Oct. 3, 1961 F. HEIL ET AL 3,002,686

POSTAGE METERS

Filed Dec. 26, 1956 4 Sheets-Sheet 1

Fig. 1

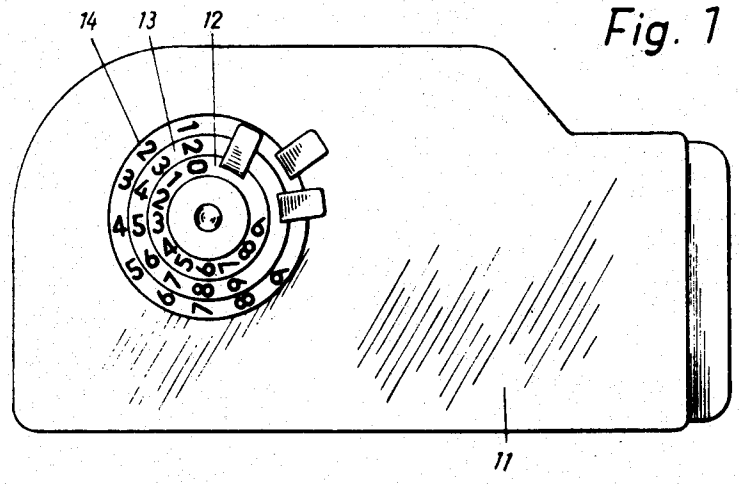


Fig. 4

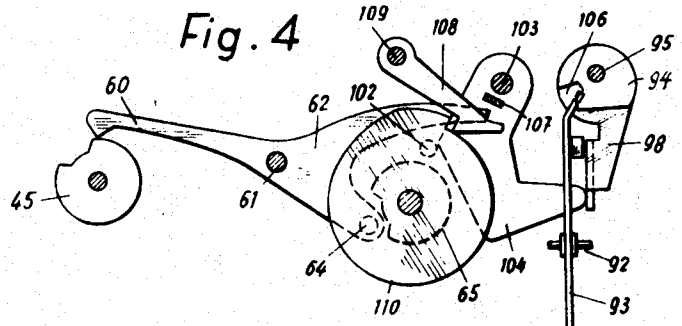
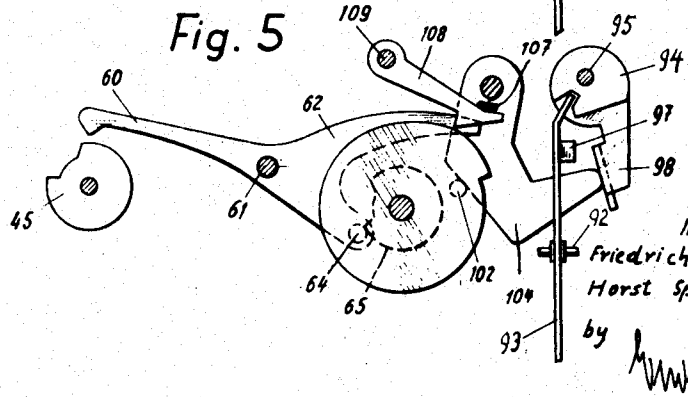


Fig. 5



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Oct. 3, 1961 F. HEIL ET AL 3,002,686

POSTAGE METERS

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Fig. 3

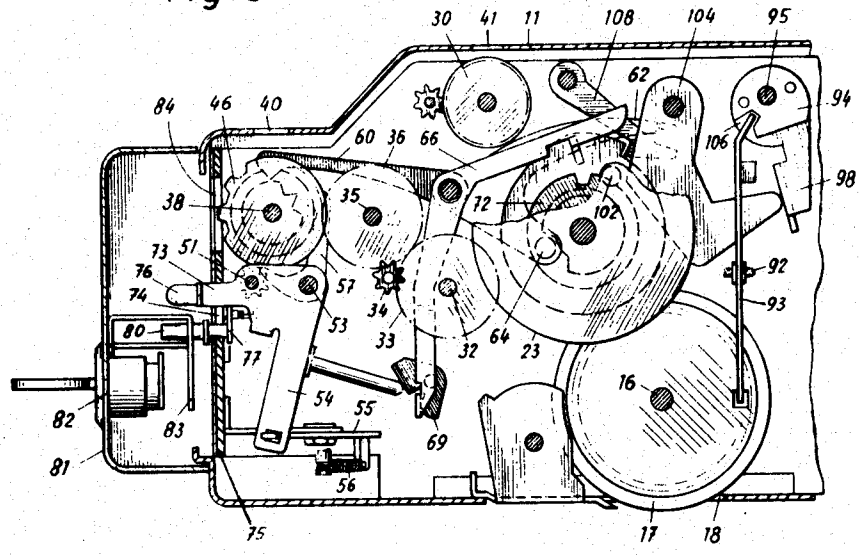
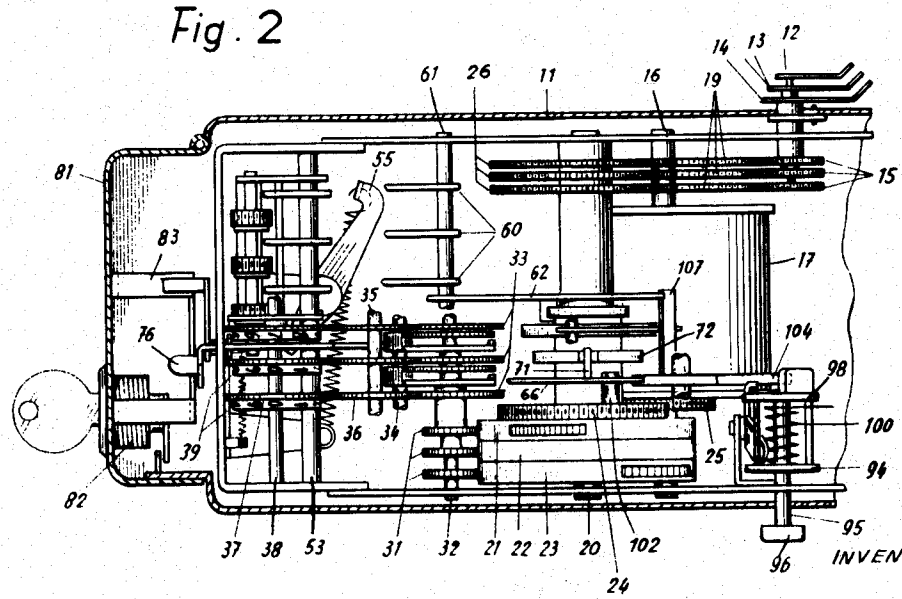


