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Malavazos, deceased et al.

[11] **3,918,361**

[45] **Nov. 11, 1975**

[54] **PRINT HEAD FOR A POSTAGE METER**

[76] Inventors: **Arthur J. Malavazos,** deceased, late of Hayward, Calif.; by **Gregory A. Malavazos,** administrator, 16047 Carolyn St., San Leandro, Calif. 94577

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[52] **U.S. Cl.** ..... **101/91;** 235/132 R

[51] **Int. Cl.²** **B41L 47/46**

[58] **Field of Search** ..... 101/91, 92, 76, 77, 110, 101/86, 87; 235/101, 132 R, 132 E

[56] **References Cited**

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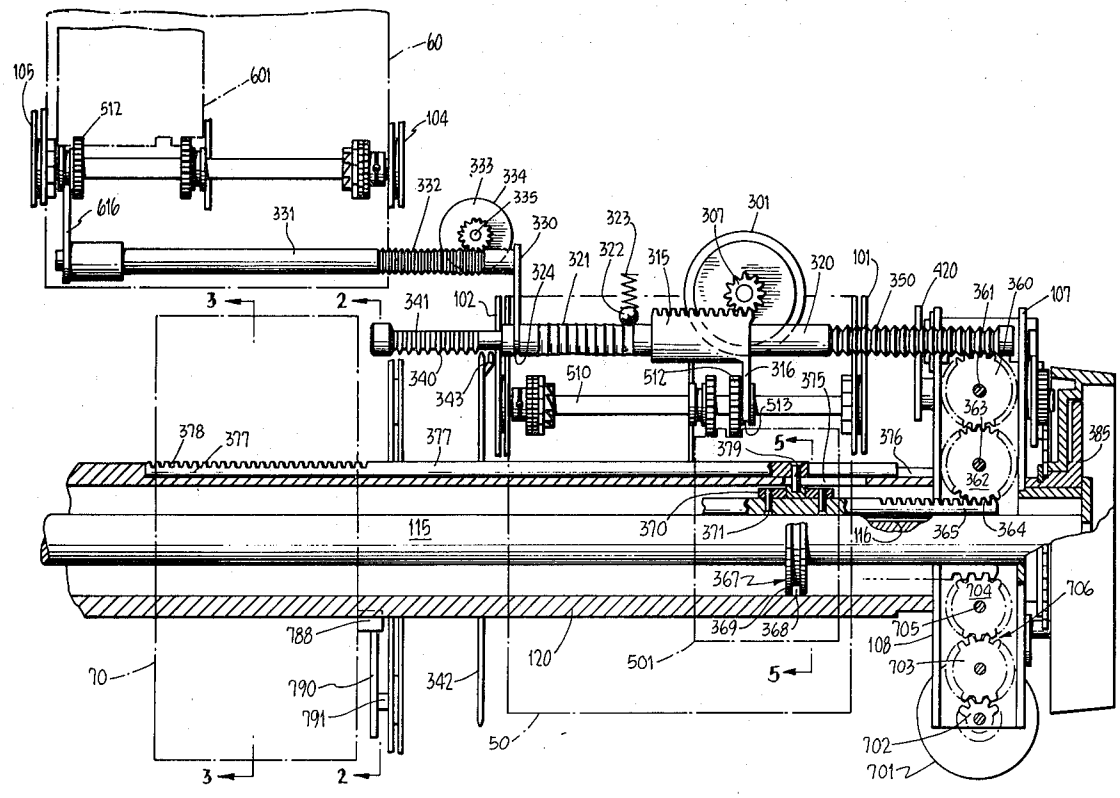
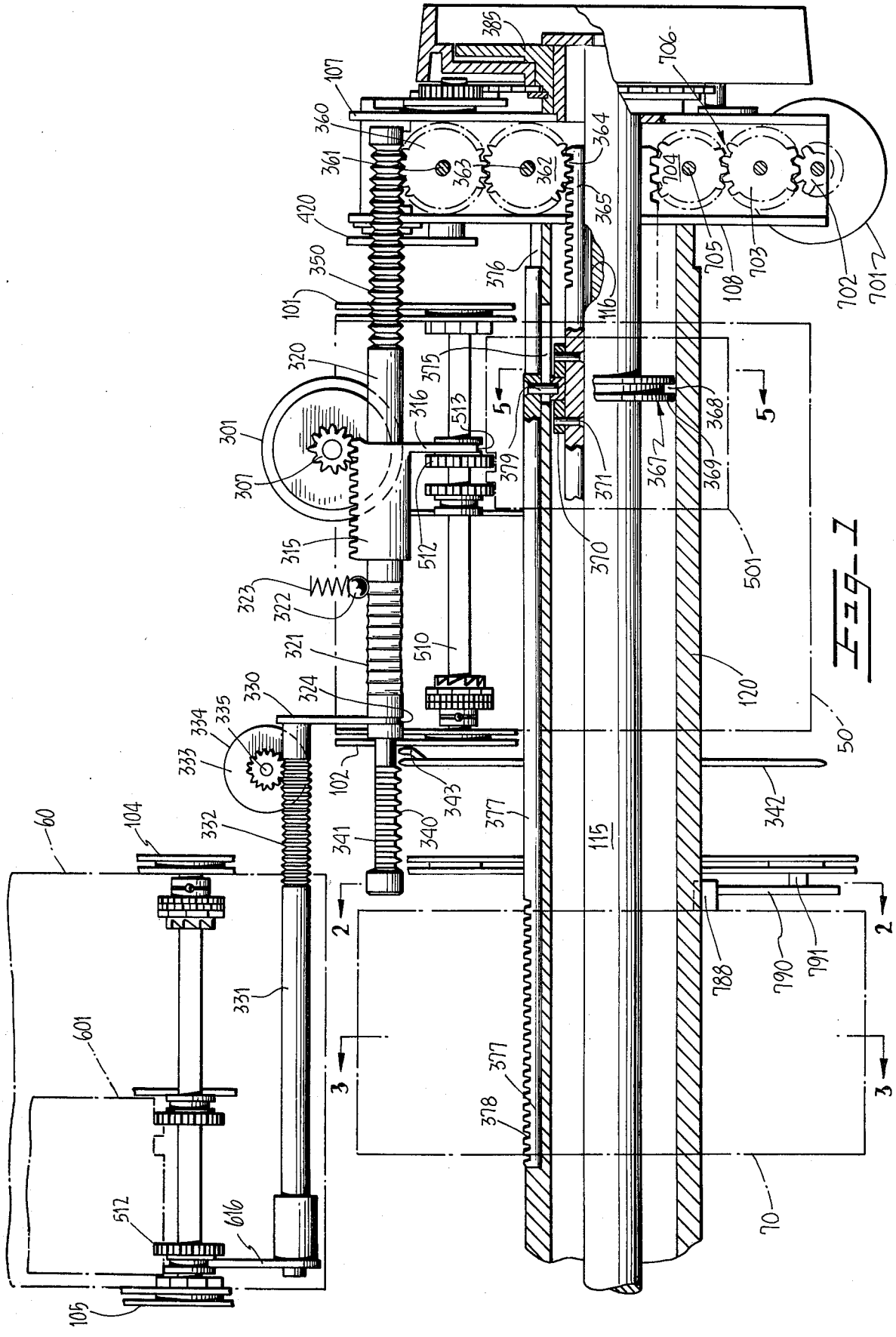
Primary Examiner—Edgar S. Burr
Assistant Examiner—R. E. Suter
Attorney, Agent, or Firm—Robyn Wilcox

