

No. 646,578.

Patented Apr. 3, 1900.

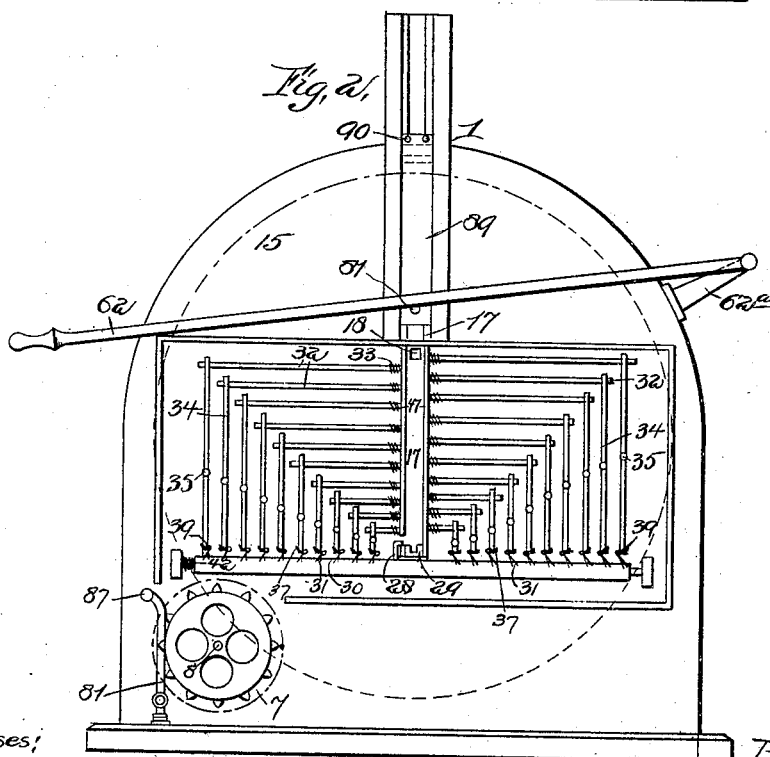
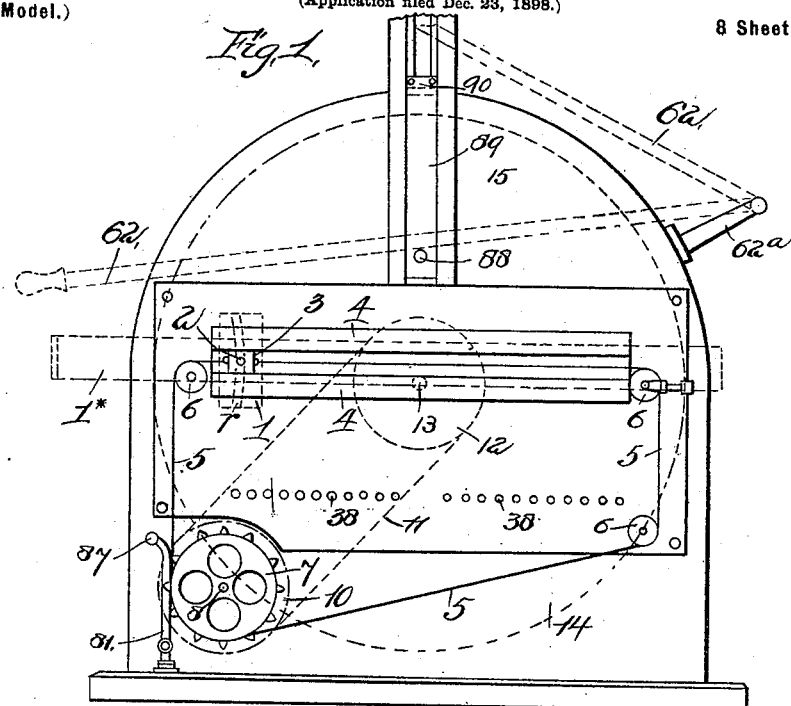
W. H. & W. L. D. GUNDRY.

**COST INDICATING, REGISTERING, AND WEIGHT TOTALING APPARATUS FOR
WEIGHING MACHINES.**

(No Model.)

(Application filed Dec. 23, 1898.)

8 Sheets—Sheet 1.



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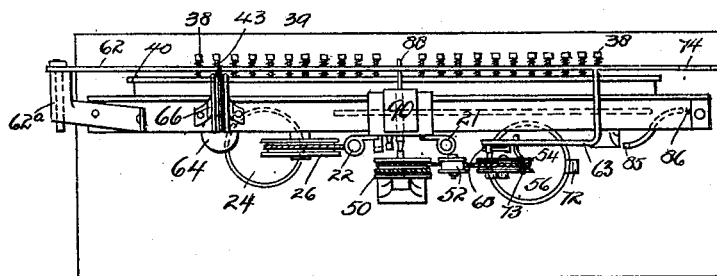
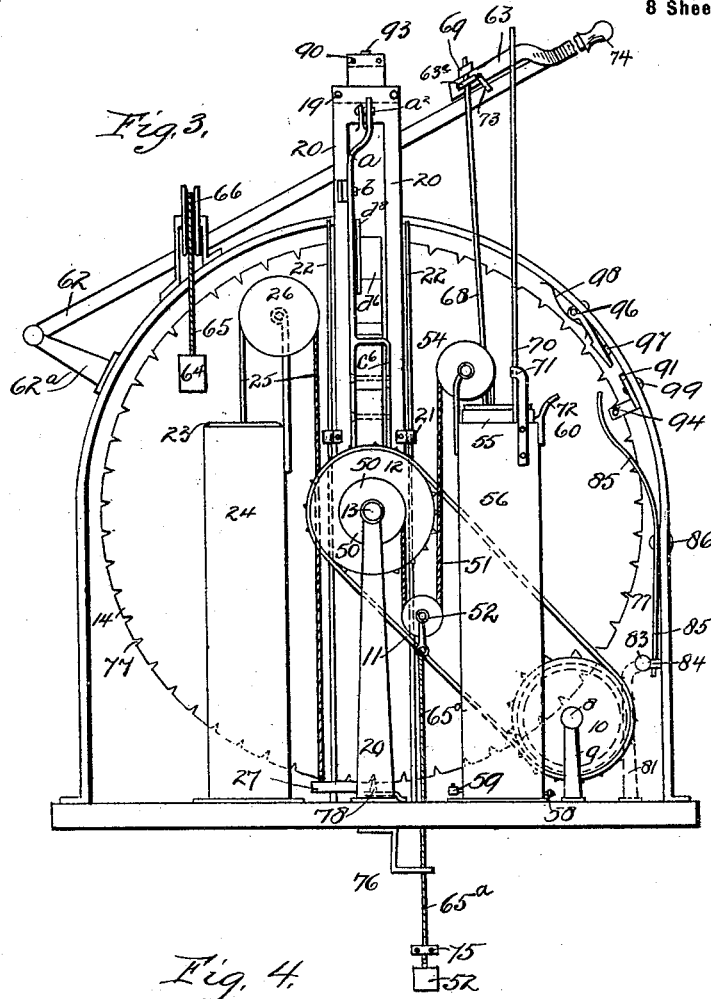
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8 Sheets—Sheet 2.



