Jan. 10, 1956 A. G. RUSSELL 2,730,041

DATE WHEEL SETTING DEVICE

Filed June 13, 1951 2 Sheets-Sheet 1

FIG. 1.

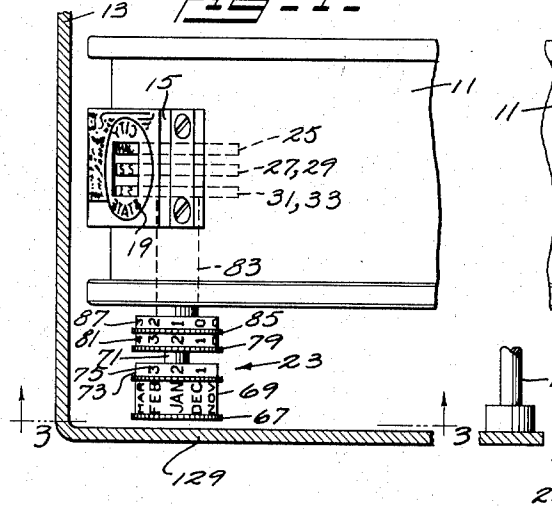


FIG. 2.

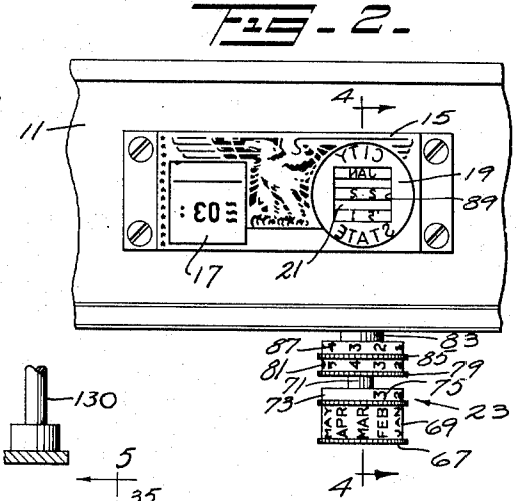
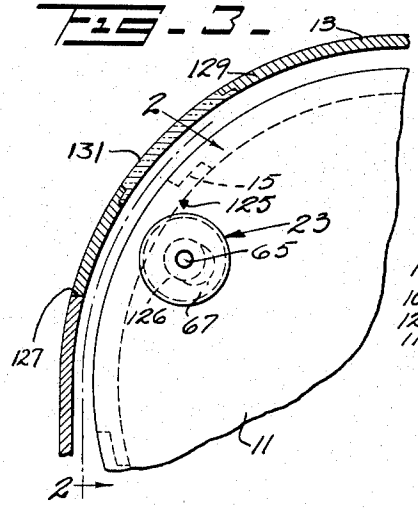


FIG. 3.



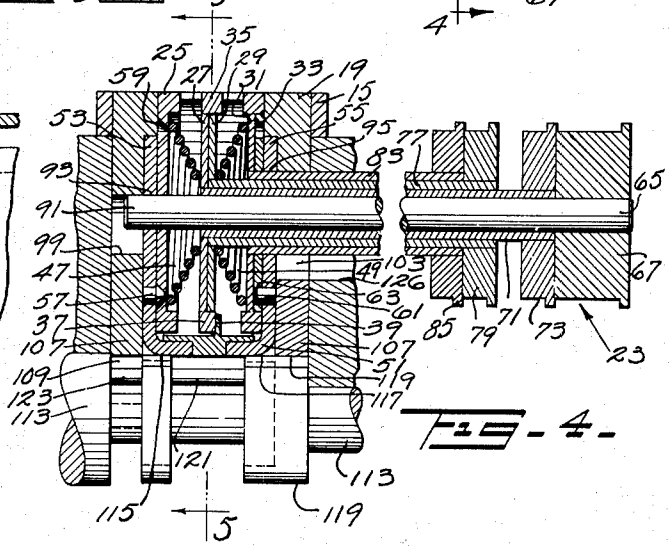
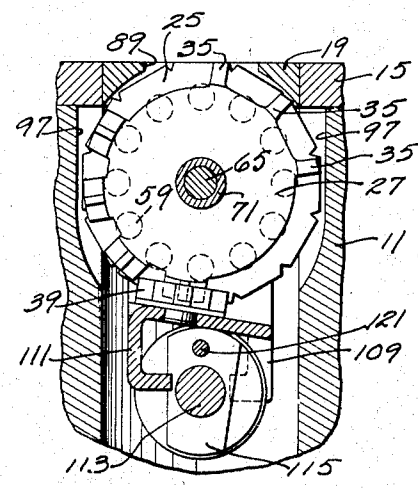


FIG. 4.

