering unit and associated drive gearing;

Fig. 3 is a vertical sectional view taken along the line 3—3 of Fig. 2, with parts broken away;

Fig. 4 is a plan view of an aligner unit which cooperates with the drum shaft and adjustable rack bars to maintain relative alignment between the settable members and setting members during a printing cycle of operation;

Fig. 5 is a vertical sectional view taken along the line 5—5 of Fig. 4 showing the aligner unit in an open position;

Fig. 6 is a view similar to Fig. 5 showing the aligner unit in a closed position; and

Fig. 7 is an enlarged detail sectional view showing an actuator tooth in a projected operative position relative to a register drive gear.

Referring to the drawings in detail, a postage meter unit generally comprises a rotatable printing drum 10 having value type wheels 11 mounted therein, the drum being supported on a drum shaft 12, which shaft is suitably supported in a frame 13. The shaft is adapted to be driven by suitable drive means, such as through a power or hand driven gear indicated at 14. Registering mechanism, generally indicated at 15, is supported within the frame structure 13, and register actuating mechanism, generally indicated at 16, is supported on the drum shaft 12. Manual value setting means, generally indicated at 17, is provided for the purpose of effecting adjustment of the value type wheels 11, and the register actuating mechanism 16.

In the description, the group of type wheels

and the groups of elements which control the setting of the type wheels and actuator means will be referred to generally by a designating reference numeral representing each group. To simplify the reading of the separate elements of each group, however, letter suffixes will be added to the designating reference numerals on the drawing to indicate the denomination represented by each of the elements wherever it is deemed necessary. The suffix letters will include U for the units, T for the tens, H for the hundreds, and X for the thousands denominations.

The type wheels 11 are mounted on a shaft 18 within the printing drum 10, and each type wheel has a pinion 19 associated therewith. Toothed rack bars 21 are slidably mounted within longitudinal recesses 22 in the drum shaft 12, and each is provided with a toothed rack portion 23, as best indicated in Fig. 1. A gear member 24, mounted on a shaft 25, within the printing drum 10, has one gear segment portion 26 which meshes with the rack teeth 23, and a second segment portion 27 which meshes with a pinion 19 of an associated type wheel 11. The rack bars 21 are mounted in pairs within recesses 22 provided on opposite sides of the drum shaft 12, and rack teeth 23, which project sidewardly therefrom, mesh with the teeth of the segment gears 26.

The value setting means 17 comprises setting levers 28 which are pivotally mounted upon a shaft 29, supported in bearings 30—30. Two of said setting levers 28X and 28H are provided with gear segments 31—31 having external gear tooth portions, and two of the setting levers 28T and 28U are provided with gear segments 31*a*—31*a* having internal gear toothed portions. A pinion 32 is fixed to a shaft 33, suitably mounted within the frame 13, and is adapted to mesh with gear segment 31 on the setting lever 28X. Also mounted on said shaft 33 is a pinion 34, Fig. 2, which meshes with a second group of rack teeth designated at 35 on one of the rack bars 21. A sleeve 33*a* over the shaft 33, Fig. 3, has a pinion 32*a* fixed to one end thereof and a pinion 34*a* fixed to the opposite end thereof, which pinions mesh with an associated segment 31 and rack teeth 35 respectively.

A pinion 36 is fixed to one end of a shaft 38 and a pinion 37 is fixed to the other end of said shaft. Also, a sleeve 38*a* over said shaft 38 has pinions 36*a* and 37*a* fixed thereon. Said pinions 36—36*a* and 37—37*a* mesh with the gear segments 31*a*—31*a* of setting levers 28T and 28U, and teeth 35 of two of the rack bars 21 respectively. When a setting lever 28, associated with any pinion 32—32*a* or 36—36*a*, is rocked about the shaft 29, the associated pinions 34—34*a* and 37—37*a* are rotated accordingly to effect adjustment of their associated rack bars 21.