Fig. 2



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Oct. 3, 1961 F. HEIL ET AL 3,002,686

POSTAGE METERS

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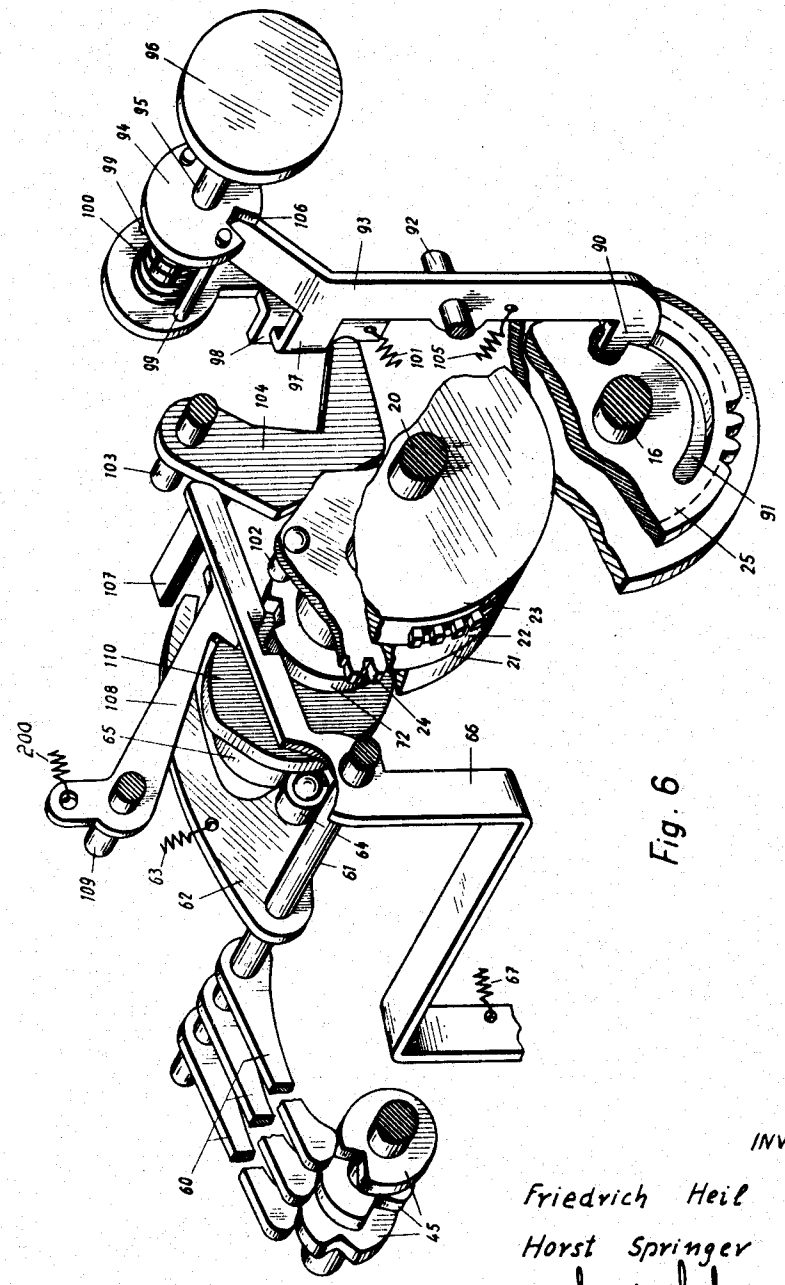

Fig. 6

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POSTAGE METERS

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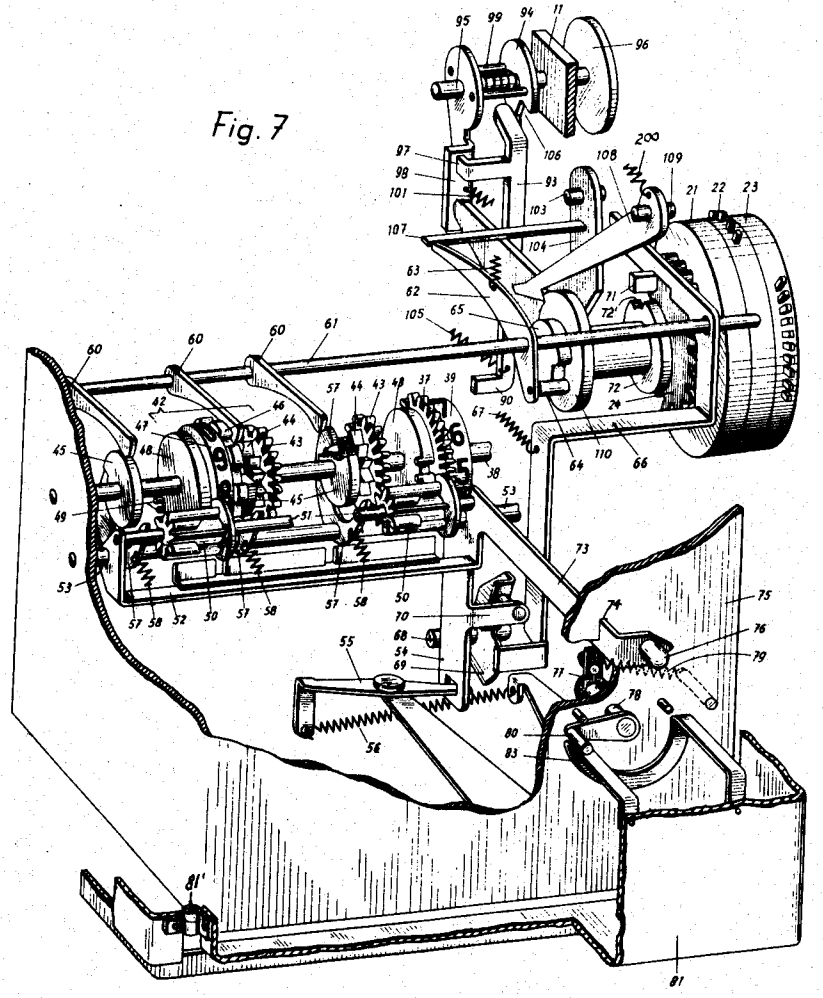
Fig. 7



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United States Patent Office 3,002,686
Patented Oct. 3, 1961

3,002,686

POSTAGE METERS

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Filed Dec. 26, 1956, Ser. No. 630,514
8 Claims. (Cl. 235—101)

This invention relates to apparatus for printing monetary amounts, and more particularly to postage meters.