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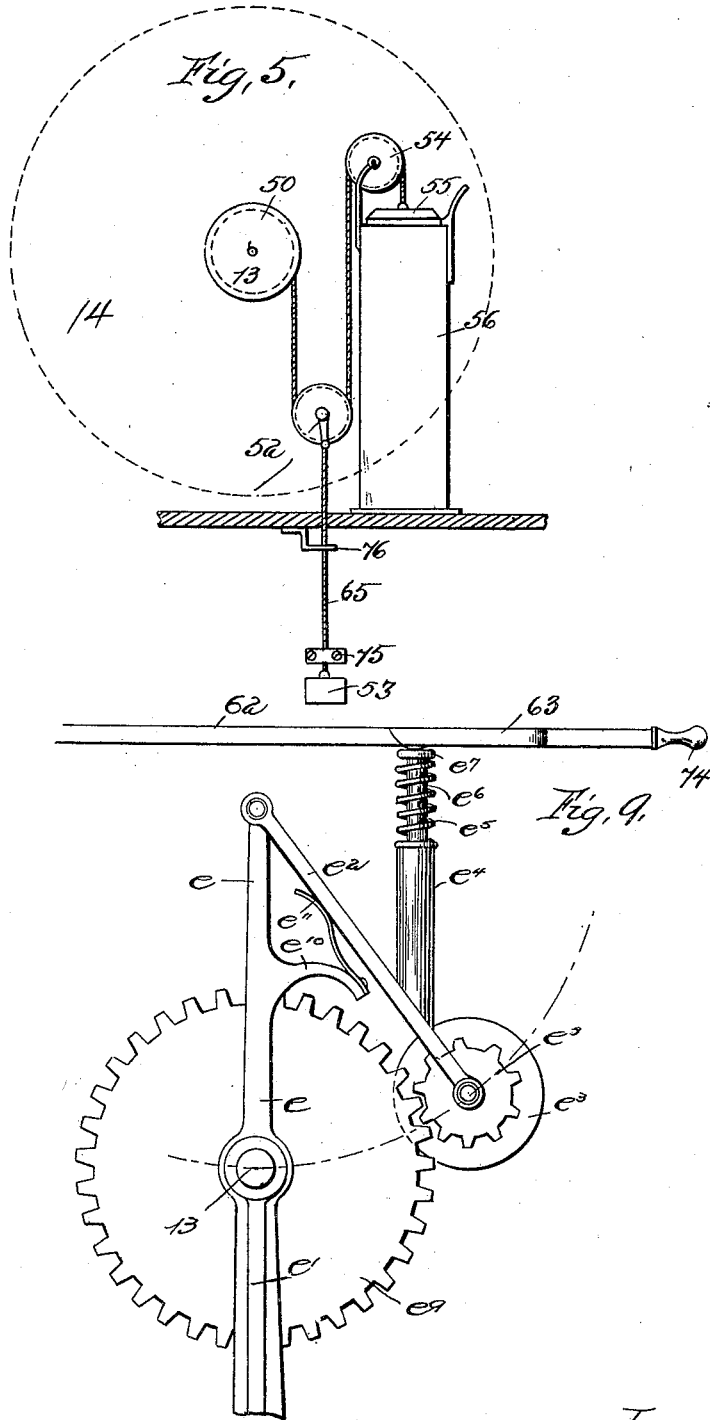
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8 Sheets—Sheet 3.



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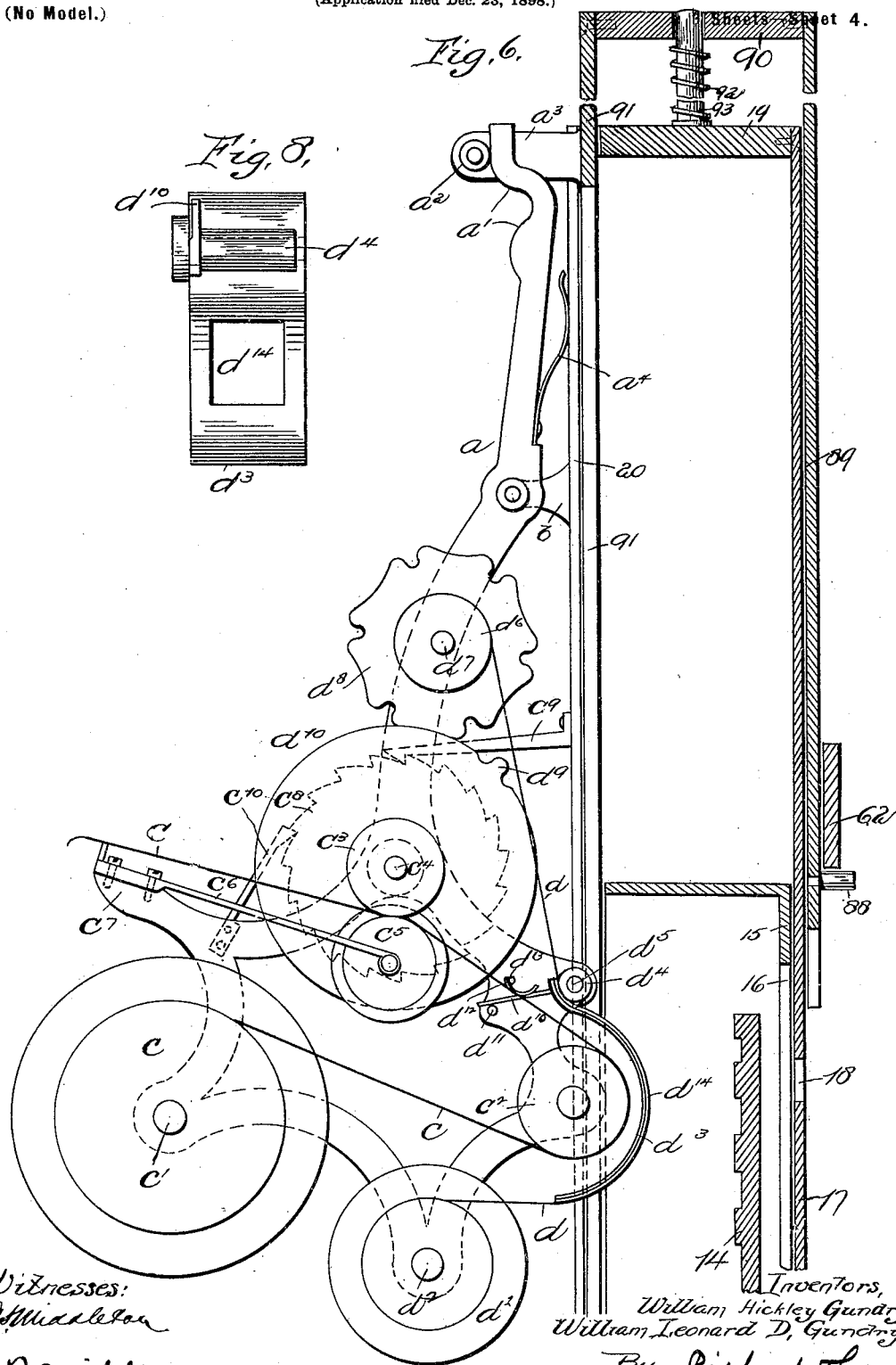
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(Application filed Dec. 23, 1898.)