[57] **ABSTRACT**

This invention relates to a mechanism for adjustably setting the print head of a postage meter and comprises: a hollow drive shaft for the meter unit, which drive shaft is removably mounted at its rear end in a meter base unit; a meter print head mounted on said drive shaft adjacent the rear end of thereof, and therefore close to the bearing in which the drive shaft is mounted; pairs of selection bars, or racks, one of which is mounted in a slot on the exterior of the drive shaft and penetrating into the central aperture of the print head and the other of each pair being non-rotatably mounted for longitudinal adjustment within the interior of the hollow drive shaft; manual means for setting the selection bars, preferably including a setting wheel for setting the value selection mechanism for the registers and a gear train from the setting wheel to the interior bars, and means for connecting the interior and exterior selection bars through a slot in the wall of the drive shaft; and gearing connecting the exterior rack with the setting mechanism of the print head. In the preferred form of the invention, the print head is nearly 50% wider than heretofore used and has a diameter of 4½ inches, which is greater than those now commonly used. Hence, the print head will print a larger stamp and provide much greater length for a slogan plate.

14 Claims, 5 Drawing Figures

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706
107
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361
363
362
364
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420
365
705
108
703
702
701
350
316
116
101
320
315
513
5
368
301
307
379
371
367
369
512
501
315
323
322
321
510
310
120
330
324
334
335
333
102
343
340
377
342
50
60
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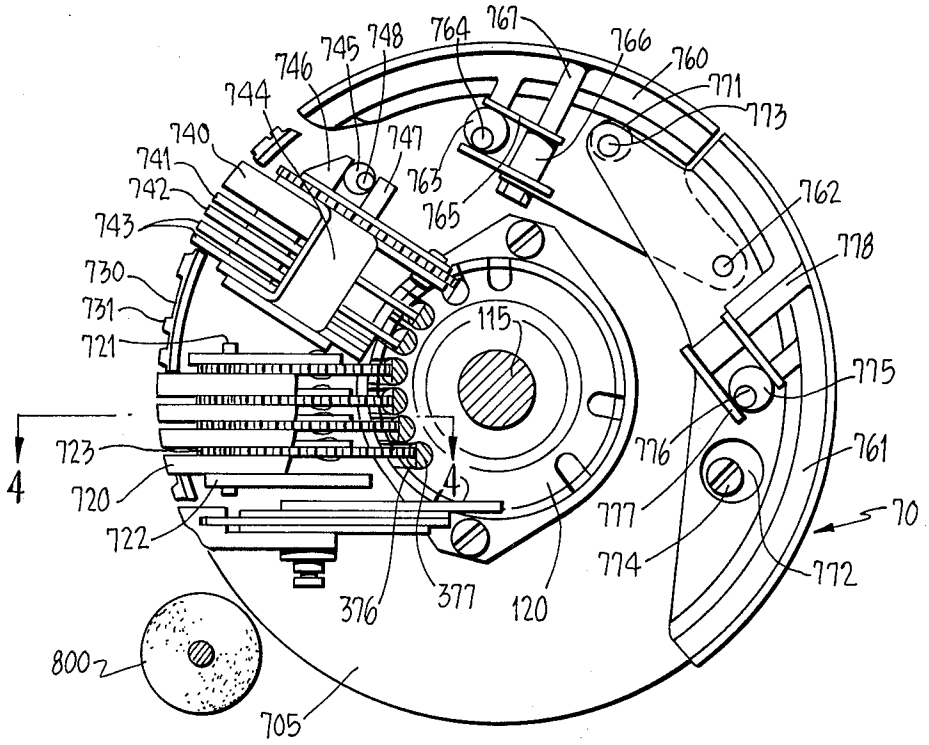
788
790
791
331
601
3
377
318
512
616
70
105

Fig. 1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764
748
745
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742
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730
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720
722
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4
747
763
765
766
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774
772
70
376
377
120
800
705

Fig_3

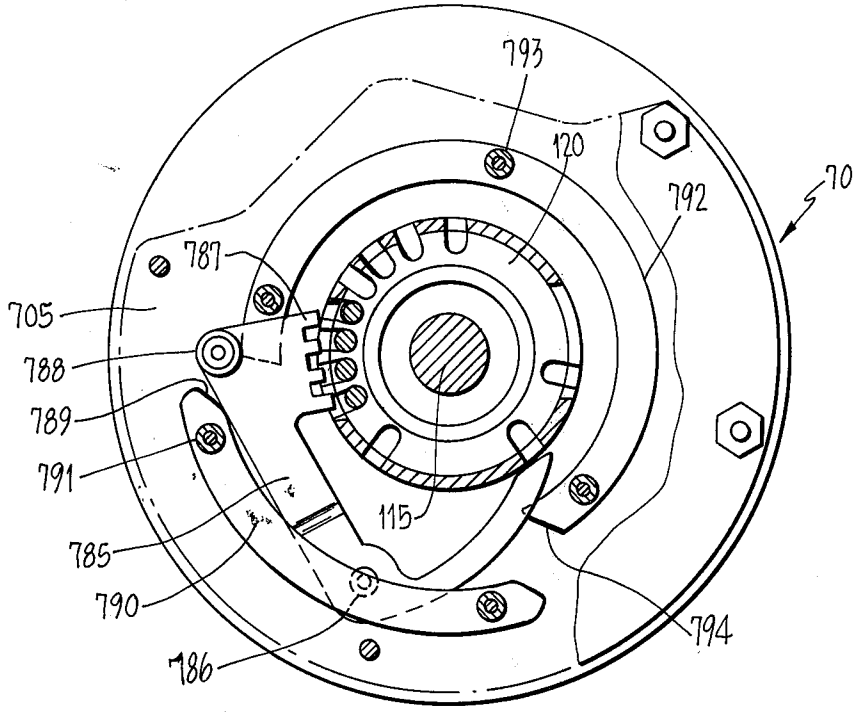
793
120
792
70
787
705
788
789
791
785
790
786
115
794