FIG. 5.



INVENTOR
Alva G. Russell
BY
Edwin H. Owen
ATTORNEY

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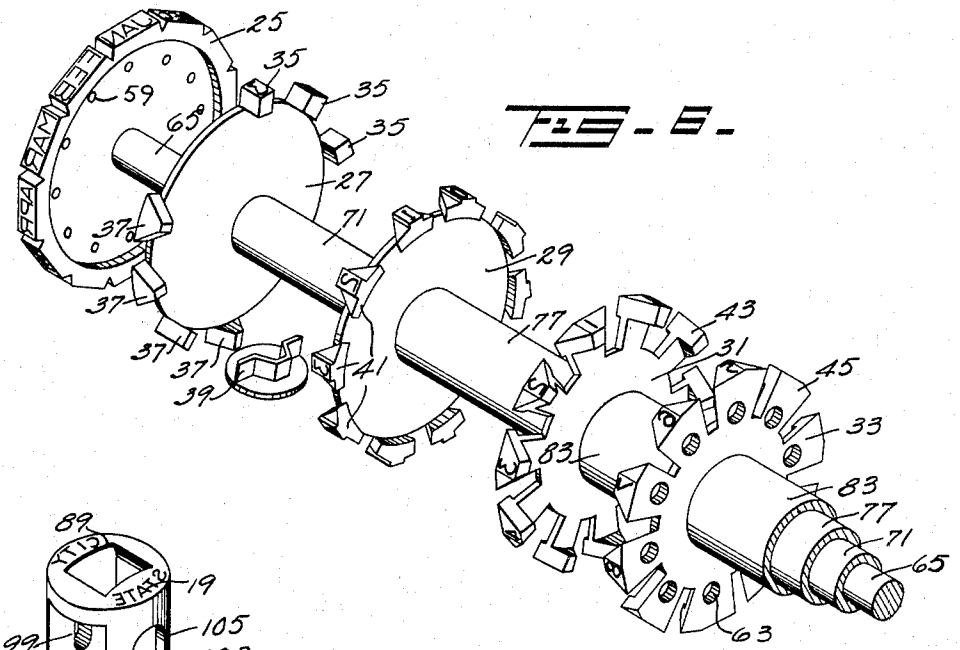


FIG. 6.

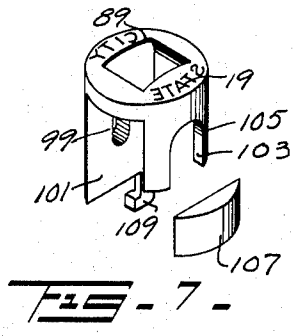


FIG. 7.

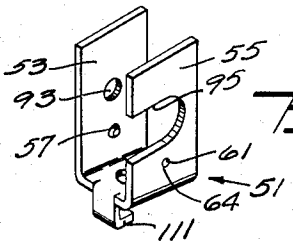


FIG. 8.

