

Sept. 30, 1952

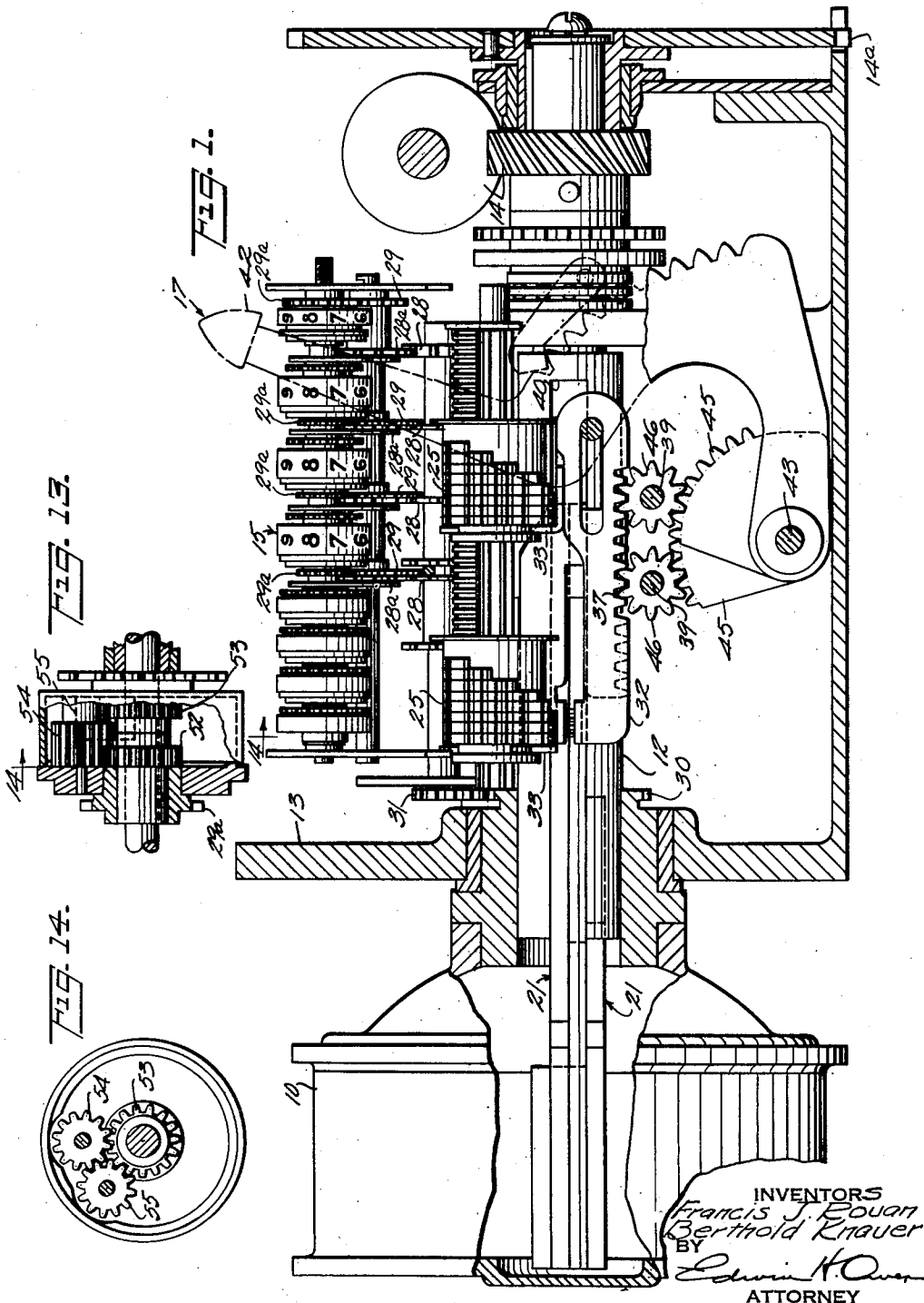
F. J. ROUAN ET AL

2,612,104

VALVE SETTING, PRINTING, AND REGISTERING DEVICE

Filed July 12, 1947

5 Sheets-Sheet 1



Sept. 30, 1952