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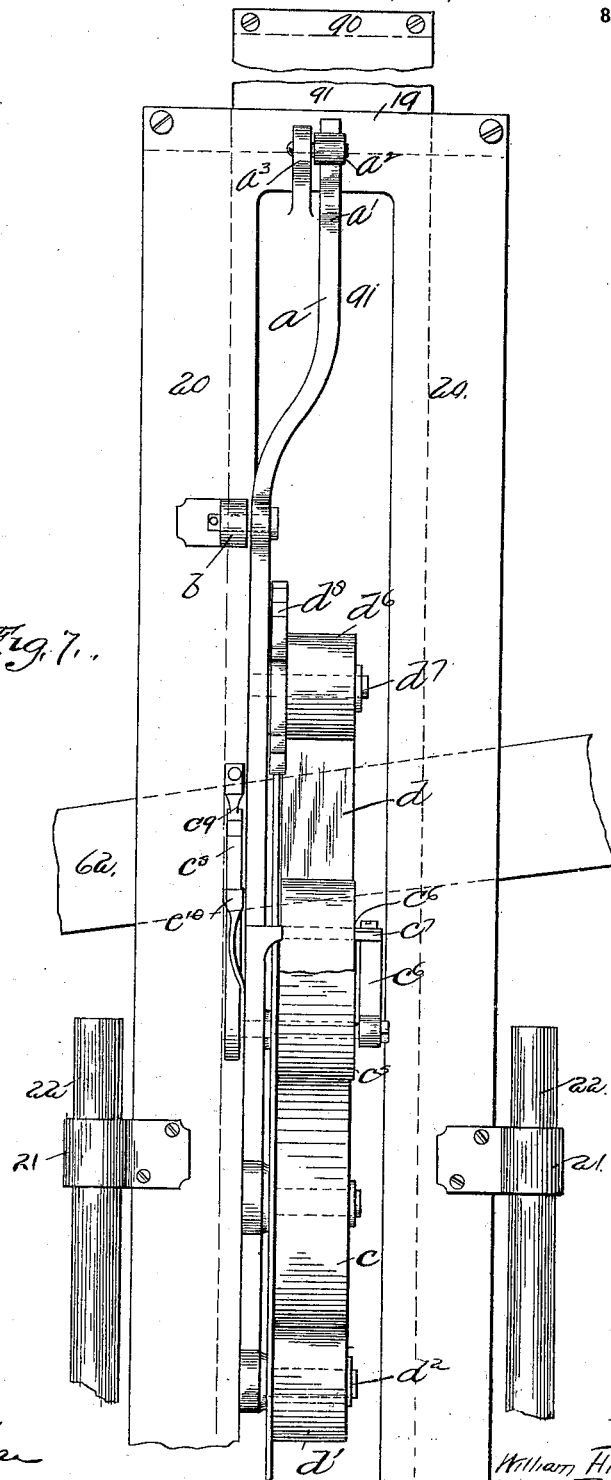
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8 Sheets—Sheet 5.

Fig. 7.



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COST INDICATING, REGISTERING, AND WEIGHT TOTALING APPARATUS FOR
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8 Sheets—Sheet 7.

Fig. 14.

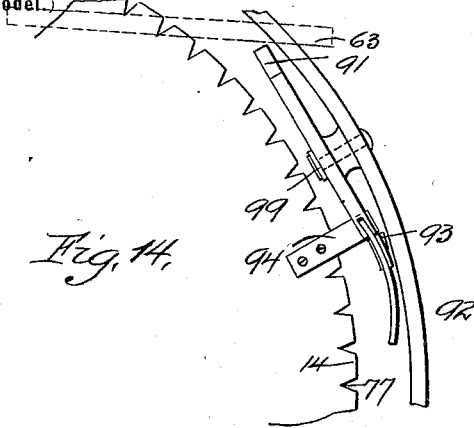


Fig. 15.

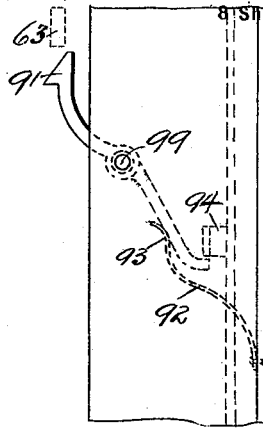


Fig. 16.

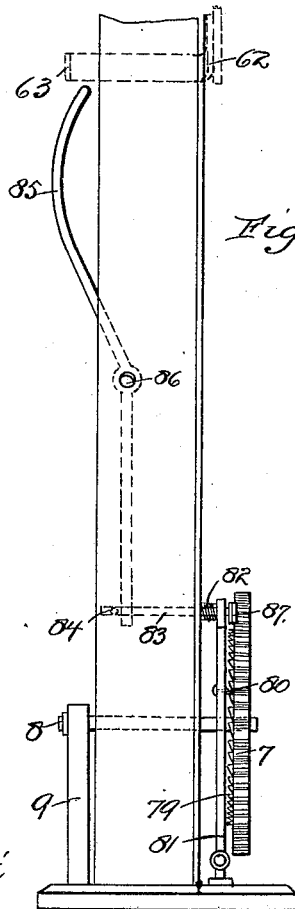
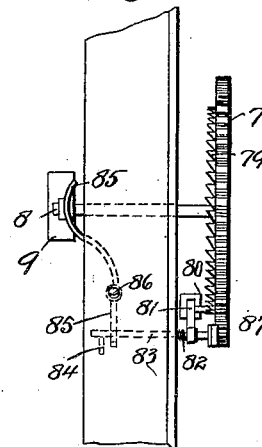


Fig. 17.