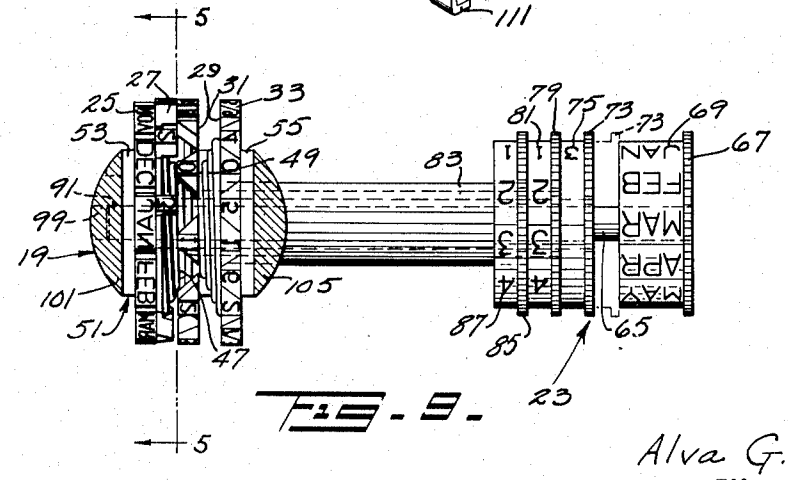


FIG. 9.

INVENTOR
Alva G. Russell
BY
Edwin H. Owen
ATTORNEY

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2,730,041

DATE WHEEL SETTING DEVICE

Alva G. Russell, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn., a corporation of Delaware

Application June 13, 1951, Serial No. 231,395

8 Claims. (Cl. 101—110)

This invention relates to printing and more particularly to date printing in postage printing meters.

Heretofore it has been the practice to print the date characters in a line, the date being made up by setting rotatable coxial date wheels whose axis was generally parallel to the date line. The orientation of the date wheel axis on the printing member was of no particular mechanical importance since the setting of the wheels was normally accomplished by direct contact with a manually carried stylus. Inasmuch as the printing member is normally a rotating drum which feeds envelopes lengthwise as it prints the postage indicia, town and date thereon, the date wheel axis was normally directed peripherally of the drum, i. e. transversely of the drum axis, so that the dates could be read holding the envelope with its bottom edge horizontal. Furthermore, the in-line arrangement of the date characters, made it convenient to provide for printing the number of the day by using two wheels side by side, one for the units digit, and one for the tens digit, each one having no more than ten characters and hence being small enough for ready insertion within the movable town die which prints the postmark ring surrounding the date.

The setting of the date wheels using a stylus as described above is usually somewhat awkward due to the tamper-proof housing which surrounds the printing member to prevent the taking of unauthorized impressions without operating the device so as to affect the register reading. This housing has a restricted opening opposite the rest position of the date wheels. It is through this opening that the stylus is normally inserted for setting the wheels. Difficulty is often experienced in determining whether or not a setting of such a device is proper due to the reverse reading of the characters and the likelihood of poor light within the housing. Some suitable external date setting control which will obviate these difficulties has, therefore, been the object of investigation.

In seeking to provide some external control for setting the date, it is convenient to think in terms of hollow coaxial shafts for operating the wheels with coaxial finger knobs arranged at one side of the printing member, e. g. on one face of a rotating drum. This, however, conflicts with the usual positioning of the date portions in line, if the date is to be positioned for proper reading on a letter.

It is an object of the present invention, therefore to arrange and mount the date printing wheels of a postage meter so that they can be controlled by hollow coaxial shafts projecting generally parallel to the vertical axis of the printed characters. This is accomplished in the form of the invention shown by stacking the parts of the date so that the day numerals will be positioned below the month, and the year numerals below the day numerals.

While stacking of the date as described above forms a part of the solution to the problem presented, difficulty was discovered in that the day and year numerals were now found to extend in a line peripherally of the date wheels rather than axially thereof. So long as the day

and year numerals were read axially of the wheels, as heretofore, two wheels side by side could readily carry the units and tens digit of each number. In the situation as now presented, however, the units and tens digit arrangement seemed to place them in line on the same wheel, so that thirty-one different positions of the day wheel would be required. If the characters were to remain large enough for legibility, such a wheel would be far too large to fit conveniently into the compact printing drums, presently in use and, of course, could not line up coaxially with the other wheels unless they are also enlarged to match.

This invention has for another object, therefore, the provision of means for separating the tens and units digits of the day numerals and also of the year numerals if desired, and making them individually settable even though positioned on a line extending transversely of the numeral wheel shaft axis.

A feature of the invention is the use of gapped numeral printing wheels whereby one wheel may penetrate into axial mesh with the other and permit both to print parts of a number the base line of which extends transversely of the numeral wheel axis.