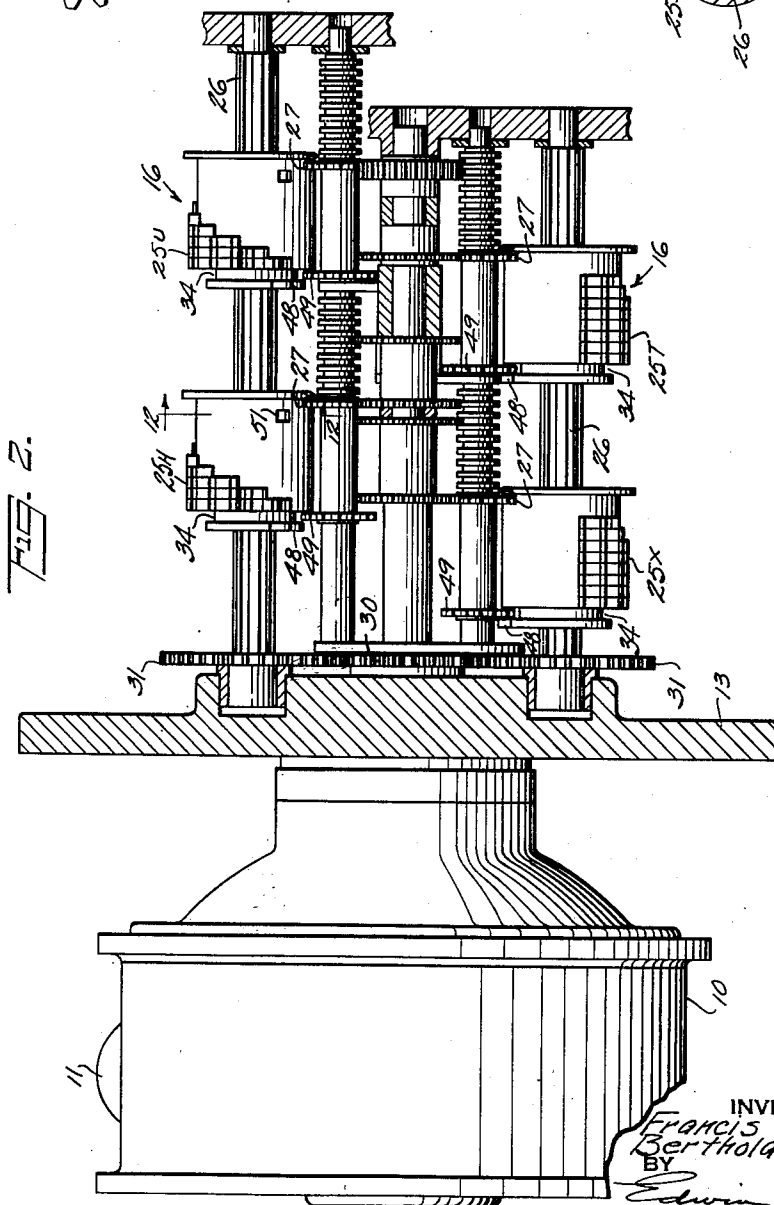
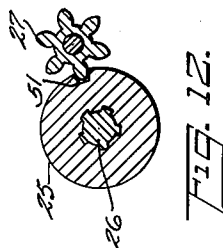
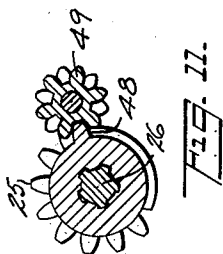
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VALVE SETTING, PRINTING, AND REGISTERING DEVICE