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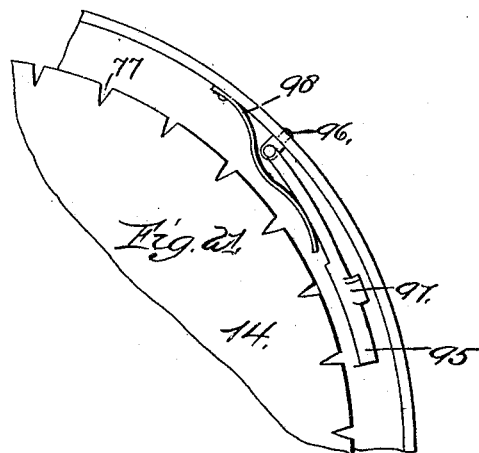
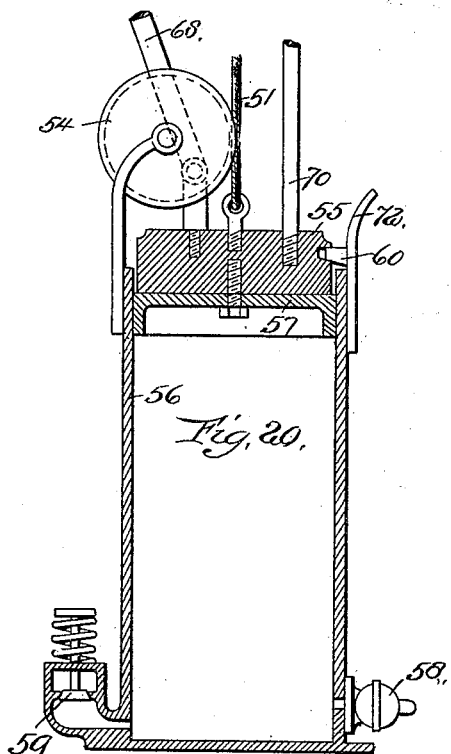
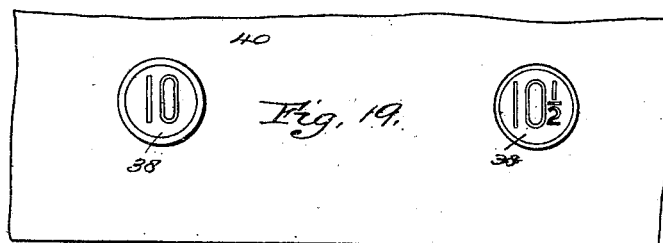
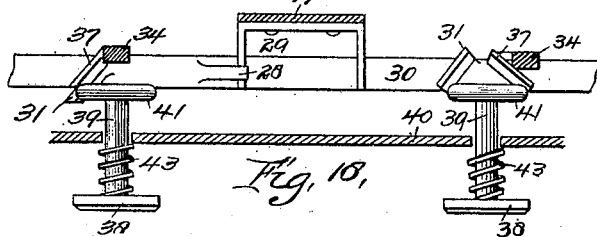
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(No Model.)

8 Sheets—Sheet 8.



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UNITED STATES PATENT OFFICE.

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OF CHRISTCHURCH, NEW ZEALAND.

COST INDICATING, REGISTERING, AND WEIGHT-TOTALING APPARATUS FOR WEIGHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 646,578, dated April 3, 1900.

Application filed December 23, 1898. Serial No. 700,156. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM HICKLEY GUNDRY and WILLIAM LEONARD DEIGHTON GUNDRY, subjects of the Queen of Great Britain, residing at 183 Hereford street, Christchurch, in the provincial district of Canterbury, New Zealand, have invented Improved Cost Indicating, Registering, and Weight-Totaling Apparatus for Employment upon Weighing-Machines, of which the following is a specification.

This invention provides apparatus for employment upon or in connection with lever-platform weighing-machines to indicate the cost of an article weighed upon the scale at any one of a number of predetermined prices per unit of weight. The cost of every article weighed is also recorded upon a traveling band of paper and totaling mechanism is actuated which indicates the total weight of articles weighed upon the machine at one or a plurality of weighings. The cost-indicating apparatus consists of a disk dial revoluble behind a fixed screen and bearing upon its face a number of radial columns of figures, the figures in each column representing the cost of articles of one weight at different prices. The dial is revolved by mechanism from the weighing-bob upon the lever-arm of the weighing-machine, and when an article is weighed the radial column of cost-markings representing the cost of articles of that weight at different prices per unit is brought into a vertical position above the axis of the dial and in line with a slot cut in the screen referred to. A cover-plate caused to slide over the vertical column of figures has an aperture through which only one cost-marking is visible at a time, and the cover-plate is held, when this aperture is in correct position, by one of a number of horizontal bolts placed one above the other, and either of which may be operated to engage a projection upon the cover-plate. In the recording mechanism the back of the dial has figure-markings in bas-relief corresponding exactly with the figures upon its face, this result being preferably obtained by stamping the figures so that they appear in recess upon the face and in relief upon the back. A traveling band of paper is pressed

by a roller against the figures at the back of the dial corresponding with those seen through the aperture in the cover-plate upon its face, the paper being marked by a carbon or ink ribbon interposed between it and the figures.

The weight-totaling mechanism consists of an ordinary counter which is driven by a spur-wheel upon the dial-axle, a toothed pinion-wheel of the counter being brought into gear with the spur-wheel after each weighing operation, as herein described.

We will more particularly describe our invention and the operation thereof by the aid of the accompanying drawings, wherein—

Figure 1 is a front elevation; Fig. 2, a similar view with part of the casing removed; Fig. 3, a rear elevation; Fig. 4, a plan; Fig. 5, a diagrammatic view of an arrangement for returning the dial to its normal position after a weighing operation. Fig. 6 is a side elevation, partly in section, and Fig. 7 a rear elevation, of the registering apparatus; Fig. 8, a rear elevation of a hinged bracket; Fig. 9, a rear elevation of the totaling apparatus, and Fig. 10 a diagrammatic elevation of a counter. Fig. 11 is a front elevation of an arrangement for locking the dial. Figs. 12 and 13 are respectively a front elevation and a sectional plan of part of the arrangement for releasing a cover-plate and arresting its motion; Figs. 14 and 15, a rear and an end elevation, respectively, of a hook for retaining the main operating-lever. Figs. 16 and 17 are an end elevation and a plan of a sprocket-wheel and ratchet-and-pawl arrangement; Figs. 18 and 19, a longitudinal section and an elevation of part of the cost-indicating mechanism; Fig. 20, a vertical section of a weighted plunger and cylinder; Fig. 21, a rear elevation of a dial-brake.

We will first describe the cost-indicating mechanism, with reference more particularly to Figs. 1 to 4, 12, 13, 18, and 19 of the drawings.