Another feature of the invention is the provision of date printing means of the foregoing type having a control projection extending therefrom exteriorly of the printing member, in cooperation with a surrounding town die which accommodates the control means, both the date wheels and town die being arranged for movement to and from printing position together, and the date printing means being separately retractable from printing position while the town die is allowed to remain therein.

Still another feature of the invention is the arrangement of a dater mechanism having coaxial printing wheels and coaxial finger wheels, and in which the printing wheel images run peripherally of their wheels while the finger wheel indicia are arranged axially of the finger wheels in order that they may be larger and more readily visible than the printing images for comparable wheel diameters.

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 drawing, wherein:

Fig. 1 is a fragmentary plan of a postage meter according to the invention showing the printing drum in rest position and the casing in section.

Fig. 2 is a face view of the printing die portion of the printing drum of Fig. 1, taken substantially on line 2—2 of Fig. 3.

Fig. 3 is an elevational section of the device of Fig. 1 taken substantially on line 3—3 of Fig. 1.

Fig. 4 is a condensed section on an enlarged scale taken through the town and date printing dies, substantially on the line 4—4 of Figs. 2 and 3, and illustrating the die projecting and retracting mechanism.

Fig. 5 is a section taken substantially on line 5—5 of Fig. 4, but with the day units digit wheel removed for purposes of clarity.

Fig. 6 is an exploded perspective view to approximately the same scale as Fig. 4 illustrating more clearly the relationship of the wheels to one another and to the day numeral detent, the springs being omitted for clarity.

Fig. 7 is an exploded perspective view to approximately the same scale as Fig. 1 of the town die, illustrating the relationship of the parts thereof.

Fig. 8 is a perspective view to a scale similar to Figs. 1 and 7 showing the dater supporting and moving yoke.

Fig. 9 is a view of the device of Fig. 4 taken from the top thereof and looking downwardly, the dater die being shown in section, and the printing drum portions being omitted for clarity, and illustrating the position of the parts during setting of the day tens digit wheel.

Referring to Figs. 1 to 3, the present invention is shown embodied in a postage meter comprising a rotating printing drum **11** housed in a fraud preventing casing **13**. To the surface of the drum is fastened the usual postal indicia printing die **15** which is provided with apertures to receive value printing dies **17** for the postage value, **19** for the town, and **21** for the date. A control means **23** is provided at one side of the drum **11** and is connected with the dater die **21** for setting the same.

Heretofore it has been the practice to arrange the month, day and year in a line as shown, for example in the patent to J. W. Ogden, No. 2,179,269, and to have the date wheels rotate about an axis parallel to that line. According to the present invention, however, the date is stacked with the month uppermost, the day numerals below it, and the year numerals at the bottom, and the wheels are arranged to rotate about an axis extending across the printing drum and transversely to the direction of reading of the characters, in other words, parallel to the height of the stack. Such an arrangement, however, places the tens and units digits of the day within the same vertical dimension, and the tens and units digits of the year within the same vertical dimension, and in such a position that the members of each pair would normally find themselves on the same wheel as is apparent from Fig. 2. This calls for a 31-position day wheel which would be impractical if not impossible due to the size of such a wheel and the cramped quarters available within the printing drum of conventional size.

This situation is resolved according to the present invention by making the units and tens wheels for the day or year in a gapped configuration so that they may mesh axially with each other to align their digits and may be adjusted relative to each other by withdrawing them to unmeshed condition prior to rotation thus requiring only a maximum of ten positions. This aspect of the invention appears particularly in Figs. 4 to 6 and 9 which show a month wheel **25**, a day tens wheel **27**, a day units wheel **29**, a year units wheel **31**, and a year tens wheel **33**, all stacked in a coaxial arrangement. As can be seen from Fig. 6, each of wheels **27**, **29**, **31** and **33** is made up of a thin central plate and thicker blocks carried on the edge of the plate. In the case of wheels **27** and **29** the blocks mesh to form in effect a single day wheel for printing purposes, while the blocks on the edges of wheels **31** and **33** mesh to form in effect a single year wheel during printing. The wheel **27** has three printing blocks **35**, each carrying one of the numerals 1, 2 or 3, and four positioning blocks **37** for cooperation with the detent **39** to position the wheel **27** in any one of the numeral printing positions, or in a blank, non-printing position. The detent **39** is preferably a thin separator presenting a recess on one side and a projection on the other which, while coming between the wheels **27** and **29**, also allows them to mesh as required for printing alignment. The blocks **41** carried on the rim of wheel **29** are ten in number and include all of the digits, each block being wedge shaped so that each adjacent pair of blocks forms between its elements a recess with sloping walls for receiving the projecting side of the detent **39** which has a complementary shape.