Fig_2

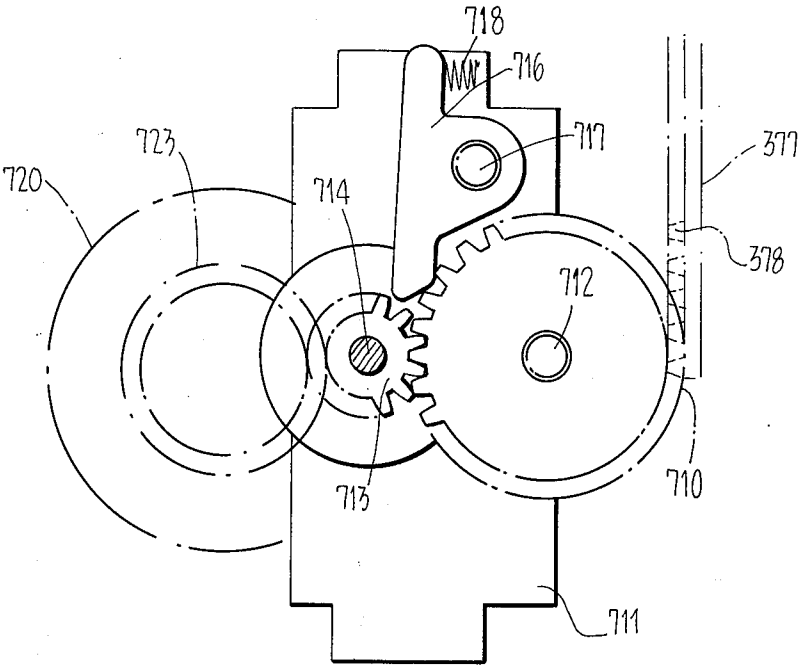
718
716
717
377
723
720
714
378
712
710
713
711

Fig. 4

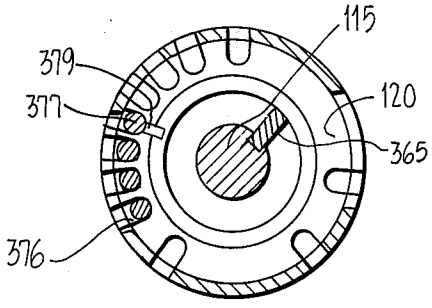
115
379
120
377
365
376

Fig. 5

PRINT HEAD FOR A POSTAGE METER

BACKGROUND OF THE INVENTION

The present invention can, in effect, be considered as actually, if not legally, a division of the copending application entitled "Arithmetic Unit for a Postal Meter", filed on even date herewith, Ser. No. **457,592,** now U.S. Pat. No. **3,890,491,** issued June **17, 1975;** and as such, is complimentary to the copending application entitled "Selection Mechanism for a Postage Meter", filed on even date herewith, Ser. No. **457,594;** "Register for a Postage Meter", filed on even date herein, Ser. No. **457,593** now U.S. Pat. No. **3,876,870** issued Apr. **8, 1975;** and "Lock for Selection Mechanism for a Postage Meter", likewise filed on even date herewith, Ser. No. **457,591** now issuing as U.S. Pat. No. **3,892,355,** dated July **1, 1975.**

Postage meters are made under strict regulations proscribed by the United States Post Office which require, among other things, that a value selected for the meter must be accurately set in the value printing stamp of the meter and accurately set into each of two registers — one in which the values are accumulated, known as the "ascending register", and one in which a value of the stamp is subtracted from the value set by the Post Office at the time of payment for postage, known as the "descending register", and a mechanism which locks the meter against any operation when the value in the descending register falls below that which could be set into the meter by the operator. The particular mechanism described and claimed herein relates to the printing mechanism of such a meter. It is well-known in the art that the Post Office with which a meter is registered will, upon the payment of an amount to cover postage desired by the user, reset the descending register from time to time, but the values accumulated in the ascending register are never changed except by machine operation. It is very important that the stamp imprint made by the meter be clear and large enough to be easily readable.

Other requirements of the Post Office are that the meter must be accurate in all aspects of its operation, and that no stamp can be printed without a like registration of the stamp value in the two registers. It should be ruggedly constructed to withstand long and hard usage and it must be relatively trouble-free. It is well-known that a meter is so encased in its cover that it cannot be altered in any way, except at the Post Office, when they unlock access to the descending register and change its setting; and the "slogan" printing plate can be changed by the user — any other repair or change in the meter requires that the meter be officially taken from service by the distributor and repaired in a facility that is subject to Post Office inspection. Hence, it is essential for a satisfactory postage meter to be extremely accurate in registering the values printed by it into both registers as well as to be rugged and trouble free in its operation.

OBJECTS

It is a primary object of the present invention to provide a print head for a postage meter that is more simply constructed than those commonly used at present.

It is another object of the present invention to provide a print head which is much larger than those now commonly in use and hence can print a larger and more legible stamp than is now possible.

It is another object of the present invention to provide a print head for a postage meter that is mounted adjacent the meter base mechanism, in contrast to most modern machines in which the print head is at or adjacent the free end thereof, and hence will not subject the shaft on which the print head is mounted to the bending and twisting which is common to most postage meters when stamping thick pieces of mail.

It is another important object of the present invention to provide a print head in which the setting members are, for the most part, contained within the hollow interior of the drive shaft on which the print head is mounted, which interior members can be held in a rigid non-rotating position, although they are readily axially adjustable to control the various functions of the print head.

A further object of the present invention is to provide a better print head than any now available.