As best shown in Fig. 2, circular grooves 39 are provided in the shaft 12 in alignment with those teeth of each of the pinions 34—34*a* and 37—37*a* which mesh with the rack teeth 35 and are arranged in such manner that when the drum shaft 12 is rotated, the grooved portion of the shaft will pass freely over the said pinion teeth.

As thus far described it will be seen that manual adjustment of the setting levers 28 will effect longitudinal adjustment of the rack bars 21 to effect setting of the type wheels 11 to the value which it is desired to print. It will also be seen, that when a cycle of operation is effected, the relative setting between rack teeth

35 and associated pinions will remain unaltered because the teeth of the pinions 34—34*a* and 37—37*a*, which mesh with the rack teeth 35 are aligned with the grooves 39 in shaft 12.

The register actuator mechanism, generally indicated at 16, Fig. 2, includes a sleeve 41, fixed to the shaft 12, and an integral flange portion 40, which has radial slots 42 therein, for the support of radially adjustable teeth 43. See Figs. 3 and 7. A disc 44 is mounted to freely rotate about the sleeve 41 and has a cam slot 46 therein. A skew bevel gear 47 is also formed as an integral part of the disc 44. Each radially adjustable tooth 43 has a pin or lug 48 extending therefrom and through the cam slot 46. Said cam slot 46 is so arranged that when the disc 44 is rotated, the number of teeth agreeing with the value which is to be printed will be extended to an operative position.

A bevel pinion 49 meshes with the skew bevel gear 47, and, when rotated, is adapted to rotate the cam disc 44 and effect setting of the radially adjustable teeth 43 to an operative position. Said bevel pinion 49 is mounted upon a shaft 51, which shaft is suitably supported in bearings 52—52, extending from a flange 40 of an adjacent actuator 16. A pinion 53 is also fixed on the shaft 51. With regard to the actuator 16X, the shaft 51 is supported by a disc 49*a*. Referring to Fig. 2, two pinions 53X and 53H are shown associated with two rack bars 21 which are positioned within the upper portion of the drum shaft 12, whereas, the remaining two pinions 53T and 53U are associated with the pair of rack bars located within the lower portion of the drum shaft 12. A third group of rack teeth is provided on each rack 21, as indicated at 54, which teeth are engaged by the pinions 53.

When therefore, a setting lever 28 is moved to effect adjustment of an associated rack bar 21, an associated bevel pinion 49 is also rotated to effect rotation of an associated skew bevel gear 47 and cam disc 44. The desired number of radially adjustable teeth 43, associated with the cam disc 44, are thus projected to an operative position by means of the cam slot 46.

The registering mechanism 15 includes a group of numeral accumulator wheels 55U—55T—55H—55X, which wheels are preferably differentially controlled by means of mechanism of the character disclosed in a pending patent application Serial Number 760,590. Said accumulator wheels are carried on a shaft 56, supported within the frame structure 13. A drive of the accumulator wheels is effected by means of gearing best shown in Fig. 3, wherein a pinion 57, forming part of the differential control of an accumulator wheel, meshes with an intermediate gear 58. The intermediate gear 58 has a pinion 59 fixed thereto, which pinion meshes with a register drive gear 61. A shaft 62 supports the intermediate gear 58 and pinion 59, and a shaft 63 supports the drive gear 61, said shafts 62 and 63 being suitably supported within the frame structure 13.

After a value has been set in the type wheels 11, and the number of actuator teeth 43 agreeing with the set value have been projected to an actuating position by means of the setting levers 28, a printing cycle of operation will cause the printing and registration of said set value to be effected.