Year wheels **31** and **33** have peripheral blocks **43** and **45** respectively which are shaped like blocks **41** of wheel **29** so as to mesh with each other. Each wheel **31**, **33** carries ten blocks, one of each digit, although a reduced number may be provided on the tens wheel **33** if desired.

Two springs **47** and **49** are located between certain of the wheels, the spring **47** urging the wheels **25** and **27** apart and the spring **49** urging wheels **29** and **31** apart. The day wheels **27** and **29** are correspondingly urged towards each other and into engagement with the detent **39** by the action of said springs.

A U-shaped yoke **51** supports the date wheel assembly and includes two parallel plates **53** and **55** (Fig. 8). As seen in Fig. 4, the spring **47** also urges the month wheel **25** towards the plate **53** and into engagement with a conical detent projection **57** which engages in one of the conical openings **59** in wheel **25**. Likewise, the spring **49** urges the year wheels **31**, **33** towards each other and towards the plate **55** so that the detent pin **61** engages in one of the openings **63** in tens year wheel **33**. The detent **39** is preferably mounted in an opening **64** in the bottom of the yoke **51**.

The operating means for the date printing wheels includes a plurality of slidably and rotatably mounted concentric shafts. The central shaft **65** is fixed at one end to the month printing wheel **25**, and at the other end to a month finger wheel **67** which carries month designating indicia **69** thereon and makes up part of the control mechanism **23**. A hollow shaft **71**, shorter than shaft **65**, is fixed at one end to day tens wheel **27** and at the other end to a day tens finger wheel **73** bearing suitable indicia **75** such as 1, 2, 3 and a blank. A still shorter hollow shaft **77** is fixed at one end to the day units wheel **29**, and at the other to a day units finger wheel **79** having suitable indicia **81**. The shortest hollow shaft **83** connects the year units wheel **43** and a year units finger wheel **85** carrying suitable indicia **87**.

It will be noted that the finger wheels **67** and **79** are arranged so that sliding movement towards the right in Fig. 4 is permitted without interfering with other finger wheels in order to correspond to the movement permitted the corresponding printing wheels **25** and **29** by springs **47** and **49**. Likewise finger wheels **73** and **85** are arranged to have non-interfering sliding movement towards the left in Fig. 4 to correspond to the movement permitted the printing wheels **27** and **31**. Furthermore, it will be seen from Figs. 4 and 9 that the printing wheel groups are so spaced that when any wheel is slid axially away from its meshing wheel or out of engagement with its detent, room is available for the wheel to be rotated between adjacent wheels and detents to a desired setting before allowing the wheel to return to meshed condition with its partner, or into full engagement with its detent.

It will be noted that the year tens wheel **33** is free to rotate on the outer surface of shaft **83** and, in the form of the invention shown, has no operating shaft or finger wheel. This is because the setting is altered so seldom (i. e. once in ten years) that no substantial inconvenience results from the necessity for manually setting this wheel. However, a finger wheel control similar to the others could also be provided for wheel **33** if desired.

The wedge configuration on the meshing and interengaging portions of the wheels and detents (i. e. detent **57**, blocks **37**, detent **39** and blocks **41**, **43** and **45**) serves at least two purposes. On one hand, the shape is such that the action of the springs **47** and **49** will cam the wheels into an extremely accurately determined printing position with a minimum of side play, but without the necessity for close tolerances at the initial stages of meshing which would make setting of the wheels extremely difficult. On the other hand, the sloping walls provided by the wedge-shaped parts make it possible for the rotary motion of the finger wheel to assist in the axial shifting of the meshed or detented wheels, since such rotation tends to cam the selected printing wheel axially out of meshed or engaged condition and into the setting space where free rotation is permitted.