These and further objects of the invention will be apparent from the description of the register in the following specification when construed in connection with the accompanying drawings in which:

FIG. **1** is a longitudinal cross-sectional view of the main drive shaft of the invention showing particularly the selection mechanism and the location of the registering devices utilized in connection with this invention.

FIG. **2** is a side view of the print head of the present invention taken immediately to the front of the print head, such as along the vertical plane indicated by the line **2—2** of FIG. **1.**

FIG. **3** is a transverse cross-sectional view of the print head of the present invention, such as taken along the plane indicated by the line **3—3** of FIG. **1;**

FIG. **4** is a detail view of a gear train connecting an exterior setting bar, nested in its groove in the exterior of the drive shaft, with its print wheel, such as a view taken along the plane indicated by the line **4—4** of FIG. **3;** and

FIG. **5** is a cross-sectional view of the drive shaft taken at a point where a pair of exterior and interior setting bars are connected one with the other, such as along the plane indicated by the line **5—5** of FIG. **1.**

The mechanism of the present invention is mounted in a frame structure which includes, among other things, a front frame plate **101,** an intermediate frame plate **102,** a second intermediate frame plate **104,** and a rear frame plate **105,** end plate **107,** and an auxiliary plate **108,** all shown in FIG. **1.** A fixed round shaft, or axle, **115** is rigidly supported at its front end in the front end in the end plate **107,** and at its rear in a frame member not shown in these drawings. The main drive shaft **120** is a hollow cylinder surrounding the bar **115** and maintained in proper spaced relationship thereto by a series of a plurality of grooved disks **367** which serve to set the mechanism in the print head **70** from setting bars that lie within the drive shaft **120,** as hereinafter described. It should be mentioned at this point that there is one such grooved disk **367** for each order of the selection mechanism (four in the preferred form of the invention), one for setting the month of the date stamp, two for setting the days of the date stamp, one for setting the date stamp in either printing to non-printing position, one for setting the "bulk rate" slug, or die, to either printing or non-printing position, and two which set the two "slogan" dies of the present invention to either printing or non-printing position, as is

more fully described hereafter. The various devices which are controlled by the selection mechanism are shown in dotted lines in FIG. **1** and include the Thomas-type mutilated gear actuator **501,** the descending register **50** described in the copending application entitled "Register for a Postage Meter" above mentioned; an identical Thomas-type mutilated gear actuator **601,** an ascending register **60,** as well as the print head **70** of the present invention.

The selection mechanism of the present invention is set in each order of the register in whcih a value can be selectively set by a setting wheel **301** which is rotatably mounted on a bar attached to the frame plate **101** and **102.** Each setting wheel **301** has a gear **307** affixed thereto, which gear meshes with a rack **315** which is rigidly affixed to a selection bar **320** that is mounted in suitable bearings carried by the frame plates **101, 102** for both longitudinal and rotating movement for purposes to be hereinafter described. Each rack **315** carries a yoke **316** that embraces a slot **513** in a nine-tooth selection gear **512** mounted on a square shaft **510** whereby the gear **512** will be differentially set opposite a selected value tooth on the mutilated drum **501,** as more fully described in the application entitled "Register for a Postage Meter" above referred to.

The selection bar **320** is provided with a series of ten circular detent grooves **321** with which is associated a spring ball detent **322** that is resiliently pressed against the bar **320.** by a compression spring **323,** the ball and spring being held in a suitable cylindrical holder, not shown, carried by the frame of the device. Thus, the bar **320** can be longitudinally adjusted by rotation of the wheeel **301** against the force of spring **323,** and once adjusted, will be resiliently held in that position by the force of that spring.

It will be understood that there is a setting wheel **301** and an associated selection bar **320** for each order of the selection mechanism in which a value can be set. In the preferred form of this invention there are four such setting mechanisms, so that a value of **$99.99** may be printed and set into the register (or a value of **$9.99½** in those few instances in which a user desires a one-half cent mechanism). The bars **320** and setting wheels **301** are angularly placed around the actuator **501** as shown in the associated application entitled "Selection Mechanism for a Postage Meter". Since the mechanisms of all of these selection setting devices are identical, it is believed that only one need be described.

Rearwardly to the detent grooves **321** on bar **320** is an annular notch **324.** The groove **324** is embraced by an ascending register yoke **330** which is rigidly secured to an ascending register setting bar **331.** The forward end of the register bar is provided with a series of circumferential teeth **332.** These teeth mesh with a gear **333** which is rigidly secured to a check dial **334** mounted on a shaft **335.** The check dial **334** is provided with indicia showing the values from **0** to **9,** inclusive, and is visible through a suitable window in the cover, not shown. The operator can thus determine the value set in the register by looking at the check dials **334** which at all times will correctly register the value set in the mechanism. No indicia are required in the setting wheel **301,** as preferably that can "slip" with respect to the value set in the mechanism.

The ascending register selection bar **331** is suitably journalled in the machine for axial, or longitudinal movement, such as in bearings in the frame plates **104, 105.** Adjacent the rear end, the bar **331** carries a yoke **616** rigidly secured thereto by any suitable means, such as a pin not identified. The outer, or Y, end of the yoke engages a notch in the hub of a selection gear **512** in the ascending register.

Adjacent the rear end of the main setting bar **320** is a series of nine circumferential rack teeth **340.** As shown in FIG. **1,** this section of the bar has a flattened surface **341.** In the drawing it would appear that this flattened surface **341** lies at the very top of the bar in the normal position of the bar. However, in actual construction, it is preferred that this flattened surface be slightly off to the side, being placed **107°** from the bottom of the rack when the bar **320** is in its normal position. Associated with the rack **340** is a restore cam **342,** having a series of nine projecting cam faces **343** so angled as to restore the selection bar **320** one tooth or step forwardly as a cam face engages one of the teeth **340.** These nine restore cam faces **343** are so angularly positioned that they trail all of the teeth on the mutiliated drum actuator **501.** Hence, after digitation is completed, the cam **342, 343** will normally restore the bar **320** to its **0** position, one step at a time, before the completion of the cycle of operation. On the other hand, if the selection bar **320** is rocked through an angle of **107°,** the flat **341** will lie opposite the restore cam disk **342** and its nine camming teeth **343** and hence it cannot engage the teeth **340** of the rack and the bar **320** will not be restored automatically.