It is one object of this invention to improve apparatus for printing monetary amounts, and more particularly postage meters of the general type disclosed in United States Patent 2,187,456 to Erich Komusin, January 16, 1940, Printing Apparatus.

It is another object of the invention to provide postage meters, and more particularly postage meters of the general type disclosed in the above identified United States patent, which are absolutely tamper proof, i.e. which positively preclude any fradulent use thereof.

Monetary printing apparatus such as postage meters comprise a subtracting totalizer adapted to be pre-set to allow making of a none pre-determined number of permissible imprints of monetary amounts aggregating a predetermined total monetary amount. Pre-setting is generally effected by the postal authorities. Each single monetary amount intended to be printed is put into the apparatus by adjusting a number of adjustable control gears which, in turn, control the aforementioned subtracting totalizer. The apparatus further comprises printing means, preferably in the form of a rotatable printing cylinder including built-in type wheels, also under the control of the aforementioned adjustable control gears. The printing means are normally locked out by a lock-out mechanism precluding operation of the printing means. Manually operable means controlling said lock-out mechanism allow, upon operation of said manually operable means, one single operation at a time of said printing means say, effecting one single revolution at a time of the aforementioned printing cylinder. In addition to the foregoing components the apparatus comprises latch means having a latching position and an unlatching position and being under the control of the aforementioned subtracting totalizer for precluding operation of said manually operable means after the pre-set or pre-determined total of permissible imprints of monetary amounts has been reached.

It is a further object of this invention to improve the means controlling the operation of said latch means to assure an absolutely tamper-proof operation of said latch means, positively precluding any fraudulent or improper use of the meter.

In apparatus of the aforementioned character a cam forming an integral part of the subtracting totalizer is engaged by a sensing lever causing the aforementioned latch means to move to, and to stay in, the latching position thereof—in which the lockout mechanism of the printing means cannot manually be rendered ineffective—when imprints aggregating a pre-set or permissible monetary amount have been made. Space limitations imposed upon this type of apparatus—particularly where the subtracting totalizer thereof is under the immediate control of control gears rather than under the control of an adding totalizer—result in that the subtracting totalizer can only be operated in the last phase of an operating cycle of the apparatus. Hence the aforementioned sensing lever senses any foreward movement of the subtracting totalizer due to operation of the meter only at a relatively late time in the operating cycle thereof when it may be too late to move the aforementioned latch means to the latching position thereof or, in other words, when the lock-out mechanism of the printing means has been manually rendered ineffective. In view of this fact there is no absolute certainty in prior art postage meters of the aforementioned character—and more particularly in postage meters wherein the operation of the subtracting totalizer is under the immediate control of gears adjustable for predetermined monetary amounts rather than under the control of an additional adding totalizer—that the meter is instantly locked against further use once imprints aggregating a pre-set or pre-determined monetary amount have been made. It is, however, imperative to lock a postage meter in a positive fashion once the pre-set total monetary amount has been fully used up.

It is, therefore, a further object of this invention to provide postage meters with means positively precluding overshooting the total monetary amount for which the subtracting totalizers thereof have been pre-set.

Other objects and advantages of the invention will, in part, be obvious and in part appear hereinafter.

For a more complete understanding of the invention reference may be had to the following detailed description thereof taken in connection with the accompanying drawings, in which:

FIG. 1 is a side elevation of a postage meter embodying the invention;

FIG. 2 is a top plan view of the structure shown in FIG. 1, the casing thereof being sectioned to expose to view the mechanism arranged therein;

FIG. 3 is a side elevation of the structure shown in FIG. 2, the casing thereof being sectioned to expose to view the mechanism arranged therein;

FIGS. 4 and 5 are elevations of the locking mechanism of the structure of FIGS. 1 to 3 in two different operating positions;

FIG. 6 is a diagrammatic isometric view of the same locking mechanism as shown in FIGS. 4 and 5;

FIG. 7 is an isometric view of the subtracting totalizer forming an integral part of the structure shown in the other figures and of parts associated with the subtracting totalizer.

Referring now to the drawings, and more particularly to FIGS. 1 to 3, inclusive, reference numeral **11** has been applied to indicate a housing which encloses the meter mechanism, and which is provided with three number discs **12, 13** and **14** on the outside thereof. Each of the three number discs **12, 13, 14** is mounted on a hollow shaft on which one of the three spur gears **15** is mounted (FIG. 2). Shaft **16** supports a printing cylinder **17** projecting through an aperture **18** in the bottom of housing or casing **11**. An imprint can be made by printing cylinder **17** on letters, or on other mail, by rolling the printing cylinder over the surface of the letter, or other mail, upon which it is intended to print. The printing cylinder **17** is provided with internal type wheels (not shown) of which each is coupled by means of a hollow shaft to one of the three spur gears **19** mounted on shaft **16**, adapted to mesh with spur gears **15**. Shaft **20** fixedly supports three control gears **21, 22, 23** of which each comprises a plurality of adjustable teeth. Spur gear **24** fixedly mounted on shaft **20** is in permanent engagement with spur gear **25** mounted on shaft **16**. Therefore control gears **21, 22, 23** are caused to rotate simultaneously with printing cylinder **17**. The mechanisms for adjusting the adjustable teeth of control gears **21, 22, 23** are coupled by means of hollow shafts with three spur gears **26** adjustably mounted on shaft **20**. Spur gears **26** may be adjusted by means of spur gears **19** with which they mesh. As mentioned above, spur gears **19** are adapted to mesh with spur gears **15** under the control of number discs **12, 13, 14**. When spur gears **15** are in meshing engagement with spur gears **19**, rotation of discs **12, 13, 14** results in an adjustment of the type wheels

in the printing cylinder 17 as well as in an adjustment of the teeth of the control gears 21, 22, 23.