Filed July 12, 1947

5 Sheets-Sheet 2



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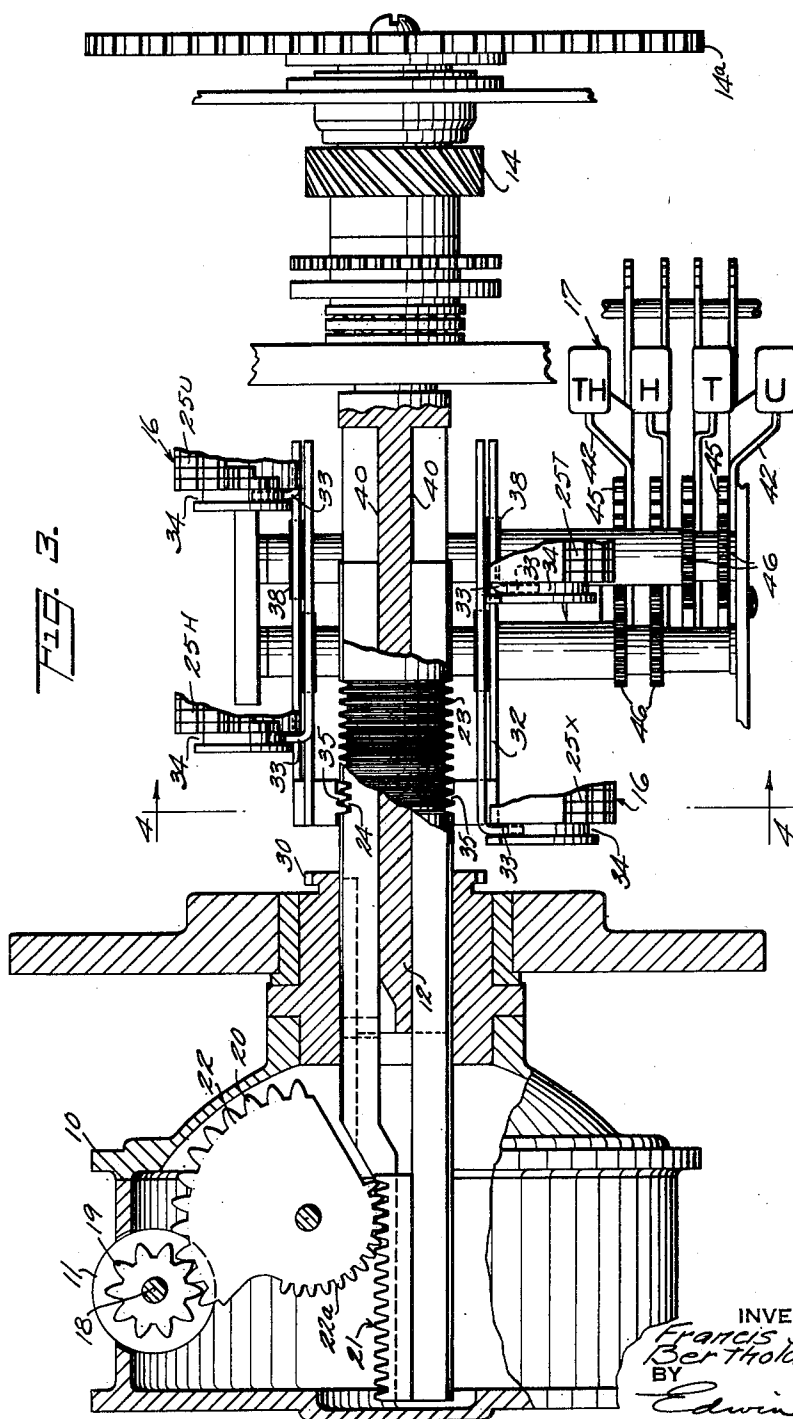
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VALVE SETTING, PRINTING, AND REGISTERING DEVICE