Adjacent the forward end of the main selection bar **320** is a second series of circumferential rack teeth **350.** While the setting bar can only be moved nine steps to enter a maximum value of nine in any order, it is preferred to provide about double that number of teeth in order to lock the bar in a non-restore position by the means hereinafter described. At this point it can be noted that at least the central portion of this series of rack teeth is flattened to permit the bar to be moved past a locking plate **420.** However, when the bar **320** is rocked through an angle of **107°,** the space between the adjacent teeth **350** will engage the edge of the plate **340,** thereby locking the setting bar **320** in its adjusted position.

Whether or not the shaft **320** is in the automatic restore position shown in FIG. **1,** or in the fixed position just mentioned, the gear teeth of each setting or selection bar **320** meshes with a first idler gear **360** rotatably mounted on a pivot stud **361** and that, in turn, meshes with a second idler **362** rotatably mounted on a stud **363.** The two gears **360** and **362** are mounted radially of the fixed bar **115** and drive shaft **120** as shown in FIG. **1.** The second idler **362** meshes with the rack portion **364** of a setting bar **365** which runs lengthwise of the fixed bar, or axle, **115** and the rotating cylindrical drive shaft **120.** Each bar **365** is held in its proper angular position by being nested in a groove **116** in the fixed bar **115.** The bars **365** are therefore held against rotation of the drive shaft **120** but are free to move axially along the fixed shaft, or axle, **115.**

Each of the bars **365** carries at an intermediate point a grooved disk **367.** The grooved disk **367** has a central annular groove **368** and a pair of side walls **369,** as shown in FIG. **1.** The grooved disk **367** is mounted on its respective bar **365** by means of a pair of collars **370** tightly holding the grooved disk between them, each of the collars being riveted to the bar **365** by suitable rivets **371.** In order to prevent interference between the

different grooved disks **367** and their clamping rings **370**, each order of the selection mechanism (of which there are preferably four in the machine of this invention), is spaced from the next by an increment slightly greater than the next one can be moved. It wil be understood that each of the setting bars will readily slide under each of the other grooved disks **367**. The rings **367** non-rotatably engage the interior wall of the main drive shaft **120**. Since there are eleven such disks **367** (one for each of the **11** settable elements in the print head, as above mentioned), it is obvious that they prevent any of the bars **365** from being displaced from their grooves in the axle **115**.

The outside wall of the drive shaft **120** is provided with a series of eleven longitudinal slots **376** so angularly arranged as to most conveniently connect to the mechanisms in print head **70** to which they relate. In each such slot **376** is a bar **377** on the rear end of which is provided with gear teeth, or rack **378**. A pin **379** is riveted at the point where it will register with the grooved disk **367** on the functionally related setting bar **365**. This pin **379**, as shown in FIG. **1**, is adapted to engage the groove **368** in the functionally related grooved disk **367** through a slot **375** through the wall of the drive shaft **120**.

It would appear from FIG. **1** that the interior bar **365** and the exterior bar **376** lie in the same angular plane. However, this figure has been distorted to show that the two are functionally associated. Actually, as shown in FIGS.**2** and **5**, the two are angularly separated. As a practical matter, it is preferred to have the print wheels and the indicia for the stamp to trail the printing position (bottom of the figure) by a very slight angle so that it may contact an ink supply device and immediately print the stamp on the mail close to the leading edge of the mail matter (which generally goes from left to right). However, the value setting mechanism is preferably placed on top of the machine where it is readily available to the operator and with the units order on the extreme right-hand as an operator faces the machine. The date stamp controls are most conveniently placed on the lower left side of the front of the meter, as shown in FIG. **1**, and the four print or non-print controls can be set in any place convenient to the operator. The angular displacement of the two functionally related setting bars **365** and **377** is readily accomplished by the use of the slotted disk **367**. Since the disk **36** is rigidly fastened to the inner bar **365**, it moves axially of the fixed shaft **115** and drive shaft **120** and in a plane perpendicular to both as the inner setting bar **365** moves longitudinally. Also, since the disk **367** forms a complete circle, the pin **370** (regardless of where the outer slot **376** and the slot **375** through the bottom of the exterior slot **376** into the interior of the cylindrical drive shaft **120**, are located) is always in contact with the slotted disk **367** and hence is effective to set the outer setting bar **377** in exact increments from the movement of the inner setting bar **365**. Thus, the manual setting devices can be arranged in the most advantageous position on the outside of the cover and be directly connected to its respective inner setting bar **365** and the outer setting bar **377** can be placed where most practical in the printing head **70**. It should be noted that the exterior bars **377** are held in ther slots **376** against radial displacement as the front ends lie within confines of the front actuator drum **501** and the rear ends lie within the confines of the print head itself.

Thus, as the main selection bar **320** is moved to a differential position selected by the operator, the rack teeth **350**, through the medium of idler gears **360** and **362**, moves the interior rack bar **365** forwardly an equal amount. By means of the grooved disk, or collar, **367** and pin **379**, the rack bar **377**, lying in the groove in the exterior walls of the main drive shaft **120**, is moved a like amount. When the main drive shaft is rotated to enter the values into the respective registers **50** and **60** and rotate the print head **70** to print the proper stamp on mail matter, the rack bar **377** is held in an adjusted position as its pin **379** travels completely around a circle by its constant contact with the wall **369** of the grooved disk **367**. It will also be positively locked in this position throughout the printing and registration portion of a cycle of operation (the portion for each operation being coextensive) as will be described shortly. It may be mentioned at this point that each cycle of operation requires a complete circle of **360°**. Regardless of whether the meter is set for a single cycle of operation, and the consequent automatic restore of the selection mechanism, or for a continuous series of operations on a locked value, the drive shaft must automatically complete its operation and stop at the end of each full rotation. The means for cycling the drive shaft **120** is not pertinent to this invention but it is understood by those skilled in the art that it is controlled by an incoming piece of mail triggering the operation of the main drive shaft. When set for continuous operation, the incoming letter will operate the trigger for another cycle before the completion of the previous cycle, so the meter will run continuously.

The means for rotating the main selection bar **320** to set it for either automatic restore or fixed selection will not be described in this application. However, it can be noted that a hand wheel **385**, through the mechanism described in the application entitled "Selection Mechanism for a Postal Meter" is operative to rock the selection bar **320** through an angle of **107°** and thereby disable the automatic restore rack **340** and cause the teeth of rack **350** to engage the locking plate **420**.