The weighing-machine weighing-bob 1 upon the lever-arm (both shown in dotted lines in Fig. 1) has a recess *r*, which is almost straight, which receives a pin 2, projecting from a slide-block 3, said slide-block being movable hori-

zontally in guides 4 and the recess in the balance-bob shaped to allow the lever of the weighing-machine to vibrate during a weighing operation, while horizontal movement of the weighing-bob is communicated to the slide-block. A driving-band 5, formed of ribbon-steel, is connected at each end to opposite ends of the slide-block and after passing over guide-pulleys 6 is led over a sprocket-wheel 7, which has sprockets upon its periphery taking into corresponding perforations in the driving-band. Sprocket-wheel 7 is fixed upon a spindle 8, journaled in bracket 9, and said spindle has also a sprocket-wheel 10 fixed upon it, connected by a driving-band 11, similar to that described, with a sprocket-wheel 12, fixed upon an axle 13, which carries the disk dial 14. The dial is provided upon its face and back with the same number of radial columns of figures as the number of different weights the machine is calculated to deal with. The figures upon the face of the dial are to give visual indication only and may be produced by printing or analogous means; but the figures upon the back of the dial are to be used as printing-type and are cast in stereo-metal or india-rubber or by stamping the dial as described in the preamble hereto, so as to be in relief, and are arranged to read backward in the manner of printing-type. There are as many cost-markings in each radial column as there are different prices per unit of weight at which articles are sold, and the figures are arranged in regular order with the cost of an article of the lowest price nearest to the center of the dial, the next higher price immediately beyond it, and so on.

In a weighing operation when the weighing-bob 1 has been adjusted upon the weighing-machine lever to the weight upon the scale then the dial has been revolved by the sprocket-wheels and driving-bands described until the radial column of figures giving the cost of articles of that weight at different prices is in a vertical position above the center of the dial. The dial revolves behind a fixed screen-plate 15, the upper portion of which has a vertical slot 16, over which slides a cover-plate 17, having an aperture 18, through which only one of the cost-markings upon the dial is seen at a time. The aperture 18 is brought into correct position to expose the marking giving the cost of an article being weighed at a particular price in the following manner: The cover-plate 17 is connected by a bridge-piece 19 with a plate 20, which extends down the back of the dial and is bifurcated to clear the dial-axle 13 and has brackets 21 fixed upon either side, through which pass vertical guide-rods 22. The cover-plate tends to slide vertically by reason of a weighted plunger 23, working in a cylinder 24 and provided with a cord 25, passing over a guide-pulley 26 and connected to a bracket 27 at the bottom of the plate 20. The cover-plate 17 is retained in its normal position by a hook 28, which engages with a bracket 29,

fixed at the bottom of the cover-plate, said hook being carried by a horizontal sliding bar 30, which has a number of cam-faces 31.

Sliding bolts 32, equal in number to the different prices used, are arranged upon the screen-plate 15, the one above the other and upon each side at right angles to the cover-plate 17, each being provided with a returning-spring 33. Levers 34, one for each bolt, fulcrumed at 35 and engaging with a pin 36 upon the bolt at one end and having a bevel cam-face 37 at the other, are employed to operate one or other of the bolts and cause it to project into the path of the bracket 29, and thereby to stop the cover-plate in its vertical travel when the aperture 18 is in correct position to disclose the cost of an article then upon the scale at a certain price. Push-buttons 38, one for each lever, are each fixed upon a spindle 39, which passes through the front of the casing 40, and a disk-cam 41 at the end of each spindle is arranged, when the button is pushed inwardly, to contact with one of the cam-faces 31 and to slide the bar 30 longitudinally against the pressure of a returning-spring 42 and to thereby withdraw the hook 28 from engagement with bracket 29 and allow cover-plate 17 to rise under influence of the weighted plunger 23. The cam 41 also at the same time contacts with one of the bevel cam-faces 37 and operates the lever to which it is attached to cause one of the bolts 32 to project into the path of the bracket 29. The push-buttons are each marked with the particular price per unit of weight to correspond with the cost-marking exposed when it is operated. A spring 43, coiled around each of the spindles 39, between the casing of the apparatus and the push-button, insures their return after an operation. The end of each bolt is provided with a notch 44, into which a projection upon bracket 29 passes and prevents the bolt from passing back until the cover-plate 17 has been brought down in a manner to be described.

To prevent the possibility of a push-button being operated so quickly that its bolt returns from the path of the bracket 29 before said bracket engages with it, locking-plates 45 (shown clearly in Figs. 12 and 13) are employed, which have holes corresponding with the number and diameter of the bolts and at the same distance apart. The locking-plates are connected together at their lower ends by a bracket 46 and tend to slide each over the face of the metal bars 47, through which the bolts operate, a spring 48 pressing upwardly upon bracket 46. Normally the locking-plates are held down, so that the holes are opposite to the bolt-holes, by the bottom of the cover-plate 17; but when a push-button is operated the rise of the cover-plate permits the plates 45 to slide upwardly a short distance and the locking-plate upon the lower side of the hole through which an operated bolt has passed engages in a notch 49, with which each of the bolts is provided, and prevents its return until

the locking-plates are depressed by the return of the cover-plate 17 to its normal position.

We will now describe the arrangement for returning the dial-disk and the cover-plate 17 to their zero positions after the apparatus has been operated, referring more particularly to Figs. 5 and 20. Upon the dial-axle 13 is a drum 50, upon which a cord 51 is wound by the forward revolution of the dial under a weighing operation. The cord is carried around the tension-pulley 52, which has a weight 53 attached to it, and is then led over the guide-pulley 54 and connected to a weighted plunger 55, working in the cylinder 56. The plunger has a piston-leather 57 at its lower end, and a tap 58 near the bottom of the cylinder permits air to be compressed beneath the piston-leather and the rate of descent of the plunger to be thereby regulated. An air-admission valve 59 at the base of the cylinder allows air to pass in when the plunger is lifted. A spring-catch 60 upon the top of the cylinder engages in a notch 61 in the plunger when it is at the top of its stroke. A hand-lever 62, pivoted on a bracket 62^a upon the casing of the apparatus, extends across the face of the dial and has a short projecting arm 63, which passes around and extends along the back of the dial parallel with said lever. A weight 64, attached to a cord 65^a, passing over the pulley 66 and connected to the lever 62, acts as a counterbalance for said lever. The plunger 55 has a pivoted upwardly-extending lifting-rod 68, passing through a bracket 63^a upon the arm 64, referred to, and terminating with a nut 69. The plunger is prevented from turning in the cylinder by a rod 70, working through a fixed guide 71. The spring-catch 60 has a tailpiece 72, arranged to be engaged by a pin 73, projecting from the lever-arm 63. Before the commencement of a weighing operation the lever 62 is raised by a handle 74, thereby lifting the plunger 55 by means of the lifting-rod 68, until the catch 60 passes into the notch 61, the slack cord between the drum 50 and the plunger 55 being taken up by the tension-pulley 52. When the dial is revolved by the adjustment of the weighing-bob upon the weighing-machine lever, the cord is wound upon the drum 50, the shortening of the cord raising the weight attached to the tension-pulley 52. When the article has been correctly balanced upon the scale, the lever 62 is pulled down by the salesman, when the pin 73 upon arm 63 contacts with the tailpiece 72 of the spring-catch 60 and the plunger 55 is released. The weight upon the tension-pulley 60 is raised until a stop 75 upon the cord 65 is retained by a catch 76, and the cord is unwound from the drum 50 as the dial revolves back to zero.