The postage meter further comprises an adding totalizer 30—which does not need to be described in detail—and a subtracting totalizer which will be described below. The operating gears of both said totalizers are arranged in the paths of the teeth of the adjustable control gears 21, 22, 23. The operating gears 31 of the subtracting totalizer are mounted on an auxiliary shaft 32 and fixedly coupled with gears 33 by means of hollow shafts. The additional auxiliary shaft 35 arranged parallel to shafts 32 and 34 supports transmission gears 36 meshing with gears 37 mounted on shaft 38. Each gear 37 is coupled with one of the number wheels 39 (shown in FIG. 2) of which but one has been shown in FIG. 7. The three number wheels 39 indicate the lowest digits of the subtracting totalizer. The number wheels of the subtracting totalizer may be viewed through a window 40 in the cover of housing or casing 11, and similarly the number wheels of the adding totalizer may be viewed through a window 41. Hence both totalizers may be checked while housing or casing 11 is closed. Shaft 38 of the subtracting totalizer supports two additional sets of number wheels and associated mechanisms generally indicated by numeral 42 in FIG. 7, but omitted in other figures. The number wheel 47 of each of said sets is associated wih a gear 43 for stepping it foreward one step when the number wheel for the next lower digit has made a complete revolution. In addition thereto each number wheel 47 is associated with a latch or ratchet wheel 44, a cam 45, an adjusting wheel 46, and a switch wheel 48. Switch wheels 48 are each provided with two pins 49 adapted to once engage pinions 50 at each revolution of switch wheels 48. The number ten transfer pinions 50 or, in other words, the pinions 50 of the transfer mechanism between digit units of the subtracting totalizer, are loosely mounted on a shaft or sipndle 51 supported by a frame 52. This applies, however, only to the three uppermost digits of the subtracting totalizer. Frame 52 is, in turn, pivotally mounted on pins 53. Frame 52 is provided with an arm or projection 54 cooperating with a lever 55. Lever 55 is pivotally supported adjacent the center thereof and has two arms to one of which helical overcenter spring 56 is attached. Frame 52 is adapted to be rocked from one to another of two limit positions thereof. Lever 55 and over-center spring 56 are arranged in such a way as to bias frame 53 to one of its aforementioned limit positions. In the position of parts shown in FIG. 7 the number ten transmission pinions 50 mesh with toothed gears 43. In the other of the two positions of frame 52 the shaft or spindle 51 of pinions 50 is spaced farther apart from shaft or spindle 38 of sets 42 and, therefore, toothed gears 43 and pinions 50 are out of meshing engagement. Sets 42 are adapted to be rotated individually relative to shaft or spindle 38. Shaft 53 supports tiltable pawls 57. Each pawl 57 is acted upon by a spring 58 tending to move the free end of the respective pawl into engagement with one of the ratchet wheels 44. In the position of the mechanism shown in FIG. 7 the arm or projection of pawl 57 to which spring 58 is attached abuts against shaft 51 supporting pinions 50; hence pawls 57 are out of engagement with ratchet wheels 44. Upon pivoting of frame 52 pawls 57 are not being held any longer in the position shown in FIG. 7, and hence pawls 57 can and will engage ratchet wheels 44.

The above referred-to subtracting totalizer has six digits, i.e. it may be set to indicate $9990.00. The number wheels 39 of the three lowest digits shown in FIG. 2 are in direct meshing engagement with the corresponding gears 33. Hence parts 39 and 33 are operated only when control gears 21, 22, 23 are operated, the former being operated in accordance with the positions of the adjustable teeth on the latter which, in turn, depend upon the monetary amount selected. The number wheels 47 of the three upper digits shown in FIG. 7 are adapted to be adjusted manually. To this end lever 73 is adapted to move the transmission or stepping pinions out of engagement with the gears of number wheels 47. The adjustment of number wheels 47 determines the sum total of the monetary amounts which the apparatus is permitted to stamp. When the three number wheels 47 of the upper digits assume their zero positions, then each sensing lever 60 drops into the recess provided in its cooperating cam 45, thus rendering the apparatus inoperative.

Each cam 45 of the subtracting totalizer is associated with a sensing lever 60. The three levers 60 are fixedly mounted on shaft or spindle 61 supporting, in addition thereto, the two-armed auxiliary lever 62. (FIGS. 4 and 5 show levers 60, 62 integrated into one single part whereas FIGS. 2 and 6 show levers 60 and 62 to be separate.) Spring 63 attached to the relatively longer arm of two-armed lever 62 tends to rock shaft 61 in clockwise direction, as seen in FIG. 7, and hence to cause positive engagement of levers 60 with cams 45. The relatively short arm of lever 62 supports a roller 64 engaging a cam 65 mounted on shaft 20 of the control gears 21, 22, 23. Cam 65 determines the exact point of time when sensing levers 60 engage cams 45 during a revolution of control gears 21, 22, 23. Shaft or spindle 61 supports also a two-armed lever 66 loosely mounted thereon, and acted upon by spring 67. The relatively long arm of lever 66 is acted upon by rocking structure 69 under the control of a projection 70 of arm 54 of frame 52. Spring 67 causes the lower end of lever 66 to continually engage rocking structure 69. Upon rocking of frame 52 projection 70 of arm 54 tilts the rocking structure 69 which, in turn, tilts the two armed lever 66 against the bias of spring 67. The upper arm of lever 66 supports a male latch member or meter lockout latch 71 adapted to enter a recess or latch-receiving groove 72' in a latch disc or latch cam 72 mounted upon shaft 20. When the postage meter is at rest, latch-receiving groove 72' in disc 72 and male latch member 71 are in registry. If male latch member 71 enters the latch receiving groove 72', the postage meter is locked out and cannot be operated. The postage meter is locked out and cannot be operated as long as frame 52, supporting pinions 50, is tilted, so that pinions 50 do not mesh with spur gears 43, in which position the meter may be adjusted or pre-set for dispensing imprints up to any predetermined monetary amount. Arm 73 of tiltable frame 52 projects through an opening or slot 74 of wall 75 of the mounting frame, or chassis, in which the shafts or spindles of the postage meter are mounted. The outer or free end of arm 73 is provided with a handle 76, for tilting frame 52 about the supporting pins 53 thereof. In the rest position of arm 73, when the postage meter is ready to be operated, arm 73 is held in position by a manually operable latch 77. Latch 77 is supported by shaft 78 mounted in chassis wall 75 and acted upon by biasing spring 79. Crank 80 mounted on shaft 78 makes it possible to move latch 77 out of the path of movement of arm 73.