It will be understood that there is a pair of setting bars **365** and **377** for each order of the value selection mechanism which, in the preferred form of the present invention is four, as this enables the large value stamp (up to **$99.99**) to be posted. There are, therefore four print wheels in the print head for registering like values on the printed stamp. There will be three pairs of exterior-interior setting bars **377, 365** for use in printing the date, one for the month, two for the days of the month (the year, since it is used so infrequently, can be set by a stylus). There are two control bars adapted to set the date stamp and the "bulk rate" die into either a printing or non-printing position; and another pair of setting bars for setting two "ad," or slogan, plates into printing or non-printing position. It can be noted here that due to the large size of the print head (in the preferred form of the present invention it is **4½** inches in diameter), there is available for printing slogans or other material, such as return addresses, more than another linear **7** inches for such plates. In the preferred form of the invention, two are used — one of **3** inches and one of **4** inches, both of which can be set to non-printing or printing position. Hence, there are eleven pairs of exterior-interior setting bars **377, 365**, all of which operate in substantially the same manner.

The value setting wheels which enter values into the register and print the value of the stamp are readily settable through the selection wheel **301** previously mentioned.

The date stamps are controlled through wheels, preferably hand-setting wheels **701** (FIG. 1). It will be understood that there are three such wheels (although only one is shown in this figure), one such wheel being used for printing the name of the month, and the other two for the date of the month.

A gear **702** on each such wheel meshes with an idler **703** and that, in turn, meshes with another gear **704.** These gears are pivotally mounted on pivot studs **705** carried by a plate **706** supported between frame plates **107** and **108.** Gear **704** meshes with rack **364** of the functionally related selection bar **365.**

The print head **70** (FIG. 3) in the preferred form of this invention carries four value print wheels **720** corresponding to the four manually set selection wheels **301** previously mentioned. These four value print wheels **720** are preferably mounted on a single shaft **721** carried by a U-shaped frame member **722** rigidly mounted on the web **705** of the print head **70.** As shown in this figure, the wheels must vary slightly in shape and curvature, as they are mounted on a shaft **721** that, if extended, would form a cord with the circumference of the print head **70.** Only one of these value print wheels can be perpendicular to the circumference of the print head, and since the others are parallel to the first, they decrease in size and increasingly increase in curvature, as shown.

These print wheels are set by means of the exterior setting bar **377,** the operation of which has heretofore been described. The rack **378** on the rear end of this setting bar meshes with a gear **710** (see FIG. 4) pivotally mounted on a mounting plate **711** by any suitable means, such as pivot stud **712.** The gear **710** meshes with an idler **713,** likewise pivotally mounted on the plate **711** by some suitable means, such as pivot stud **714.** The gear **713,** in turn, meshes with a print wheel gear **723** which is rigidly secured to its respective value print wheel **720.** Thus, it is seen that the longitudinal movement of the setting bars **365** and **377,** through the gear train **710, 713** and **715,** will set the respective value wheels **720** to the proper positions. A light spring-pressed detent **716** is pivotally mounted on the supporting plate **711** by any suitable means, such as pivot stud **717,** and is biased into light engagement by a light spring **718.**

The value printing wheels **720** are centered in a postage design die plate **730** which carries a design **731** approved by the Post Office. The die **730** is affixed to the print wheel **70** by any suitable means, such as screws, not shown. The mechanism for printing the date on the envelope adjacent the stamp comprises a month printing wheel **740,** two date setting wheels **741, 742** which can be identical, although the first one will never print more than three digits, and a year wheel **743.** As mentioned previously, the year wheel, since it is set only once a year, can be adjusted by a stylus. The three wheels **740, 741** and **742,** however, are changed more often, and accordingly, it is preferred to control them from the manual setting of the setting wheels **701** prevously mentioned. The setting wheels **701** (FIG. 1) position interior setting bars **365** as heretofore explained, and they, in turn, translate the exterior setting bars **377** for controlling the three print wheels **740, 741** and **742.** The longitudinal movement of the three bars **377** for the dating mechanism operate gear trains similar to the gear train **710, 713,** and **715** heretofore described to set the date stamps to the selected position.

It is well-known that in some types of mail the Post Office does not want the date printed, so that the dating mechanism should be selectively controlled to either a "print" or a "non-print" position. This control can be readily secured by providing an eccentric **745** which lies between opposed arms **746** and **747** on a frame **744** which carries the dating print wheels. The frame **744** is pivotally mounted on the web **705** of the print head. It will be obvious from a glance of FIG. 3 that rotation of the eccentric **745** about its pivot **748** will rock the frame **744** through an angle sufficient to move the entire frame away from the periphery of the print heaad, so that it will no longer be in a "print" position. The rotation of the eccentric on its shaft **748** can be secured through a gear train meshing with the functionally related exterior setting bar **377.**

It was mentioned previously that the preferred form of the print wheel of this invention has a diameter of 4½ inches, and accordingly there is approximately 7 inches of space left for slogan plates, or the like. It can be noted that when the print head is at rest (full cycle position shown), there is a blank between the tail end of the second slogan plate and the postage die **730.** Preferably, this space ahead of the blank is divided into two sections, or slogan plates, **760** and **761** (FIG. 3). In this figure, the first slogan plate **760** has a length of **3** inches and the second plate **761** has a length of **4** inches. These are much larger than any heretofore usable, as most print heads heretofore have been about half the diameter of that in this preferred form. The first plate **760** is pivoted on a stud **762** and is moved in and out of printing position by an eccentric **763** mounted on a shaft **764** carried by the web of the wheel. The eccentric **763** is embraced by a pair of arms **765** which are connected by a sleeve **766.** The sleeve **766** is rigidly mounted on a bar **767** formed integrally of the circumference of the slogan plate **760.** It will be understood that any suitable slogan die can be mounted on the plate **760** by any suitable means, such as screws (not shown). The shaft **764** and its integral eccentric **763** can be rotated to rock the slogan plate **760** into and out of printing position by means of a gear train operated by an exterior setting bar **377** similar to that previously described in connection with the postage value print wheels.