Filed July 12, 1947

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Sept. 30, 1952

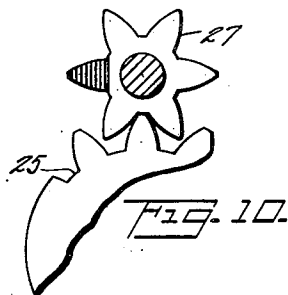
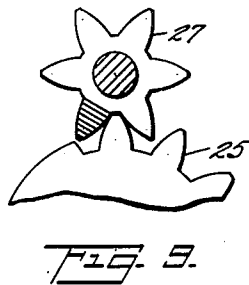
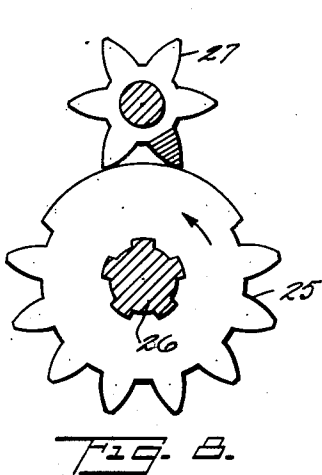
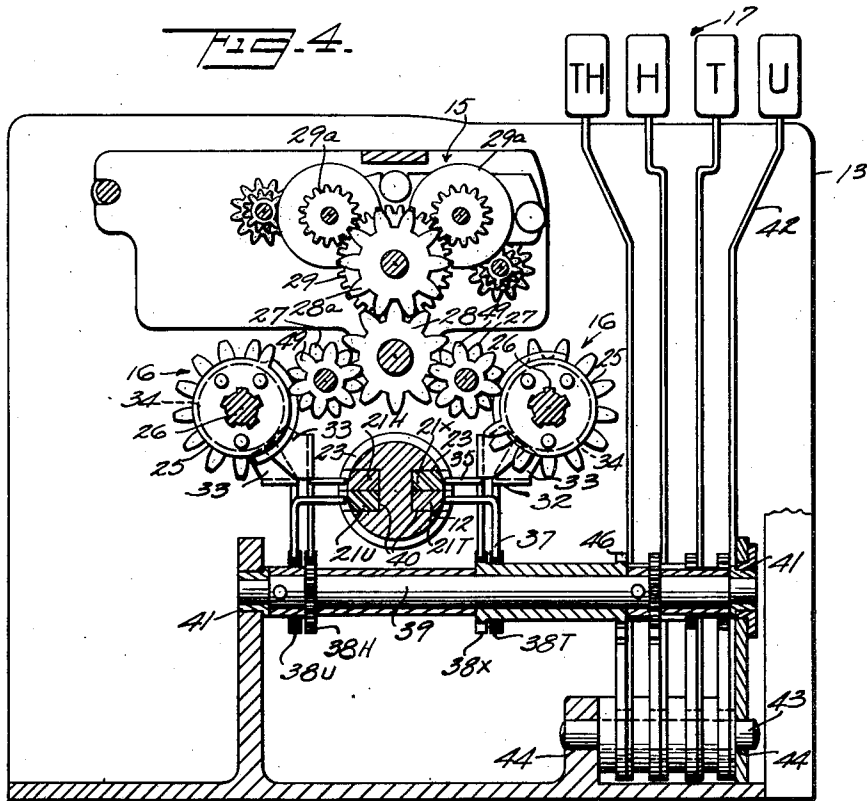
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2,612,104