Wall 75 of the chassis is covered by a hood 81. Hood 81 is hingedly mounted on housing 11 at 81' and can be locked in closed position by means of lock 82 (see FIGS. 2 and 3). Hood 81 is provided with a bracket 83 on the inside thereof which bracket forms part of an interlock for crank 80. Hood 81 can only be closed when crank 80 is in the position shown in FIG. 7, in which lever 73 is latched in position, and the postage meter is ready to be operated.

If the meter is to be adjusted to perform stamping operations for a given aggregate amount of postage, this calls for an adjustment or pre-setting of the subtracting totalizer. Such adjustment or pre-setting can only be effected upon removal of hood 81 by the postal authorities.

The chassis-wall 75 covered by hood 81 is provided with slots or apertures 84 (FIG. 3) giving access to wheels 46 of the counting mechanisms of the three highest digits of the subtracting totalizer. Upon removal of hood

81, removal of manually operable latch 77 by operation of crank 80, and of tilting of frame 52 by depressing handle 76 the adjusting or pre-setting wheels 46 of the subtracting totalizer may be adjusted by the postal authorities for a given aggregate monetary amount to be subsequently used up in performing imprinting operations. During the time the subtracting totalizer is undergoing manual adjustment, the meter is locked out by male latch member or meter lock-out latch 71 engaging the latch receiving groove 72' in latch disc 72. Upon adjustment or pre-setting of the subtracting totalizer for an aggregate amount of stamping or imprinting operations, frame 52 must be returned or tilted to its initial position shown. Arm 73 of frame 52 is then latched in position by manually operable latch 77. Then, and only then, is it possible to reclose hood 81 and to operate the postage meter.

Referring now more particularly to FIG. 6, reference numeral 90 has been applied to indicate a hook of a lock-out mechanism for locking the postage meter upon any operation thereof. Hook 90 is adapted to engage a semi-circular groove 91 provided in toothed wheel 25 mounted upon shaft 16 of printing cylinder 17. Hook 90 is formed by the hooked end of a latch lever 93 pivotally mounted upon pin 92 and under the bias of spring 105 tending to move lever 93 clockwise as seen in FIG. 6 to the latching position thereof. The arm of lever 93 situated above pin 92 is arranged in the path of disc 94 mounted on shaft or spindle 95 of push button 96. The upper arm of latch lever 93 is provided with a hook-shaped lateral projection 97 arranged in the path of motion of a lever 98 loosely mounted upon shaft or spindle 95 of bush button 96. Lever 98 is coupled with disc 94 by a pair of pins 99 for causing joint rotation of both parts. Helical spring 100 is mounted on shaft or spindle 95 between lever 98 and disc 94, and tends to push button 96 axially outwardly, i.e. out of the plane of FIG. 6. Push button 96 is depressed or pushed axially inwardly against the bias of spring 100, whenever it is intended to operate the postage meter. This causes disc 94 engaging lever 93 to pivot lever 93 about pivot 92, which causes hook 90 to move out of groove 91 of toothed wheel 25. The aforementioned pivotal movement of lever 93 also causes projection 97 thereof to move out of engagement with lever 98. Consequently lever 98 is free to be rocked a certain distance under the action of spring 101 which is attached to it. As a result lever 98 enters into hook 97 formed by lever 93. This, in turn, causes lever 93 to be held out of engagement with groove 91, whether or not pressure upon push button 96 is maintained. The postage meter can now be used to make one impression. As the printing cylinder 17 is rolled over a letter, or like matter, to be imprinted, shaft 20 and control gears 21, 22, 23 are rotated by the intermediary of gears 25 and 24. It will be apparent from the foregoing that parts 98, 97 are latch means controlling the lock-out mechanism 91, 90, 93, 92 for printing cylinder 17. Gear 24 is provided with a pin 102. Operating lever 104 pivotally mounted on pin 103 is arranged in the path of movement of pin 102. During the later portion of a revolution of shaft 20, pin 192 abuts against lever 104, causing a pivotal or rocking movement thereof. As a result of this pivotal or rocking movement, one arm of bell crank shaped lever 104 abuts against lever 98, causing pivotal movement thereof against the bias of spring 101. This, in turn, causes lever 98 to release hook-shaped projection 97 of latch lever 93, thus allowing hook 90 to enter groove 91 of toothed wheel 25 under the bias of spring 105. The presence of pins 99 causes disc 94 to be moved jointly with lever 98 when the latter is moved by means of operating lever 104. Disc 94 is provided with a cut-out or groove 106 which is moved to a position of registry with the upper end of lever 93 when lever 98 and disc 94 are jointly moved by lever 104. In that registry position push button 96 cannot operate lever 93 since the upper end of lever 93 slides through the cut-out or groove 106 in disc 94. Pin 102 of toothed wheel 24 moves out of engagement with lever 104 upon a rotary movement of shaft 20 of about 335 deg. The spatial arrangement of the driving gears 31 of the subtracting totalizer in regard to the control gears 21, 22, 23 results in that the subtracting totalizer may be operated until after shaft 20 has been turned approximately 350 deg. Hence it is then, and only then, possible to ascertain definitely, or finally, by means of cams 45, and sensing levers 60, whether or not the aggregate monetary amount for which the postage meter has been initially set, or pre-set, has been used up. It is, therefore, necessary to maintain lever 98 in the tilted position—i.e. in the position precluding operation of latch lever 93 by push button 96—up to that point of time. To achieve this end lever 104 is provided with a lateral extension or projection 107 (FIGS. 6 and 7) of which one end is arranged immediately adjacent to two-armed abutment lever 62 and immediately adjacent to additional abutment lever 108 mounted on pin 109 and engaging operating cam 110 supported by shaft 20. Cam 110 is shaped substantially spirally in such a way as to lift lever 108 during the rotary motion of shaft 20, causing one end thereof to move under projection 107 of lever 104, retaining the latter in the aforementioned tilted or second limit position thereof, even after pin 102 is disengaged from lever 104 (see particularly FIG. 5). Only when shaft 20 is about to complete one revolution, say after a rotary motion thereof in the order of 358 deg., is lever 108 allowed by cam 110 to drop down under the bias of spring 200, thus moving out of the path of projection 107 of lever 104. Lever 104 returns to its initial first limit position shown in FIG. 4 in case that the aggregate monetary amount for which the postage meter has been pre-set has not been used up. If this amount has been used up or fully spent, then all sensing levers 60 drop into their cooperating recesses in cams 45, causing shaft 61 and two-armed abutment lever 62 to be rocked. This rocking motion of lever 62 brings one end of abutment lever 62 into the path of projection 107 of lever 104, precluding the latter from moving to the initial position thereof (FIG. 3). Hence lever 98 is maintained in its tilted position by lever 104, i.e. in the position wherein the cut-out or V-groove 106 in disc 94 is in registry with the upper end of lever 93, making it impossible to operate parts 93, 94 by push button 96; therefore, the postage meter cannot be operated.