The longer plate **761** is pivotally mounted on a stud **773** that extends through an aperture **771** in the first slogan plate **760.** The plate **761** is controlled by an eccentric **775** formed on shaft **776.** What appears to be another eccentric is actually a clearance aperture **772** and a frame bar **774** that rigidly ties the two side pieces, or webs, **705** that form the frame of the print head **70.** The inward or outward movement of this plate **761** is controlled by the rotation of the eccentric **775** that is integral with a rotatable shaft **776** journalled in suitable bearings carried by the web **705** of the print head **70.** The eccentric **775** is embraced between a pair of arms **777** that are rigidly mounted on a post **778** rigidly mounted on the peripheral wall of the slogan plate **761.** This eccentric is controlled in the same manner as those previously mentioned.

On of the requirements of the Post Office for the manufacture of postage meters is that the value print-

ing devices be centered in a proper digital position and be rigidly locked in their adjusted position throughout the printing cycle, so that they are not subject to displacement from the position selected by the operator. This is readily secured in the present invention by means of a locking arm **785** (FIG. **2**) that is pivotally mounted on the outside of the web **705** of the print wheel **70**, as by means of a pivot stud **786** rigidly mounted on the web **705** of the print wheel. This locking arm **785** carries four teeth **787**, each of which, when the locking arm **785** is rocked (clockwise in FIG. **2** from the position shown) engage between the teeth **378** of the exterior setting rack **377** which lie immediately outside of the inside web **705**. It will be seen in FIG. **1** that there is at least one inter-tooth space to the outside (to the right) of the print head **70**. Since setting of the value wheel is to the right from the zero position shown, it is obvious that the teeth **787** can mesh with the teeth **378** of the exterior racks. when so locked against movement, not only the bar **377** but also the value print wheels **720** are firmly held against any displacement and are positively centered in a correct printing position if not manually so set.

The locking arm **785** carries a roller **788** pivotally mounted thereon. As the print head starts to rotate (counterclockwise in this figure), the roller engages the leading beveled edge **789** of a cam bar **790** that is rigidly mounted on the back side (left in FIG. **1**) of the frame plate **104**. The cam plate **790** is spaced away from the frame plate by suitable spacers and studs **791** so as to be readily engageable with roller **788**. The cam plate **790** has a length which keeps the locking arm **785** in deep contact with the teeth of the rack **378** throughout the printing phase of a cycle of operation. Trailing the locking cam plate **790** is an unlocking cam plate **792**, also mounted on the frame plate **104**. This cam plate likewise is spaced from the adjacent frame plate by suitable spacers and studs **793**. This cam plate **792** is located inside of the locking cam plate **790**, and as the roller **788** comes off of cam **790**, it is moved outwardly by a leading cam edge **794** and will thereafter roll against the outside of this cam plate **792**. In this position the locking arm **785** is out of locking engagement with the racks **378** and the entire setting mechanism can be restored to zero if necessary.

It will be understood that a suitable inking mechanism **800** of any suitable construction is placed ahead of the stamp die and before the printing mechanisms of the print head can reach the printing position, i.e., the lowermost peripheral edge of the print head in FIGS. **2** and **3**.

It is believed obvious that many modifications can be made in the present invention. For example, it can be either larger or smaller than mentioned; it can have more or less than two slogan plates, and they can be of any size desired; the various printing mechanisms shown can be controlled by means other than as herein shown as by setting them directly from the interior setting bars within the limits of the print head, etc.

These and other such changes are believed within the scope of the present invention and accordingly an interpretation of the claims should be commensurate with the invention.

What is claimed is:

1. A printing device for a postage meter comprising:

1. a hollow drive shaft;

2. a substantially cylindrical print head rigidly mounted on said shaft;

3. adjustable printing elements carried in said cylindrical head, said elements being mounted within said print head and extending to the periphery thereof;

4. axially extending control elements carried on said drive shaft and movable to adjust said printing elements to selected printing positions;

5. means operatively connecting said control elements to said printing elements;

6. setting bars slidably but non-rotatably mounted within said shaft;

7. means for permanently connecting said setting bars to said control elements through the wall of said shaft;

8. manually operated selection members for adjusting said setting bars; and

9. means for permanently connecting said manually operated selection means to said setting bars.

2. The apparatus of claim **1** wherein the control elements are mounted in axially extending slots in the periphery of said shaft.

3. The apparatus of claim **1** comprising also:

1. an auxiliary printing member movable out to, or interiorly of, the periphery of said print head; and

2. means for selectively moving said auxiliary printing member between said peripheral or interior position.

4. The apparatus of claim **1** comprising also means for rotating said shaft and means for locking the adjusted control elements in an adjusted position upon start of rotation of said shaft.

5. The apparatus of claim **1** wherein the means for connecting each of said setting bars to its respective control element comprises:

1. a ring mounted on each of said setting bars, each ring having an annular slot in the periphery thereof;

2. a longitudinal slot through the wall of said drive shaft in an angular position below each respective control element and so located as to extend over the area through which said slotted ring and associated setting bar can be moved; and

3. a pin in the respective control element engaging the annular slot in its respective ring.

6. The apparatus of claim **1** wherein the means for operatively connecting said control elements to said printing elements comprises a gear train.

7. The apparatus of claim **1** wherein said manually operated selection members comprise:

1. a plurality of selection bars movable parallel to the axis of the hollow drive shaft;

2. manually operated members for setting said bars in a selected value position; and

3. means set by the movement of said bar for displaying the value selected by operation of the manually operated members.

8. Printing means for a postage meter comprising:

1. a hollow rotatable shaft;

2. a print head mounted on said shaft;

3. value printing elements mounted within said print head and forming a part of a periphery of said print head;

4. dater printing elements comprising adjustable printing elements mounted within said print head;

5. a control rack for each of said value and dater printing elements, said rack being slidably mounted on the exterior of said shaft;
6. a gear train within said print head connecting each one of said racks with its respective printing element;
7. a setting rack for each of said control racks slidably but non-rotatably mounted within said shaft;
8. a grooved disk mounted on each of said setting racks;
9. a pin mounted in each said control rack extending through an axial slot in the wall of said hollow shaft to engage the groove of the disk of the respective control rack; and
10. manual means for positioning said setting racks.