It is required that until an article has been correctly balanced upon the scale the dial shall be revoluble in either direction and the weighing-bob 1, and consequently the slide-

block 3 working with it, shall be capable of movement backward and forward; but directly the article has been weighed and the price push-button operated then the operator shall not be able to move the weighing-bob 1 backwardly until the lever 62 has been brought down to its full extent. This result is secured by the following arrangement illustrated in Fig. 11: The dial has notches 77 around its periphery, one opposite to each column of cost-markings, and one or other of them is always engaged by a spring-catch 78 unless said catch is pressed down by the bottom of the plate 20 referred to at the back of the dial. Consequently when the cover-plate is caused to rise in the manner before described the dial cannot be revolved until the cover-plate is returned.

Referring now particularly to Figs. 16 and 17, the sprocket-wheel 7 in front of the dial has ratchet-teeth 79 upon its inner face engaged by a pawl 80 upon a pivoted arm 81 and kept in engagement with the ratchet-teeth by a spring 82 around a spindle 83, projecting rearwardly from the arm 81, and provided with a pin 84, engaged by one end of a lever 85, pivoted at 86 upon the casing of the apparatus and having its other end projecting into the path of the lever-arm 63, by which it is operated to disengage the pawl from the ratchet-teeth when the lever is pulled down. A push-button 87, projecting in front of the pawl-arm 81, enables the pawl to be pushed out of engagement with the ratchet-teeth when it is desired to move the weighing-bob back upon the lever of the weighing-machine; but, as before described, when one of the price push-buttons has been operated then the dial is locked by one of the notches 77 and spring-catch 78, so that if the pawl push-button 87 be operated the dial cannot be revolved back until the lever 62 has been pulled down.

To return the cover-plate 17 to its zero or normal position, the lever 62 engages with a pin 88, projecting from a second plate 89, (clearly shown in Figs. 6 and 7,) sliding over the cover-plate 17 and having a vertical slot to enable the dial-markings to be seen. The plate 89 has a bridge 90, connecting it to a plate 91, which slides over the plate 20 at the back of the dial. A spring 92 upon a spindle 93, fixed to the bridge 19 and passing through bridge 90, tends to keep the bridges apart; but when said spring is compressed by the action of the lever 62 on the pin 88 one bridge is brought down toward the other and all the plates slide together until the bracket 29 at the foot of the cover-plate 17 passes under the hook 28 upon the sliding bar 30 referred to, and is thereby held down. It is also required that when the lever 62 has been pulled down it cannot be returned until the dial which has been set in motion thereby has returned to its zero position. This arrangement is shown in Figs. 14 and 15. A hook 91, pivoted at 99 upon the casing of the apparatus, normally projects into the path of the lever-arm 63 un-

der influence of a spring 92, and when the lever 62 is pulled down said hook is pushed aside until the lever-arm has passed, when it passes over it and prevents its return. In this position an extension 93 from the hook is in the path of a bracket 94 fixed upon the dial, and when the dial is returning to zero said extension is struck and the hook moved back out of engagement with the lever.

- 16 To prevent the dial from revolving back to starting-point with too much impetus, a brake is employed. (Shown in Fig. 21.) Said brake consists of a lever 95, pivoted at one end 96 upon the casing of the apparatus and having a projection 97 engaged by the arm 63 when the main lever is pulled down, the lever being thereby pressed down upon the periphery of the dial, and a spring 98 draws the brake out of contact with the dial, when the main lever is raised.

We will now describe the registering arrangement, which is shown more particularly in Figs. 6 to 8. A lever-bracket a is pivoted in a bearing b , attached to the sliding plate 20. A reel of ribbon-paper c is carried on a stud c' , projecting from lever a , the paper being led around a rubber pressure-roller c^2 , journaled on the lever, and from thence passed between a roller c^3 , fixed upon a spindle c^4 , journaled in the lever, and a roller c^5 , at the end of a spring c^6 , secured to a projection c^7 from said lever. Roller c^3 is caused to revolve by a ratchet-wheel c^8 upon its spindle engaged by a spring-pawl c^9 , which is fixed at one end to plate 20. A detent or retaining-pawl c^{10} being fixed to lever a , the ratchet-wheel is revolved by pawl c^9 , when lever a is vibrated. A carbon or ink ribbon d , similar to those employed upon type-writers, is carried upon a reel d' upon a spindle d^2 , fixed to lever a , the ribbon being led around a curved hinged bracket d^3 beneath a roller d^4 , journaled upon the pivot-pin d^5 of said bracket, and from thence carried to a reel d^6 , journaled upon a spindle d^7 , fixed to lever a . The reel d^6 is partially revolved at intervals by an escapement-wheel d^8 , to which it is connected, and which is engaged by a projection d^9 upon a disk d^{10} , carried upon the same spindle as ratchet-wheel c^8 . The object of the hinged bracket d^3 is to keep the ink-ribbon out of contact with the paper ribbon except when contact is required for printing purposes. It is shown clearly in Figs. 6 and 8 and has an extending arm d^{10} , which engages with a pin d^{11} upon the lever a , and a spring d^{12} , which engages with a pin d^{13} upon the same bracket and limits its upward movement. An aperture d^{14} is provided to permit the paper ribbon to be pushed through into contact with the ink-ribbon d and simultaneously the ink-ribbon into engagement with the cost-recording type upon the dial, when lever a is operated in the following manner:

65 The upper end of lever a is formed with a cam-race a' , kept in contact with a cam-roller a^2 , carried upon a bracket a^3 , fixed to the

slide-plate 91 by a spring a^4 between said plate and the lever. When the main operating-lever 62 is operated, the bridge 90 in moving down toward the bridge 19 takes with it the plate 91, to which is attached the cam-roller a^2 . When said cam-roller is moved down a short distance, the shape of the cam-race a' allows the end of the lever to spring out under pressure of the spring a^4 , and the opposite end of the lever carries the pressure-roller, with the paper ribbon around it, into contact with the ink-ribbon through the aperture in the hinged bracket and the ink-ribbon into contact with the registering type, so that the paper receives a printed record of the cost of the article upon the scale. The curved hinged bracket d^3 is pushed back by contact with the dial. A further downward movement of plate 91 causes the cam-roller a^2 to force the upper end of the lever inward, and the paper and ink ribbons are withdrawn from the type, the spring-catch d^{12} upon the arm d^{10} causing the hinged bracket d^3 to keep the ink-ribbon away from the paper ribbon. The outward movement of the upper end of the lever-bracket a also causes the spring-pawl c^9 to revolve the ratchet-wheel through one tooth and causes paper ribbon to be drawn off the reel c and delivered outwardly between the rollers c^3 and c^5 .