In order to pre-set the postage meter again for a given monetary amount, hood 81 is removed from the meter, whereby access is obtained to handle 76. Downward pressure upon handle 76 causes a rocking motion of lever 66 about shaft 61 by the intermediary of rocking part 69. As a result latch 71 on lever 66 engages, or enters into, its cooperating latching groove 72' in cam 72 (FIG. 7). The upper end of lever 66 is adapted to engage lever 104 when the former is operated by the downward motion of handle 76. Then lever 66 engages lever 104, and operates as a prop maintaining the latter in the tilted position thereof. Hence push button 96 cannot be operated, and cannot operate the latching lever 93, irrespective of whether or not projection 107 of lever 104 is propped-up by abutment lever 62. This mode of interlocking the postage meter is necessary because operation of the subtracting totalizer for presetting the same for a given monetary amount results in lifting of sensing levers 60 by cams 45, and consequent movement of the latching end of lever 62 out of the path of movement of projection 107 on lever 104. If levers 104 and 98 were not controlled, as set forth above, by the upper end of lever 66, thereby precluding operation of push button 96 and operation of the postage meter, the meter could be used improperly by rendering it temporarily operative during the process of pre-setting the subtracting totalizer, i.e. the meter could be operated without establishing a permanent record in the counting mechanism of the subtracting totalizer of the imprints then made.

The end of auxiliary lever **66** situated behind shaft **61** (as seen in FIG. 7) forms an abutment adapted to engage operating lever **104** or to be out of engagement from operating lever **104**. If pre-setting lever **73** is in its active position one end of auxiliary lever **66** engages operating lever **104**, thus blocking the latter. When pre-setting lever **73** is moved to the inactive position thereof the abutting end of auxiliary lever **66** is disengaged from operating lever **104** and thus frees the latter.

Some elements of the structure embodying the invention as, for instance, the printing cylinder **17** and its associated printing means, and also the structural details of the control gears **21, 22, 23** have been disclosed but summarily in the foregoing. These details are not needed for a full understanding of the present invention and, besides, reference may be had to the aforementioned United States Patent 2,187,456 for a complete disclosure thereof.

It will be understood that the main problem in regard to avoiding misuse of postage meters arises out of the fact that the meters are provided with a subtracting totalizer (or integrating device) which is directly operated by the adjustable control gears **21, 22, 23** rather than by the intermediary of an adding totalizer, and out of the fact that in such meters the control gears **21, 22, 23** perform one revolution concomitant with each imprinting operation, and that near to the end of such revolution the manual operating member or push button **96** is readied to allow another unlatching operation and another imprinting operation. Lever **108** maintains member **98** in the locking or unblocking position thereof wherein manual operation of parts **96** and **93** is precluded until mechanism **45, 60, 61, 62** establishes a permanent lock-out of the meter subsequent to exhaustion of the aggregate monetary amount for which the postage meter has been pre-set.

At each operating or duty cycle of the device the adjustable control gears **21, 22, 23** and cam **110** mounted on the same shaft perform one complete revolution, i.e. rotate 360 deg. Lever **108** cooperating with cam **110** may enter the recess provided in that cam only when the aforementioned revolution is almost completed. Lever **108** enters the recess provided in cam **110** when the latter has turned about 350 deg. As long as lever **108** is in the raised position thereof, the end of lever **108** remote from pivot **109** projects into the path of projection **107** on lever **104**, maintaining the latter in its tilted position, wherein push button **96** is precluded from operating lever **93**. The gears of the adding totalizer and of the subtracting totalizer are turned during the first 300 deg. of a revolution of the adjustable control gears **21, 22, 23** and of cam **110**. If, upon completion of that motion, one of the three upper digit number wheels **47** of the subtracting totalizer remains in a position higher than the zero position thereof, this precludes sensing levers **60** from engaging the recesses in cams **45** since, under such circumstances, the recesses in cams **45** are out of registry, or out of alignment. Upon completion of a rotation of about 350 deg. of cam **110** lever **108** may move to the lower position thereof, thus no longer obstructing lever **104** and lever **98**. This occurs, for instance, when the subtracting totalizer still indicates the amount of $20.00.

As mentioned above, the end of lever **108** remote from pivot pin **109** extends into the trajectory of projection **107** of lever **104** as long as lever **108** is maintained in the raised position by means of cam **110**. This causes lever **104** to be maintained in its shifted position. Lever **104**, in turn, maintains lever **98**, and hence also disc **94**, in their shifted positions. Therefore push-button **96** is precluded from acting upon lever **93**. These conditions obtain during the first 350 deg. of the revolution of the mechanism. Only thereafter is lever **108** allowed to enter the recess in cam **110**, thereby moving out of the trajectory of projection **107** of lever **104**, and thus unlatching or releasing the latter.