VALVE SETTING, PRINTING, AND REGISTERING DEVICE

Filed July 12, 1947

5 Sheets-Sheet 4



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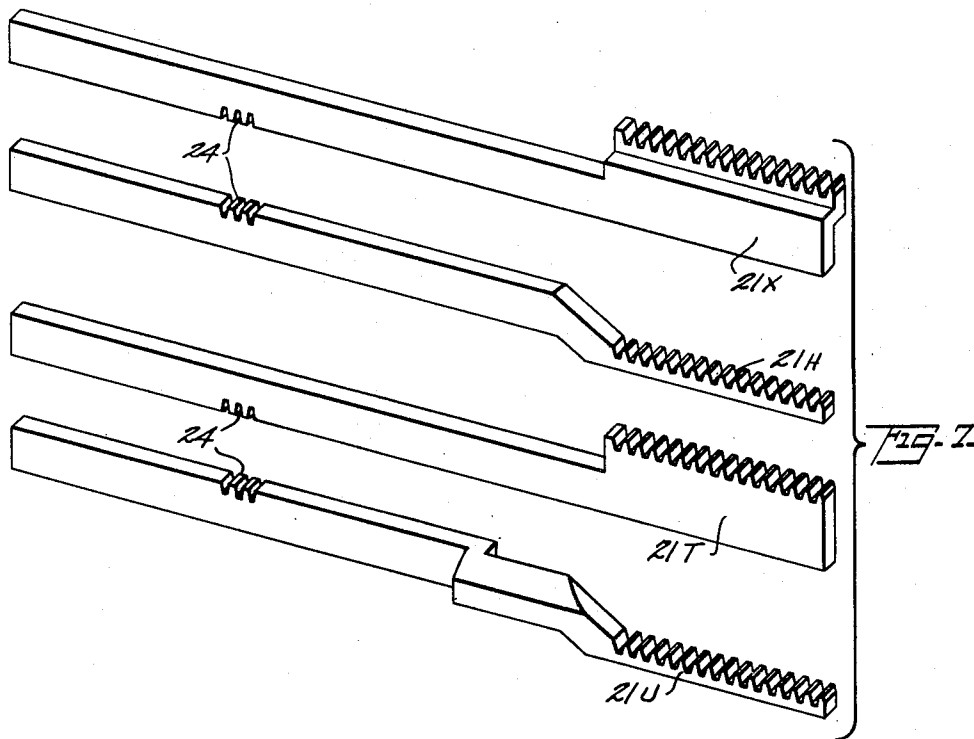
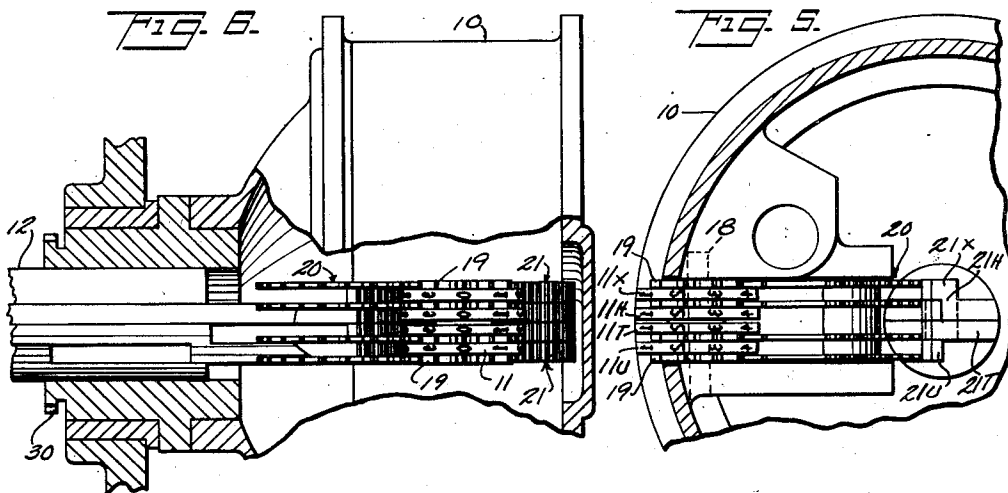
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2,612,104

VALVE SETTING, PRINTING, AND REGISTERING DEVICE

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5 Sheets-Sheet 5



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2,612,104

VALUE SETTING, PRINTING, AND
REGISTERING DEVICE

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Application July 12, 1947, Serial No. 760,590

3 Claims. (Cl. 101—91)

1

This invention relates to an improved 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.

In postage printing and metering devices, a manual setting of a value to be printed and registered is effected before starting a cycle of machine operation. A meter unit comprises a stationary housing wherein the registering mechanism is maintained, and a rotatable printing drum wherein the value type wheels are mounted. Setting of the type wheels and register actuator mechanism is effected by setting levers positioned in the stationary housing. When the drum rotates during a cycle of operation the direct connection between the setting means and rotating drum is broken.

The principal object of the invention is to provide an improved connection between the elements associated with the setting levers and the settable elements associated with the rotatable printing drum, which will permit rotation of the printing drum while the setting levers remain stationary.