It will be noted that the detent pin **61** for the year tens wheel **33** is not wedge-shaped. The reason for this is that, since the wheel has no special control, nor any spring other than spring **49** insuring its continued engagement with the detent, there might be some tendency for it to

follow the wheel **31** during setting thereof and thus provide an improper year setting. By having the detent **61** so shaped as to prevent any camming action, rotation of the finger wheel **85** will tend to cam wheel **31** out into the setting space provided, and at the same time will tend to cam the wheel **33** back against the wall **55** and into engagement with its detent **61** to anchor the year tens wheel **35** firmly against rotation during the setting of the year units wheel **31**.

The mounting of the dater mechanism within the town die **19**, and the mechanism for moving the dies to and from printing position is similar in some respects to that disclosed in the application of Berthold Knauer, Serial No. 214,750, filed March 9, 1950, but is modified to accommodate certain features of the present dater mechanism.

Briefly, the town die **19** consists of a barrel slidable in the printing member **11**. The yoke **51**, Fig. 8, which carries the dater mechanism, is slidable within the town die **19** so that the wheels are projectable into printing position in the opening **89** of the town die **19**. The dater wheel assembly **21** is supported primarily on the month shaft **65** which has a projecting end **91** receivable in an opening **93** in the plate **53** of the yoke. The hollow shaft **83** is carried in a slot **95** in the plate **55** of the yoke. Since the date wheels of the present invention are slightly larger than the wheels needed for printing the date in line, they extend somewhat beyond the town die and are received in shallow recesses **97** (Fig. 5) formed for that purpose in the printing member **11**.

When the yoke **51** and dater mechanism are placed within the town die **19**, the end of shaft **65** fits within a slot **99** in one leg **101** of the town die, while the shaft **83** is received in a downward opening slot **103** in the shorter leg **105**. It will be seen that when the parts are thus assembled, the edges of slot **103** prevent any movement of the shaft **83** within the slot **95** so that the dater mechanism is held firmly against lateral displacement. A filler and pusher piece **107** is provided for closing the slot **103** and completing the leg **105** for a purpose which will hereinafter appear. A town retracting hook **109** is integral with and depends from the leg **101** of the town die, and a date retracting hook **111** depends from the bottom portion of the yoke **51**.

Rotatably mounted in the printing member **11** is a control shaft **113** provided with a suitable operating means (not shown) extending from one face of the printing member **11**. The shaft **113** has cam portions **115** and **117** engaging the bottom of the dater yoke **51** for projecting the same into printing position and supporting the same therein when the shaft **113** is rotated to one position, namely, that of Fig. 5. Adjacent the cam portion **117** is another cam portion **119** which is positioned to engage the bottom of pusher member **107** and thus to project and maintain the town die **19** in printing position whenever the shaft **113** is in its Fig. 5 position or is rotated counterclockwise from that position through 90 degrees. The shaft **113** also carries rods **121** and **123**. The former engages the hook member **111** to retract the dater to non-printing position while the town die **19** remains in printing position as the shaft is rotated 90 degrees counterclockwise from the Fig. 5 location. The rod **123** is positioned to strike the hook **109** on the leg **101** of the town die and thereby to retract both the town and dater dies to non-printing position when the shaft is rotated 90 degrees clockwise from the Fig. 5 location.

In order to make a date setting with the device of the invention, the operator first grasps the month finger wheel **67** and shifts the same to the right against the force of spring **47** as viewed in Figs. 4 and 9 until the recesses **59** in the month printing wheel **25** are free of the detent **57**. The knob **67** is then rotated until the desired month appears at a predetermined location (e. g. opposite an indexing pointer) whereupon the printing image for the same month will be in printing position, and the knob **67** can then be allowed to move to the left to its initial axial position under the influence of spring **47**, while the detent **57** enters the appropriate recess **59**. In the device shown, the indexing position is directly upward as can be seen in Fig. 1, a pointer for indicating this fact being designated by reference character **125** in Fig. 3.