Inasmuch as the circular grooves 39 in the drum shaft 12, Fig. 2, are engaged by the pinions 34 and 37 when the shaft 12 rotates, aligner means is provided to assure alignment of said grooves 39

with the tooth spaces of the rack teeth 35 of the rack bars 21. Said aligner means, which is best shown in Figs. 4, 5 and 6, includes opening and closing upper and lower jaws 66—66a which cooperate with a V groove 64 in the drum shaft 12 and V grooves 65 in the rack bars 21. Said jaws 66—66a have arms 67—67a extending therefrom and are pivotally supported on studs 68—68a respectively. The studs 68—68a are supported in the front wall of the frame 13. Each jaw 66—66a has a semi-circular mouth 69—69a shaped in cross-section to fit within the V grooves 64 and 65, when the jaws are closed as shown in Fig. 6.

Control means is provided for closing and opening the aligner jaws during a printing cycle of operation and includes a cam operated rocker plate 71. Said rocker plate 71 is pivoted on a stud 72 and has two arcuate cam slots 73—73a therein, which are engaged by pins 74—74a respectively, projecting from the aligner jaw arms 67—67a. Another pin 75 projects from one face of the rocker plate 71 into the path of a disc cam 76, which cam is fixed to the drum shaft 12 and has a notched cam portion 78 in the periphery thereof. A second disc cam 79, fixed to the drum shaft 12, has a cam projection 81 on the periphery thereof, which cooperates with a pin 82, projecting from the rocker plate 71.

When the aligner jaws 66—66a are in the position shown in Fig. 5, the pin 82 is in engagement with the high point of the cam projection 81, and the pin 75 is in engagement with the low point of the notched cam 78. In this position the jaws 66—66a are open and free from engagement with the V grooves 65 in the rack bars 21 and said rack bars 21 are adapted to be adjusted to effect setting of the type wheels and actuator mechanism.

At the beginning of a cycle of operation, the pin 75 will rise from the low to the high point of the notched cam 78 while the pin 82 will drop from the projection 81 to lower point thereof or the peripheral surface of the cam disc 79. As a result of said cam control, the rocker plate 71 is rotated to effect a change of position of the cam slots 73—73a therein and the pins 74—74a, to thereby effect a change of position of the aligner jaws 66—66a to the closed position shown in Fig. 6. When the aligner jaws 66—66a are in said closed position, the jaw portions thereof will engage the V groove 64 in the shaft 12, and one of each of the V grooves 65 in the rack bars 21. During rotation of the shaft 12, the tooth spaces of the rack teeth 35 of the rack bars 21 will thus be maintained in alignment with the grooves 39 in the shaft 12 to permit free rotation of the shaft 12.

Having described the invention, what is claimed is:

1. In a value printing device, in combination, a printing drum having an adjustable value printing wheel therein, a drum shaft having a longitudinal recess therein, a rack bar having groups of teeth thereon and slidably mounted in said shaft recess, gearing connecting one group of rack bar teeth with the printing wheel, and a settable member including a connecting gear meshing with another group of rack bar teeth, the drum shaft having cylindrical grooves therein aligned with the teeth of the connecting gear which mesh with the second named group of rack bar teeth, the meshing teeth of said gear being adapted to pass within the cylindrical grooves when the shaft is rotated during a printing cycle.

2. In a value printing device, in combination, a printing drum having an adjustable value printing wheel therein, a drum shaft having a longitudinal recess therein, a rack bar having groups of teeth thereon and slidably mounted in said shaft recess, gearing connecting one group of rack bar teeth with the printing wheel, a settable member including a connecting gear meshing with another group of rack bar teeth, the drum shaft having grooves therein aligned with meshing teeth of the connecting gear to permit shaft rotation during a printing cycle, and means to maintain alignment of the drum shaft grooves and connecting gear during a cycle of operation.

3. In a value printing device, in combination, a printing drum having an adjustable value type wheel therein, a drum shaft having cylindrical grooves therearound, a toothed rack bar longitudinally slidable within a longitudinal recess in said shaft and geared to the type wheel, a pinion meshing with the rack bar and having the meshed teeth aligned with the cylindrical grooves of the drum shaft, and a setting element movable about an axis transverse to the drum shaft and connected with the pinion to effect adjustment of the rack and type wheel, the meshing teeth of said pinion being adapted to clear the shaft as the grooved shaft portion moves therethrough during the printing cycle of operation.