It is another object to provide type wheel setting elements with rack teeth intermediate the ends thereof, and a rotative element with cylindrical rack teeth coinciding with the said rack teeth of the settable elements, also manually adjustable elements with teeth which mesh with the rack teeth of the settable elements when setting is effected, the same being arranged to permit the rack teeth of the setting elements and the cylindrical rack teeth of the rotative element to move through the tooth spaces of the teeth of the manually adjustable element during a printing cycle of operation.

It is a further object to provide an improved form of variable toothed actuator gear and pinion for effecting operation of the registering mechanism.

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

2

illustrated in the accompanying drawings, wherein:

Fig. 1 is a vertical longitudinal, part sectional and part elevational view, showing the mechanism of a postage meter including type wheel setting and register actuator mechanism;

Fig. 2 is a plan view of a portion of the mechanism shown in Fig. 1, with parts in section;

Fig. 3 is a plan sectional view taken substantially through the center of the printing drum and drum shaft, and including a plan elevational view of a portion of the register actuator and type wheel setting mechanism, also the drive mechanism;

Fig. 4 is an end sectional view, taken substantially along the lines 4—4 of Fig. 3;

Fig. 5 is a fragmentary detail view showing a portion of the printing drum with the type wheel and setting elements therein;

Fig. 6 is a fragmentary detail sectional side view of the type wheel and setting elements shown in Fig. 5;

Fig. 7 is a grouped view showing the structure of the several rack elements which are used for the setting of the type wheels;

Figs. 8, 9 and 10 are enlarged detail operational views showing the arrangement of a six-toothed pinion and associated variable toothed actuator gear in a choke position, and first toothed drive positions;

Fig. 11 is a sectional view through a variable toothed actuator gear and six-toothed pinion at the time of actuating a one digit value;

Fig. 12 is a sectional view taken substantially along the line 12—12 of Fig. 2, showing the position of an associated six-tooth pinion during the one digit actuating position of the variable toothed actuator gear, as shown in Fig. 11.

Fig. 13 is a vertical sectional view taken through a register wheel showing a differential drive; and

Fig. 14 is a view taken along the line 14—14 of Fig. 13.

Referring to the drawings in detail, a postage meter unit generally comprises a rotatable printing drum 10 having numeral 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 12 is adapted to be driven by a suitable drive means, such as a manually actuated spiral gear drive indicated at 14 or a power drive through gear 14a. Within the meter frame 13, registering mechanism is mounted as generally indicated at 15, Figs. 1 and 4, also register actuating means, as generally indicated

3

at 16, Figs. 2 and 4. Manual setting means, generally indicated at 17, is also provided for the purpose of effecting adjustment of the value type wheels 11 and 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.

As best shown in Fig. 3, the type wheels 11 are carried on a shaft 18, mounted within the printing drum 10, and each type wheel has a pinion 19 connected thereto. Said type wheel pinions 19 are adapted to be adjusted by longitudinally movable rack bars 21 through intermediate segmental gear members 20, each gear member including an outer toothed segment 22 and an inner toothed segment 22a. The longitudinally movable rack bars 21 are slidably mounted within longitudinal recesses 40—40 in the drum shaft 12, in the manner best shown in Figs. 3 and 4, and are constructed in the manner indicated in Fig. 7, to provide alignment of the rack toothed portions thereof, and for their meshed engagement with the intermediate segment gear portions 22a. The said rack bars 21 extend from the drum into the meter frame 13 and are located within the drum shaft 12 in pairs, on opposite sides thereof, in the manner indicated in Fig. 4.

The drum shaft 12 is provided with cylindrical rack teeth 23, Fig. 3, and the rack bars 21 have rack teeth 24 which are adapted to become aligned with the cylindrical rack teeth 23 in any adjusted position of the rack.