When the month has been set, the day tens digit can be set by moving the finger wheel **73** to the left into the central gap. This disengages the wheel **27** from the detent **39** and removes it from mesh with the wheel **29** as shown in Fig. 9. The wheel **73** may then be turned until the appropriate numeral 1, 2, 3 or a blank is presented opposite the indexing marker. When the finger wheel **73** is released the spring **47** moves the same back to its original axial position, shown in dotted lines in Fig. 9. Similarly settings may be made using day units finger wheel **79** or the year units finger wheel **85** by moving the former to the right or the latter to the left, then rotating to the desired indication and releasing the finger wheel to be returned to initial axial position by the spring **49**. When the occasion arises to change the year tens printing wheel **33**, the same may be accomplished by shifting the finger wheel **85** to the left to release the pressure of spring **49**, and also manually shifting the wheel **33** to the left for example with a stylus, so that it remains in mesh with the wheel **31**, but frees itself from the detent **61**. By rotating finger wheel **85** without regard for the indicia **87**, the printing wheel **33** can be brought to a position such that the desired year tens numeral appears in printing position. When the finger wheel **85** is released, both of the wheels **31**, **33** will be returned, still in meshed relationship, to their normal position with the detent pin **61** engaged in the appropriate opening **63** of the year tens wheel **33**. This is brought about by the force of spring **49**. Thereafter a corrected setting of the year units digit may be made as described above.

The town die slot **103** is provided to permit the dater control shafts **65**, **71**, **77** and **83** to exit from the town die and to reach an accessible position at the side of the printing member **11**. The slots **103** and **99** are of sufficient length to permit appropriate relative movement between the town die **19** and the dater yoke **51** so that, whenever desired, the dater may be retracted while the town die remains in printing position. A similar radially elongated aperture **126** is provided in the printing member **11**, as seen in Figs. 3 and 4, to permit the slight movement of the control assembly **23** necessitated by the retraction of the dater.

It will be seen from the foregoing description that the device of the present invention can be set with the greatest of convenience, for the finger wheel indicia **69**, **75**, **81** and **87** will all be direct reading instead of reversed, as is the case where the printing elements themselves must be inspected to ascertain the correctness of the setting. Furthermore, the finger wheel indicia may be delineated in bright colors or placed against a strongly contrasting background, or may even be self-luminous if necessary, since they need not serve as printing means and hence will not become obscured due to the ink deposited thereon. In addition, the finger wheel indicia may be made larger than the corresponding printing images even on finger wheels of restricted diameter, for the month may be placed to read axially of the wheel while the tens and units digits are each on separate wheels. This principle is particularly well illustrated in Fig. 9 wherein the finger wheel indicia is larger than the corresponding printing image, even though the finger wheels are smaller in diameter than the type wheels.

Access to the finger wheels is provided by the swinging of a cover about a pivot or shaft indicated at **130**, Fig. 1, to thus expose the finger wheels for manipulation. For casual inspection of the date reading on the finger wheels, a transparent window may be provided as indicated at **131**.

Having described the invention, what is claimed is:

1. In a device of the type described, a pair of coaxial settable numeral printing wheels; printing images on the periphery of each wheel arranged with their base lines extending transversely of the wheel axis, the peripheries of each of said wheels having gaps between each adjacent pair of images thereon for receiving an image of the other wheel therebetween, said wheels being axially meshed during printing to align the printing images on their peripheries; and means for relatively axially moving said wheels to unmeshed position and rotating one relative to the other and for controlling their meshing in any desired combination; and a detent member positioned adjacent the peripheries of the wheels and having a projecting surface portion on one face and a recess on the other, said recess being opposite and entering within the body of the projection, said detent member being receivable between the wheel peripheries when the wheels are in meshed condition.

2. In a device of the type described, a pair of coaxial settable numeral printing wheels; printing images on the periphery of each wheel arranged with their base lines extending transversely of the wheel axis, the peripheries of each of said wheels having gaps between each adjacent pair of images thereon for receiving an image of the other wheel therebetween, whereby the wheels may mesh axially to align the printing images on their peripheries; and means for relatively axially moving said wheels to unmeshed position and rotating one relative to the other for meshing them in any desired combination; and spring means for urging said wheels towards meshed position.