4. In a value printing device, in combination, a printing drum having an adjustable value type wheel therein, a drum shaft having cylindrical grooves therearound a toothed rack bar longitudinally slidable within a longitudinal recess in said shaft and geared to the type wheel, a pinion meshing with the rack bar and having the meshed teeth aligned with the cylindrical grooves of the drum shaft, a setting element movable about an axis transverse to the drum shaft and connected with the pinion to effect adjustment of the rack and type wheel, the meshing teeth of said pinion being adapted to clear the shaft as the grooved shaft portion moves therethrough during the printing cycle of operation, said drum shaft and rack bar having aligner grooves therein, and means coacting with an aligner groove in said shaft and an aligner groove in the rack to effect and maintain alignment of the pinion teeth with the first named grooves in the shaft.

5. In a value printing device, in combination, a printing drum having adjustable value type wheels therein, a drum shaft, rack bars longitudinally slidable within recesses in said shaft and having a plurality of groups of teeth thereon, each rack bar having a pinion associated therewith and meshing with one group of teeth, each rack bar having another group of teeth geared to an associated type wheel, setting elements geared to the pinions, said drum shaft and rack bars having peripherally aligned grooves therein, aligner jaws adapted to engage a groove in said shaft and a groove in each rack bar, and control means associated with said aligner jaws, whereby the jaws are closed at the beginning of an operating cycle and are opened before the end of a cycle to thereby retain the rack bars in their pre-set positions during a cycle of operation.

6. In a value printing device, in combination, a printing drum having adjustable value type wheels therein, a drum shaft, rack bars longitudinally slidable within recesses in said shaft and having a plurality of groups of teeth thereon, each rack bar having a pinion associated therewith and meshing with one group of teeth, each rack bar having another group of teeth geared to an associated type wheel, setting ele-

ments geared to the pinions, said drum shaft and rack bars having peripherally aligned grooves therein, aligner jaws adapted to engage a groove in said shaft and a groove in each rack bar, and driven cam controlled means connected with said aligner jaws, whereby the jaws are closed at the beginning of an operating cycle and are opened before the end of a cycle to thereby retain the rack bars in their pre-set positions during a cycle of operation.

7. In a value printing and registering device, in combination, a printing drum having an adjustable type wheel therein, a drum shaft having cylindrical grooves therearound, a toothed rack bar longitudinally slidable within a recess in said shaft and geared to the type wheel, a pinion meshing with teeth on the rack bar, a setting element movable about an axis transverse to the drum shaft and connected with the pinion, an accumulator wheel including gearing thereto, a second pinion meshing with teeth on the rack bar and adapted to be rotated when the rack bar is adjusted by the first named pinion, means on the shaft having teeth radially and slidably supported therein, and control means operatively connected with said slidable teeth and operated by the rotation of the second named pinion, whereby a number of teeth agreeing with the value selected for printing are extended to an operative position relative to the gearing associated with the accumulator wheel.

8. In a value printing and registering device,

in combination, a printing drum having an adjustable value type wheel therein, a drum shaft having cylindrical grooves therearound, a toothed rack bar longitudinally slidable within a recess in said shaft and geared to the type wheel, a pinion meshing with teeth on the rack bar, a setting element movable about an axis transverse to the drum shaft and connected with the pinion, an accumulator wheel including gearing thereto, a second pinion meshing with teeth on the rack bar and adapted to be rotated when the rack bar is adjusted by the first named pinion, means on the shaft having teeth radially and slidably supported therein, a cam operatively connected with said slidable teeth, and gearing between said cam and second named pinion, whereby a number of teeth agreeing with the value selected for printing are extended to an operative position relative to the gearing associated with the accumulator wheel.

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