Variable toothed actuator gears 25 are mounted on splined shafts 26—26, which shafts are suitably supported within the frame structure 13, as best indicated in Fig. 2. In the structure illustrated, two actuator gears 25H and 25U are mounted on one shaft 26, and 25T and 25X are mounted on the other shaft, and said shafts 26—26 are positioned on opposite sides of the drum shaft 12. Each actuator gear has nine groups of toothed sectors numbering from 1 to 9, and each gear is adapted to be adjusted along its associated shaft 26 to move a desired toothed sector into operative alignment with an associated six-toothed pinion 27. The six-toothed pinions 27 mesh with intermediate gears 28, Fig. 4, which, through intermediate gears 28a and associated gearing 29—29a, will provide a drive for the four numeral wheels of lowest denomination of the registering mechanism 15.

A drive is provided for the splined shafts 26—26 by means of a gear 30 which forms a part of the printing drum structure and meshes with two gears 31—31 on the splined shafts 26—26. See Figs. 1, 2 and 3.

By means of manual setting mechanism, generally indicated at 17, Figs. 3 and 4, and settable slide bars 32 both the mutilated gears 25 and rack bars 21 are adapted to be adjusted longitudinally to positions conforming with the value which it is desired to print and register. Each slide bar 32 has a tongue portion 33 adapted to

4

engage a groove 34 in an associated actuator gear 25, and further has a horizontally disposed rack portion 35 having rack teeth which mesh with the rack toothed portions 24 of the rack bars 21. Said slidable bars 32 further have rack teeth 37, Fig. 1, which mesh with associated pinions 38. The said pinions 38 are mounted on shafts 39—39, which shafts are supported in suitable bearings 41—41, forming part of the frame structure 13.

Setting levers 42 are adapted to be rocked about a shaft 43, which shaft is mounted in bearings 44—44. Each setting lever has a segmental gear portion 45 joined therewith, which is adapted to mesh with an associated pinion 46, also fixed to the shaft 39. Hence, any motion of a setting lever from the "0" to the "9" positions will effect rotation of the pinions 46 and 38 to move the slidable members 32 and thereby effect adjustment of associated actuator gears 25 and rack bars 21.

The use of six-toothed pinions 27 with the actuator gears 25 provides a substantial choke to prevent overthrow, as will be noted in Fig. 8, but when a drive of the pinion is effected as indicated in Fig. 9, the first tooth of the pinion will have moved through a distance equivalent to a two digit count, while the first tooth of the gear has moved only the distance of one tooth. This will be clearly observed by the position of the shaded tooth of the pinion in Figs. 8, 9 and 10.

In view of such two-toothed movement of the pinion for one-tooth movement of the gear, the actuator gear will require only a single tooth to effect a count of two, and in the same manner two teeth will effect a count of three, three teeth will effect a count of four, etc. To produce a count of one with said actuator gear, a special one-toothed gear portion is provided, as indicated at 48, and a separate pinion is provided at 49 in such manner that when an actuator gear 25 is moved to effect a one-tooth setting, the one-toothed gear portion 48 will become aligned with the pinion 49. Referring to Fig. 11, it will be noted that the one-toothed gear portion 48 has no choking surface relative to the teeth of the pinion 49. Hence, the pinion 49 does not take the same relative position, as the pinion 27 and as a result the effective operation of the one-tooth gear portion will only produce one tooth rotation of the pinion 49. Choking is adapted to be effected however, through pinion 27, which, during the one-tooth setting, is in alignment with a depression 51 in the actuating gear 25 and is so positioned that, when the one-toothed drive is effected, a tooth of an associated pinion 27 will engage the depression 51 in the manner indicated in Fig. 12. After the one tooth operation, the teeth of the pinion 27 will effect choking across the choking surface of the actuator gear in the same manner as shown in Fig. 8.

The setting of a value for printing will be effected, when a setting lever 42 is rotated about the shaft 43, which rotation will effect movement of an associated gear segment 45 and pinions 46 and 38 to thus move an associated slidable bar 32. Movement of said slidable bar 32 will move an associated rack 21 to thus adjust a type wheel 11 and an actuator gear 25. In this manner the teeth of the actuator gear 25, which agree with the selected value, will be adjusted in an operative relation with an associated pinion 27 or 49.