3. In a device of the type described, a pair of coaxial settable numeral printing wheels; printing images on the periphery of each wheel arranged with their base lines extending transversely of the wheel axis, the peripheries of each of said wheels having gaps between each adjacent pair of images thereon for receiving an image of the other wheel therebetween, whereby the wheels may mesh axially to align the printing images on their peripheries; and means for relatively axially moving said wheels to unmeshed position and rotating one relative to the other for meshing them in any desired combination; a detent member positioned adjacent the peripheries of the wheels and having a projecting surface portion on one face and a recess on the other, said recess being opposite and entering within the body of the projection, said detent member being receivable between the wheel peripheries when the wheels are in meshed condition; and spring means for urging said wheels towards meshed position and for urging said wheels into engagement with said detent.

4. In a postage meter a rotatable printing drum; a plurality of coaxial settable date printing wheels mounted on said drum; a plurality of coaxial finger wheels mounted on said drum at one end thereof, coaxial with said printing wheels; and means connecting each of said finger wheels to one of said printing wheels for setting the same, at least two of said date printing wheels having each a series of printing images on its periphery with intervening gaps, and being meshable axially with the other wheel with the printing images of its series disposed in the gaps of the other so as to align the printing images of both wheels in a direction peripherally of the wheels.

5. In a postage meter a rotatable printing drum; a plurality of coaxial settable date printing wheels mounted on said drum; a plurality of coaxial finger wheels mounted on said drum at one end thereof, coaxial with said printing wheels; and means rigidly connecting each of said finger wheels to one of said printing wheels for setting the same, at least two of said date printing wheels having each a series of printing images on its periphery with intervening gaps, and being meshable axially with the other wheel with the printing images of its series disposed in the gaps of the other so as to align the printing images of both wheels in a direction peripherally of the wheels, the finger wheels connected to said meshable date printing wheels being axially shiftable to mesh and unmesh said date printing wheels for setting the same.

6. In a postage meter a rotatable printing drum; a plurality of coaxial settable date printing wheels mounted on said drum, one for printing the month and two for printing the day, the latter two wheels each having gaps between the images on their periphery for receiving an image of the other wheel with the images in peripheral alignment and the wheels in axial mesh; coaxial finger wheels arranged coaxially with said date printing wheels at one end of said drum; and a plurality of coaxial shafts rigidly connecting each of said finger wheels with its corresponding printing wheel.

7. In a postage meter a rotatable printing drum; a plurality of coaxial settable date printing wheels mounted on said drum, one for printing the month and two for printing the day, the latter two wheels each having gaps between the images on their periphery for receiving an image of the other wheel with the images in alignment and the wheels in axial mesh; coaxial finger wheels arranged coaxially with said date printing wheels at one end of said drum; a plurality of coaxial shafts connecting each of said finger wheels with its corresponding printing wheels; and a detent for normally holding said month wheel against rotation and disengageable by axial movement of said wheel away from said detent, said day wheels being at the opposite side of said month wheel from said detent; a second detent positioned between said day wheels, the day wheel nearer said month wheel engaging said second detent from which it is releasable by axial movement towards said month wheel, and a spring urging said month wheel and said nearer day wheel apart and into engagement with their respective detents.

8. In a postage meter a rotatable printing drum; a town printing die slidably mounted in the drum for movement between extended printing position and retracted non-printing position; a dater die slidable within the town die and including a plurality of rotatable date printing wheels; a plurality of finger wheels arranged at one end of said drum; and a plurality of coaxial shafts connecting said finger wheels, each with its corresponding printing wheel, said town die and drum being provided with openings accommodating said shafts, said openings being larger in one direction than the diameter of the outermost shaft to provide for projecting and retracting movement of said dies relative to each other and said printing drum.

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2,080,333	Pendergast	May 11, 1937
2,141,119	Wheeler	Dec. 20, 1938
2,204,971	Rouan	June 18, 1940
2,343,721	Vantuyl	Mar. 7, 1944

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