We will now describe an arrangement by means of which the total weight is indicated of a number of articles weighed upon the weighing-machine, referring now more particularly to Figs. 9 and 10 of the drawings. A bracket e , extending upwardly from the bearing e' , carrying the dial-axle 13, has a lever-arm e^2 pivoted upon it, which carries at its opposite end a counter e^3 , of ordinary construction. Lever-arm e^2 has a tube e^4 fixed upon it, in which works a plunger e^5 , a part of which extending above the cylinder has a spring e^6 coiled around it, bearing between the end of the cylinder and a head e^7 upon the end of the plunger. When the lever-arm 63 is operated, as hereinbefore described, its end engages with the head e^7 and forces the lever-arm e^2 down until a pinion e^8 , attached to and driving the counter, comes into gear with a spur-wheel e^9 , fixed upon the dial-axle. A bracket e^{10} , to which is attached a spring e^{11} , assists to prevent the pinion being forced too deeply into gear with the spur-wheel, downward motion of lever-arm 63 beyond that necessary for the purpose being taken up by the plunger e^5 , passing into tube e^4 . By the above arrangement the counter is only in gear when a weighing has been performed and the dial is returned to "zero."

Any one of a large number of existing counters can be used for our purpose. One with which we are acquainted is shown diagrammatically in Fig. 10. The short cylinders f' f^5 f^6 , having a common axis, have numerals "1" to "10" upon their circumferential peripheries. The right-hand or unit cylinder f' is connected directly to pinion e^8 ,

before referred to, and is caused to revolve (by arranging the relative sizes of the spur-wheel e^9 and pinion e^8) through the space of one numeral for each pound weighed upon the machine. At the end of each revolution a projecting pin f^2 engages in a tooth of the ratchet-wheel f^3 , made integral with a pinion f^4 , which gears with internal teeth cut in the second or tens cylinder f^5 , which is thereby moved through the space of one numeral upon its periphery. Cylinder f^5 has also a pin f^2 , which at each revolution actuates a ratchet-wheel f^3 , giving motion to the third cylinder f^6 , as described in regard to f^5 .

We will now describe the principal operations of apparatus in the order in which they are performed. The lever 62 is normally kept in its raised position, and the action of balancing an article upon the scale by means of the weighing-bob causes the slide-block 3 to be moved along and the dial to be revolved by the sprocket-wheels 7 10 12 and driving-bands 5 and 11. One of the push-buttons actuating the cost-indicating apparatus is then operated and the cover-plate allowed to rise and to show through an aperture the cost of the article. The rising of the cover-plate locks the dial by the retaining-catch 78, and the lever is then pulled down, thereby pressing down the plate 89 by means of the pin 88 and actuating the recording mechanism. Continued movement of the lever brings the cover-plate 17 back to zero and sets the dial free, while the arm 63 upon the lever 62 releases the weighted plunger 55 and at the same time throws pawl 80 out of engagement with the sprocket-wheel 7, and the dial returns to zero. The arm 63 also brings the pinion upon the counter into gear with the spur-wheel, and the weight of the article in pounds is thereby totaled upon the counter. The lever 62 is then raised, and the cycle of operations is complete.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. The combination of cost-indicating, cost-registering and weight-totaling apparatus for lever-platform weighing-machines consisting of a disk dial both sides of which are provided with radial columns of figures, the figures upon one side of the dial being opposite to and corresponding with the figures on the other the figures in each column representing the cost of articles of one weight at different prices and being upon the back of the dial in printing-type, means for revolving said dial by movement of the weighing-bob upon the lever of the weighing-machine, a weighted plunger for returning the dial to starting-point, a spring-catch holding said plunger at the top of a cylinder in which it works, a cover-plate upon the face of said dial, means for causing said cover-plate to slide vertically and for arresting it when an aperture with which it is provided is opposite a required

cost-marking, a bridge connecting said cover-plate with a bifurcated plate extending down the back of the dial, a lever-bracket pivoted upon said bifurcated plate a reel of paper ribbon upon said lever, feed-rollers and means for operating same to intermittently unwind paper from the reel, an ink-ribbon carried upon reels between said paper ribbon and said type-figures, means for partly revolving one of said ink-ribbon reels at intervals, a pressure-roller journaled upon the lever a plate sliding over said cover-plate carrying a projecting pin and connected by a bridge with a plate at the back of the dial upon which is a cam-roller said roller bearing against a cam-race at end of said lever-bracket a spring pressing said lever outwardly a spring between said bridge and bridge upon the cover-plate, a spur-wheel upon the dial-axle counting apparatus carried upon a lever-arm and driven by a pinion gearing with said spur-wheel, a spring upon the lever-arm for operating it to keep the pinion normally out of gear with the spur-wheel a plunger working in a tube and a spring upon said plunger, a main operating-lever engaging when pulled down with the projecting pin upon the plate which slides over the cover-plate and an arm upon said lever having a projecting pin engaging and releasing the spring-catch of the plunger-weight said arm also engaging the head of a plunger at the end of the lever-arm bringing the pinion of the counting apparatus into gear with the spur-wheel, substantially as specified.

2. The combination in indicating and registering apparatus of the disk dial means for revolving same by movement of the weighing-bob upon the lever of a weighing-machine radial columns of cost-markings upon the front and corresponding markings in type-figures at the back of the dial the weighted plunger and drum upon the dial-axle a cover-plate means for sliding same vertically over the face of said dial an aperture in said cover-plate a sliding plate at the back of the dial connected by a bridge to said cover-plate, a lever fulcrumed thereon an ink-ribbon and a paper ribbon carried upon the lever means for vibrating said lever and pressing the paper ribbon against the ink-ribbon and the ink-ribbon against type-figures upon the dial a plate sliding over said cover-plate a projecting pin therefrom a bridge connecting said cover-plate with a plate at the back of the dial a cam-roller journaled thereon a cam-face at end of said lever, a spring between said bridges, a main operating-lever fulcrumed on the casing of the apparatus connecting with said projecting pin and operating the plate carrying the cam-roller, substantially as and for the purposes specified.

3. In indicating and registering apparatus the combination of a disk dial both sides of which are provided with radial columns of figures, the figures upon one side of the dial being opposite to and corresponding with the

figures on the other, the figures in each column representing the cost of articles of one weight at different prices and being upon the back of the dial in the form of printing-type, means for revolving said dial from the weighing-bob of a weighing-machine and means for returning the dial to its normal position a cover-plate upon the face of said dial, a weighted plunger for vertically sliding said cover-plate, means for arresting the motion of the cover-plate when an aperture with which it is provided is opposite to a required cost-marking, a bridge connecting said cover-plate with a bifurcated plate extending down the back of the dial, a lever pivoted upon said bifurcated plate a reel of paper ribbon upon said lever, feed-rollers and a ratchet-wheel and pawl for intermittently unwinding paper from the reel, an ink-ribbon carried upon reels between said paper ribbon and said type-figures, an escapement for partially revolving one of the ink-ribbon reels at intervals and a pressure-roller journaled upon the lever at the back of the paper ribbon, means for vibrating the lever, consisting of a plate sliding over said cover-plate a bridge connecting it to a plate sliding between said bifurcated plate and the dial, a cam-roller, a cam-race upon the end of the lever, a spring pressing said lever outwardly against the cam-roller, a spring interposed between the bridges and means for vertically sliding the plate carrying the arm, substantially as specified.