During a cycle of operation, the drum 10 will rotate to effect printing of the value selected

5

and said value will be entered in the registering mechanism 15 when the teeth of the actuator gears 25 actuate the intermediate gears 28—28a and gearing 29—29a.

It will be noted that each of the first four register wheels is adapted to be driven directly by an associated actuator gear. This may be accomplished by means of planetary differential gearing within each register wheel, such as disclosed in Figs. 13 and 14. The drive from an actuator gear 25, through associated gearing to the pinion 29a, will effect the drive of a sun gear 52. Another sun gear 53 is normally held fast, as a result of a Geneva transfer connection with a numeral wheel of lower order. Therefore, the planetary gears 54 and 55 will rotate around the sun gears 52 and 53 respectively. With the planetary gears 54 and 55 mounted in the numeral wheel casing, the numeral wheel will rotate when the planetary gears rotate.

Having described the invention what is claimed is:

1. In a value printing and value registering machine, in combination, a printing drum and drum shaft, a type wheel in said drum, a cylindrically toothed rack comprising a fixed part of the drum shaft and rotatable therewith, said drum shaft and cylindrically toothed rack having a longitudinal peripheral recess therein, longitudinally setttable toothed means, manual setting means operatively connected with the setttable toothed means, a member longitudinally slidable within the longitudinal recess and rotatable with said shaft, rack teeth on said member geared to the type wheel, and rack teeth on said member meshing with the setttable toothed means and normally coinciding with tooth spaces between the cylindrical rack teeth after setting is effected, whereby adjustment of the slidable rack toothed member is adapted to be effected to place a selected value type in a printing position, and whereby the rack teeth geared to the setttable toothed means will move with the cylindrical rack teeth through the tooth spaces of the setttable toothed means during rotation of the shaft.

2. In a value printing and value registering machine, in combination, a printing drum and drum shaft, a type wheel in said drum, a register wheel including gearing therefor, a variable toothed actuator longitudinally adjustable relative to the register wheel gearing, a cylindrically toothed rack on said drum shaft, said shaft and cylindrically toothed rack having a peripheral longitudinal recess therein, a rack bar having teeth coinciding with the cylindrical rack teeth and positioned in said recess, said rack bar

6

further having teeth geared to the type wheel, and selective means including an element movable longitudinally of the drum shaft, said element having teeth meshing with the first named teeth of the rack bar and a portion thereof engaging the variable toothed actuator, whereby rack adjustment is effected to set the type wheel and the variable toothed actuator is adjusted to an actuating position relative to the register wheel gearing, and whereby the teeth of the selective element will remain in mesh with the cylindrically toothed rack during rotation of the shaft.

3. In a value printing and value registering machine, in combination, a printing drum and drum shaft, type wheels in said drum, register wheels including gearing therefor, splined shafts parallel to the drum shaft, variable toothed actuator members longitudinally adjustable along said splined shafts, a cylindrically toothed rack on said drum shaft, said drum shaft and cylindrically toothed rack having a peripheral longitudinal recess therein, rack bars having teeth coinciding with the cylindrical rack teeth and positioned in said recess, said rack bars further having rack teeth geared to associated type wheels, and selective means including elements movable longitudinally of the drum and splined shafts, said elements having teeth meshing with the first named teeth of the rack bar and a portion engaging the variable toothed actuator, whereby rack adjustment is effected to set the type wheels and the variable toothed actuators are adjusted to their actuating positions relative to the register wheel gearing, and whereby the teeth of the selective elements will remain in mesh with the cylindrically toothed rack during rotation of the shaft.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
Re. 20,064	Ogden	Aug. 11, 1936
2,005,038	Kalman	June 18, 1935
2,141,119	Wheeler	Dec. 20, 1938
2,248,257	Thatcher	July 8, 1941
2,306,499	Rouan	Dec. 29, 1942
2,321,425	Rouan	June 8, 1943
2,371,070	Sager et al.	Mar. 6, 1945
2,488,143	Rouan et al.	Nov. 15, 1949
2,510,350	Rouan et al.	June 6, 1950
2,516,920	Ryan	Aug. 1, 1950