Thereupon lever **104**, and also lever **98**—which is under the former's control—may or may not be allowed to be shifted by spring **101** to the initial position thereof depending upon whether the sensing levers **60** of the subtracting totalizer are still maintained on the outer surfaces of, or have entered the recesses in, cams **45**. In case that the ends of sensing levers **60** are allowed to enter the recesses in cams **45**, lever **62** is simultaneously rocked by the action of spring **63** in such a way that the end of lever **62** remote from shaft **61** is moved into its latching position, i.e. into the path of projection **107** of lever **104**, thus maintaining both levers **104** and **98** in their shifted positions. Because lever **62** is adapted to abut against projection **107**, lever **62** may be referred to as abutment lever.

It will also be understood that upper part of lever **66** and member **98** form an additional or separate interlock precluding fraudulent use or misuse of the meter.

Assuming that lever **73** is operated manually and the subtracting totalizer readjusted, causing sensing levers **60** to be moved out of their interlocking positions, and further assuming that the subtracting totalizer is thereafter returned to its initial position, under such circumstances sensing levers **60** could not return to their initial latching or interlocking positions if, in the meantime, member **98** had returned to inactive or unlatching position. Such a fraudulent manipulation would enable to manually operate parts **96** and **93**, and to perform any number of fraudulent imprints. Tampering of the meter in the aforementioned way is, however, positively precluded by virtue of interlock **66, 98**.

It will be understood that we have illustrated and described herein a preferred embodiment only of our invention, and that various alterations may be made in the details thereof without departing from the spirit and scope of our invention as defined in the appended claims.

We claim:

1. In an apparatus for printing monetary amounts the combination of a printing cylinder adapted to perform repetitive printing cycles; a lock-out mechanism for said printing cylinder adapted to release said printing cylinder for the duration of one of said printing cycles at a time and to become effective at the end of each consecutive of said printing cycles; manually operable means for moving said lock-out mechanism to an ineffective position thereof after completion of one printing cycle to allow initiation of a consecutive printing cycle; control gears adjustable for predetermined monetary amounts; mechanical means operated by said control gears for controlling said lock-out mechanism, said mechanical means including an operating lever having a first limit position allowing said manually operable means to move said lock-out mechanism to said ineffective position thereof and a second limit position precluding said manually operable means from moving said lock-out mechanism to said ineffective position thereof; a subtracting totalizer adapted to be pre-set for a predetermined total of permissible imprints operated by said control gears; means under the control of said totalizer responsive to said total of permissible imprints for maintaining said operating lever in said second limit position thereof upon response of said totalizer-controlled means; an operating cam jointly movable with said control gears; and an abutment lever controlled by said cam to maintain said operating lever in said second limit position thereof up to a point of time shortly preceding termination of one of said printing cycles by said printing cylinder.

2. An apparatus as specified in claim 1 wherein said operating cam is substantially spirally shaped in such a way as to maintain said operating lever in said second limit position thereof until after a rotation of said cam in excess of 350 degrees.

3. In an apparatus for printing monetary amounts the combination of printing means; a lock-out mechanism having a lock-out position precluding operation of said printing means; latch means controlling said lock-out mechanism and having a disengaged position allowing said lock-out mechanism to assume said lock-out position

and an engaged position precluding said lock-out mechanism from assuming said lock-out position; manually operable means to render said lock-out means inoperative to allow operation of said printing means; control gears adjustable for predetermined monetary amounts; an operating lever for said latch means operated by said control gears, said operating lever having a first limit position allowing said latch means to remain in said engaged position thereof and a second limit position causing movement of said latch means to said disengaged position thereof; means operatively related to said latch means precluding said manually operable means from rendering said lock-out means inoperative when said operating lever is in said limit position thereof; a subtracting totalizer adapted to be pre-set for a predetermined total of permissible imprints of monetary amounts operated by said control gears; sensing means under the control of said totalizer responsive to said total of permissible imprints; a first abutment lever operated by said sensing means to maintain said operating lever in said second limit position thereof upon response of said sensing means to said total of permissible imprints of monetary amounts; a second abutment lever for maintaining said operating lever in said second limit position thereof, and an operating cam for said second abutment lever jointly rotatable with said control gears allowing said second abutment lever to release said operating lever only upon completion of the operation of said totalizer by said control gears.

4. In an apparatus for printing monetary amounts the combination of a printing cylinder adapted to perform repetitive printing cycles; a lock-out mechanism for said printing cylinder adapted to release said printing cylinder for the duration of one of said printing cycles at a time and to become effective at the end of each consecutive of said printing cycles; manually operable means for moving said lock-out mechanism to an ineffective position thereof after completion of one printing cycle to allow initiation of a consecutive printing cycle; control gears adjustable for predetermined monetary amounts; mechanical means operated by said control gears for controlling said lock-out mechanism, said mechanical means including an operating lever having a first limit position allowing said manually operable means to move said lock-out mechanism to said ineffective position thereof and a second limit position precluding said manually operable means from moving said lock-out mechanism to said ineffective position thereof; a subtracting totalizer adapted to be pre-set for a predetermined total of permissible imprints operated by said control gears; means under the control of said totalizer responsive to said total of permissible imprints for maintaining said operating lever in said second limit position thereof upon response of said totalizer-controlled means; an operating cam jointly movable with said control gears; an abutment lever controlled by said cam to maintain said operating lever in said second limit position thereof up to a point of time shortly preceding termination of one of said printing cycles by said printing cylinder; a manually operable pivotally mounted pre-setting lever having an active position allowing pre-setting of said subtracting totalizer and an inactive position precluding pre-setting of said subtracting totalizer; a pinion support forming an integral part of said pre-setting lever; pinions for the transfer mechanism between digit units of said subtracting totalizer supported by said pinion support; a rocking lever; an over-center spring for said rocking lever; and said rocking lever cooperatively engaging said pre-setting lever to bias said pre-setting lever from an intermediate position thereof to said active position thereof and to said inactive position thereof.