9. The apparatus of claim 8 comprising also:
1. an auxiliary print section extending through a portion of the periphery of said print head and positionable in either a position in the periphery of said print head or into a position interiorly thereof;
2. means within said print head for selectively positioning said auxiliary print section of either a peripheral or an interior position;
3. an auxiliary control rack mounted on the exterior of said shaft;
4. means operatively connecting said auxiliary control rack to said positioning means;
5. an auxiliary setting rack slidably but nonrotatably mounted within said shaft;
6. means for permanently connecting said auxiliary control rack and said auxiliary setting rack; and
7. manually controlled means for adjusting said auxiliary setting rack.

10. The apparatus of claim 7 having:
1. a plurality of auxiliary print sections movable to a printing or non-printing position;
2. an auxiliary control rack for each print section;
3. an auxiliary setting rack for each print section;
4 means for permanently connecting each said auxiliary control rack and its respective auxiliary setting rack; and
5. manually controlled means for adjusting said auxiliary setting racks.

11. In a postage meter having:
1. a frame;
2. a hollow drive shaft rotatably mounted in said frame;
3. a print head rigidly mounted on said drive shaft;
4. a plurality of settable printing elements mounted in said print head; and
5. a plurality of manual setting members mounted in the frame exteriorly of said print head;

a means operatively connecting the settable printing elements in said print head to the respective setting member comprising:

a. an exterior positioning bar for each of said printing elements slidably mounted for longitudinal movement on the exterior of said drive shaft and penetrating into the interior of said print head, each of said bars being located on said drive shaft in an angular position suitable for connection to the printing element with which it cooperates;

b. interior positioning bars slidably mounted for longitudinal movement within said drive shaft, therebeing one such interior bar for each exterior bar, each of said interior bars extending beyond the end of said hollow drive shaft;

c. connecting means operatively connecting each of said manual setting members to the extending portion of its respective interior positioning bar for positioning its respective interior positioning bar;

d. a ring mounted on each of said interior positioning bars, each said ring having an annular slot in the periphery thereof and the respective rings being so spaced one from another that each may be set to any position irrespective of the position of the others;

e. a lengthwise extending slot through the wall of said hollow drive shaft below the respective exterior bar and so located in said hollow drive shaft as to register with said slotted ring on the respective interior bar in any position thereof; and

f. a pin rigidly mounted on each exterior bar extending through the respective slot in the wall of said hollow drive shaft and engaging the slot in the periphery in the ring fixed to the respective interior bar.

12. A printing means for a postage meter comprising:
1. a hollow rotatable drive shaft;
2. a print head rigidly mounted on said drive shaft;
3. a value printing elements mounted within said print head and forming a part of the periphery of said print head;
4. dater printing elements mounted within said print head and adjustable to either form a part of the periphery thereof or to be retracted into an interior position therein;
5. a positioning element for each of said value and dater printing elements, said positioning elements being mounted on the exterior of said hollow drive shaft for longitudinal movement thereon and extending within the print head;
6. means within said print head connecting each one of said positioning elements to its respective printing element;
7. a plurality of manual setting members mounted in said postage meter exteriorly of said print head;
8. a control bar for each positioning element, said bars being mounted within the interior of said shaft for longitudinal movement therein and extending beyond the end thereof;
9. means operatively connecting each of said setting members to the extending portion of its respective control bar for longitudinally positioning its respective control bar;
10. a disk having a slot in the periphery thereof rigidly secured to each of said control bars;
11. a longitudinally extending slot in the wall of said drive shaft underlying each of the positioning elements and at a location to register with the disk mounted on the respective control bar; and
12. a pin rigidly secured to each said positioning element extending through its respective slot and engaging the slot in the disk secured to the respective control bar.

13. In a postage meter having:
1. a frame;
2. a hollow drive shaft rotatably mounted in said frame;
3. a print head rigidly mounted on said drive shaft;
4. a plurality of settable printing elements mounted in said print head; and
5. a plurality of manual setting members mounted in

the frame of said machine;

a means for operatively connecting each of the settable printing elements in said print head to its respective one of said setting members comprising:

a. an exterior positioning bar for each of said printing elements slidably mounted for longitudinal movement on the exterior of said drive shaft and penetrating into the interior of said print head;

b. an interior positioning bar for each of said exterior positioning bars slidably mounted for longitudinal movement within said drive shaft, each of said interior bars extending beyond the end of said hollow drive shaft;

c. means operatively connecting each of said manual setting members to the extending portion of its respective interior positioning bar for positioning its respective interior positioning bar;

d. a collar non-slidably mounted on one bar of each pair of said exterior and interior bars, each said collar having an annular slot in a wall thereof and the respective collars being so spaced one from another that each may be set to any position irrespective of the position of the others;

e. a lengthwise extending slot through the wall of said hollow drive shaft below each respective exterior bar and so located in said hollow drive shaft as to register with its respective collar in any position thereof; and

f. a pin rigidly mounted on the other bar of each of said pair of said exterior and interior bars extending through the respective slot in the wall of said hollow drive shaft and engaging the slot in the respective collar.

14. An arithmetic and printing unit for a postage meter comprising:

1. a cylindrical hollow main drive shaft;

2. means for mounting said drive shaft for rotation;

3. means for cyclically rotating said drive shaft;

4. an ascending register and a descending register;

5. a print head mounted on said drive shaft;

6. a manually operative selection mechanism for selecting values to be registered in said registers and in said print head;

7. a mutilated drum acutator mounted on said drive shaft;

8. means controlled by said selection mechanism for registering a selected value in one of said registers by said actuator in accordance with a value set in said selection mechanism;

9. a second mutilated drum actuator;

10. means driven by said main drive shaft for driving said second mutilated drum actuator;

11. means controlled by said selection mechanism for registering the selected value in said second register by said second actuator in accordance with the selected value set in the selection mechanism simultaneously with the registration of said value in said one of said registers;

12. value stamping members positionably mounted within said print head for printing a stamp value on mail matter;

13. auxiliary printing members carried by said print head;

14. a plurality of setting members slidably but nonrotatably mounted within said hollow drive shaft, some of said setting members being associated with the value stamping members and the others of said members being associated with said auxiliary printing members;

15. means operated by said selection mechanism for positioning the said some of said setting members to a selected value position;

16. manually operated setting devices for setting the others of said setting members;

17. exterior slides slidably mounted on the exterior of said drive shaft;

18. means for permanently connecting each of said setting members to one of said exterior slides through the wall of said shaft and in all angular positions of said shaft; and

19. means for operatively connecting said exterior slides to said value stamping members and said auxiliary printing members, respectively.

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