4. In cost-indicating apparatus for weighing-machines a disk dial revolved by operation of the weighing-bob said dial bearing upon its face radial columns of figures, the figures in each column being the cost of an article of one weight at different prices, a cover-plate sliding vertically over one of said columns the weighted plunger in a cylinder for operating same, a bracket upon the cover-plate, sliding bolts to engage said bracket and an aperture in said cover-plate through which the cost of an article of the weight upon the scale at a required price is disclosed, substantially as specified.

5. The disk dial, a cover-plate and means for sliding same vertically over the face of the dial consisting of a bridge-piece connecting said cover-plate with a plate extending vertically downward behind the dial, guide-brackets upon said plate working upon vertical guide-rods, and a bracket upon said plate connected by a cord with a weighted plunger working in a cylinder, substantially as specified.

6. In combination a weighing-bob upon the lever-arm of a platform weighing-machine, a slot therein, a pin working in the slot, a block carrying the pin and sliding in horizontal guides a driving-band having its ends fixed to opposite sides of said block, a sprocket-wheel driven thereby, ratchet-teeth upon the sprocket-wheel, a pawl engaging said ratchet-teeth a pivoted arm carrying the pawl, a push-

button for vibrating the bracket and disengaging the pawl from the ratchet-teeth and a spring for normally keeping the pawl engaged therewith, substantially as and for the purposes specified.

7. In combination a weighing-bob upon the lever-arm of a platform weighing-machine, a slot therein, a pin working in the slot, a block carrying the pin and sliding in horizontal guides, a driving-band having its ends fixed to opposite sides of said block-guide rollers, a sprocket-wheel driven by the driving-band, ratchet-teeth upon the sprocket-wheel, a pawl engaging said ratchet-teeth a pivoted arm carrying the pawl, a spindle projecting from the arm, a spring thereon, a pin upon the spindle, a lever one end of which engages the pin and the arm upon the main operating-lever engaging said lever when pulled down whereby the pawl is disengaged from the ratchet-teeth, substantially as specified.

8. A disk dial, means for revolving said dial, the cover-plate and means for sliding same over the face of said dial, a bracket at bottom of the cover-plate, a hook upon a horizontally-sliding bar, cam-faces upon said bar cams operated by push-buttons engaging said cam-faces whereby said bar is caused to slide laterally and a spring for returning said bar, substantially as specified.

9. A disk dial, a cover-plate sliding vertically over the face of said dial, an aperture therein, a bracket upon the bottom of the cover-plate, means for causing said cover-plate to slide vertically a plurality of horizontally-sliding bolts, notches in the ends of the bolts levers for operating said bolts, a cam-face at the end of each lever engaging said cam-faces operated by push-buttons a spring upon each bolt for returning it to its normal position and a spring for returning each push-button, substantially as specified.

10. The disk dial a cover-plate and means for sliding same vertically over the face of said dial, a plurality of sliding bolts a lever for each bolt, a cam-face at the end of each lever, cams connected to push-buttons for operating same, a bracket upon the end of the cover-plate and means for preventing the return of an operated bolt to its normal position until the cover-plate is returned to its normal position consisting of a locking-plate sliding over the ends of the bolts, holes in said plate to correspond with the bolt a bracket upon the cover-plate and bracket upon the plate with a spring sliding the locking-plate vertically and a notch in the end of each of the bolts, substantially as specified.

11. The disk dial means for revolving same forwardly and a cover-plate sliding vertically over the face of said dial with means for preventing the return of the dial to starting-point until the cover-plate has been returned to its normal position consisting of notches in the periphery of said dial a spring-catch normally engaging in one of said notches a projection from the catch and a bracket car-

ried by a plate at the back of the dial said plate being connected to the cover-plate, substantially as specified.

12. The disk dial means by which said dial is revolved from the weighing-bob upon the lever-arm of a platform weighing-machine and means for returning said dial to starting-point consisting of a weighted plunger working in a cylinder a spring-catch upon the cylinder, a notch in the plunger engaging the catch a cord connected to said plunger a guide-pulley a weighted tension-pulley, a drum upon the dial-axle, means for releasing the spring-catch from the plunger and a stop upon the cord which connects the weight to the tension-pulley substantially as herein described.

13. The registering apparatus consisting of a disk dial having radial columns of type-figures, a paper ribbon, a pair of feed-rollers, a ratchet-wheel upon the axle of one of the rollers, a pawl engaging said ratchet-wheel an ink-ribbon between said paper ribbon and said type-figures a pressure-roller at the back of the paper ribbon a lever-bracket fulcrumed upon a sliding plate carrying said pressure-roller reels and feed-rollers, means for causing said plate to slide vertically and for arresting its travel and means for vibrating the lever, whereby the paper ribbon is pressed by the pressure-roller against the ink-ribbon and the ink-ribbon against the type-figures upon the dial, substantially as described.

14. In registering apparatus the lever-bracket carrying the ink-ribbon and means by which said ink-ribbon is intermittently wound from one reel to the other consisting of an escapement-wheel upon the axle of the reel upon which the ribbon is to be wound a projection from a disk upon said lever-bracket engaging said escapement-wheel and means for partially revolving said disk at intervals, substantially as specified.

15. The means whereby the ink-ribbon is

normally kept from contact with the paper ribbon consisting of a lever bracket a reel of paper ribbon carried thereby an ink-ribbon with means for carrying same upon the lever said ink-ribbon passing over a curved bracket hinged upon the lever a projecting arm upon said curved bracket, a pin engaging said arm a spring upon said arm and a pin engaging said spring and an aperture in said hinged bracket to allow the paper ribbon to contact with the ink-ribbon, substantially as specified.

16. The disk dial, a spur-wheel upon its axle a lever-arm fulcrumed upon a bracket counting apparatus carried thereby, a pinion communicating motion to said counting apparatus and gearing with said spur-wheel a spring acting upon the lever-arm, a projection from the bracket a tube upon said lever-arm, a plunger working therein, a spring upon the plunger, and the arm upon the main operating-lever engaging a head upon said plunger, substantially as specified.

17. The means for holding down the main operating-lever until the dial has returned to its normal position, consisting of the combination of the disk dial, means for revolving the dial forwardly and for returning it to its normal position, a hand-lever, a pivoted hook engaging said lever, a spring operating said hook, an extension from the hook and a bracket upon the dial engaging with such extension, substantially as described.

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