5. In an apparatus for printing monetary amounts the combination of printing means; a lock-out mechanism having a lock-out position precluding operation of said printing means; latch means controlling said lock-out mechanism and having a disengaged position allowing said lock-out mechanism to assume said lock-out position and an engaged position precluding said lock-out mechansim from assuming said lock-out position; manually operable means to render said lock-out means inoperative to allow operation of said printing means; control gears adjustable for predetermined monetary amounts; an operating lever for said latch means operated by said control gears, said operating lever having a first limit position allowing said latch means to remain in said engaged position thereof and a second limit position causing movement of said latch means to said disengaged position thereof; means operatively related to said latch means precluding said manually operable means from rendering said lock-out means inoperative when said operating lever is in said limit position thereof; a subtracting totalizer adapted to be pre-set for a predetermined total of permissible imprints of monetary amounts operated by said control gears; sensing means under the control of said totalizer responsive to said total of permissible imprints; a first abutment lever operated by said sensing means to maintain said operating lever in said second limit position thereof upon response of said sensing means to said total of permissible imprints of monetary amounts; a second abutment lever for maintaining said operating lever in said second limit position thereof, an operating cam for said second abutment lever jointly rotatable with said control gears allowing said second abutment lever to release said operating lever only upon completion of the operation of said totalizer by said control gears; a manually operable pre-setting lever having an active position allowing pre-setting of said subtracting totalizer and an inactive position precluding pre-setting of said totalizer; an auxiliary lever; a male latch member on said auxiliary lever; a latch cam coaxial to and coupled with said control gears; a recess defined by said latch cam adapted to receive said male latch member; and mechanical means under the control of said pre-setting lever controlling the position of said auxiliary lever to cause said male latch member to rest in said recess as long as said pre-setting lever is in said active position thereof.

6. In an apparatus for printing monetary amounts the combination of printing means; a lock-nut mechanism having a lock-out position precluding operation of said printing means; latch means controlling said lock-out mechanism and having a disengaged position allowing said lock-out mechanism to assume said lock-out position and an engaged position precluding said lock-out mechanism from assuming said lock-out position; manually operable means to render said lock-out means inoperative to allow operation of said printing means; control gears adjustable for predetermined monetary amounts; an operating lever for said latch means operated by said control gears, said operating lever having a first limit position allowing said latch means to remain in said engaged position thereof and a second limit position causing movement of said latch means to said disengaged position thereof; means operatively related to said latch means precluding said manually operable means from rendering said lock-out means inoperative when said operating lever is in said limit position thereof; a subtracting totalizer adapted to be pre-set for a predetermined total of permissible imprints of monetary amounts operated by said control gears; sensing means under the control of said totalizer responsive to said total of permissible imprints; a first abutment lever operated by said sensing means to maintain said operating lever in said second limit position thereof upon response of said sensing means to said total of permissible imprints of monetary amounts; a second abutment lever for maintaining said operating lever in said second limit position thereof, an operating cam for said second abutment lever jointly rotatable with said control gears allowing said second abutment lever to release said operating lever only

upon completion of the operation of said totalizer by said control gears; a manually operable pre-setting lever having an active position allowing pre-setting of said subtracting totalizer and an inactive position precluding pre-setting of said totalizer; a movable auxiliary lever having an abutment end adapted to engage said operating lever; and mechanical means under the control of said pre-setting lever controlling the position of said auxiliary lever to cause said abutment end thereof to maintain said operating lever in said second limit position thereof as long as said pre-setting lever is in said active position thereof.

7. In an apparatus for printing monetary amounts the combination of printing means; a lock-out mechanism having a lock-out position precluding operation of said printing means; latch means controlling said lock-out mechanism and having a disengaged position allowing said lock-out mechanism to assume said lock-out position and an engaged position precluding said lock-out mechanism from assuming said lock-out position; manually operable means to render said lock-out means inoperative to allow operation of said printing means; control gears adjustable for predetermined monetary amounts; an operating lever for said latch means operated by said control gears, said operating lever having a first limit position allowing said latch means to remain in said engaged position thereof and a second limit position causing movement of said latch means to said disengaged position thereof; means operatively related to said latch means precluding said manually operable means from rendering said lock-out means inoperative when said operating lever is in said limit position thereof; a subtracting totalizer adapted to be pre-set for a predetermined total of permissible imprints of monetary amounts operated by said control gears; sensing means under the control of said totalizer responsive to said total of permissible imprints; a first abutment lever operated by said sensing means to maintain said operating lever in said second limit position thereof upon response of said sensing means to said total of permissible imprints of monetary amounts; a second abutment lever for maintaining said operating lever in said second limit position thereof; an operating cam for said second abutment lever jointly rotatable with said control gears allowing said second abutment lever to release said operating lever only upon completion of the operation of said totalizer by said control gears; a manually operable pre-setting lever having an active position allowing pre-setting of said totalizer and in inactive position precluding pre-setting of said totalizer; a movable auxiliary lever having an abutment end adapted to engage said operating lever; a male latch member on said auxiliary lever; a latch cam coaxial to and coupled with said control gears; a recess defined by said latch cam adapted to receive said male latch member; and mechanical means under the control of said pre-setting lever controlling the position of said auxiliary lever to cause said abutment end thereof to maintain said operating lever in said second limit position thereof and to cause said male latch member to engage said recess as long as said pre-setting lever is in said active position thereof.

8. In an apparatus for printing monetary amounts the combination of a rotatable printing cylinder; a lock-out mechanism having a lock-out position precluding rotation of said cylinder; latch means controlling said lock-out mechanism and having a disengaged position allowing said lock-out mechanism to assume said lock-out position and an engaged position precluding said lock-out mechanism from assuming said lock-out position; push button means to render said lock-out means inoperative to allow rotation of said cylinder; control gears adjustable for predetermined monetary amounts; an operating lever for said latch means having a first limit position allowing said latch means to remain in said engaged position and a second limit position causing movement of said latch means to said disengaged position thereof; cam means operated by said control gears operating said operating lever; means including a slotted plate operatively related to said latch means precluding said push button means from rendering said lock-out means inoperative when said operating lever is in said second limit position thereof; a substracting totalizer adapted to be preset for a pre-determined total of permissible imprints of monetary amounts operated by said control gears; a plurality of cams jointly movable with said totalizer; a plurality of sensing levers adapted to be controlled by said plurality of cams; a common shaft supporting said plurality of sensing levers; a first abutment lever mounted on said common shaft adapted to maintain said operating lever in said second limit position upon being operated by said plurality of cams, said plurality of sensing levers and said common shaft; a second abutment lever for maintaining said operating lever in said second limit position thereof; and an operating cam for said second abutment lever jointly movable with said control gears, said operating cam having a substantially spiral surface in cooperative engagement with said second abutment lever allowing said second abutment lever to release said operating lever only upon a rotary motion of said cam in exces of 350 degrees.

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