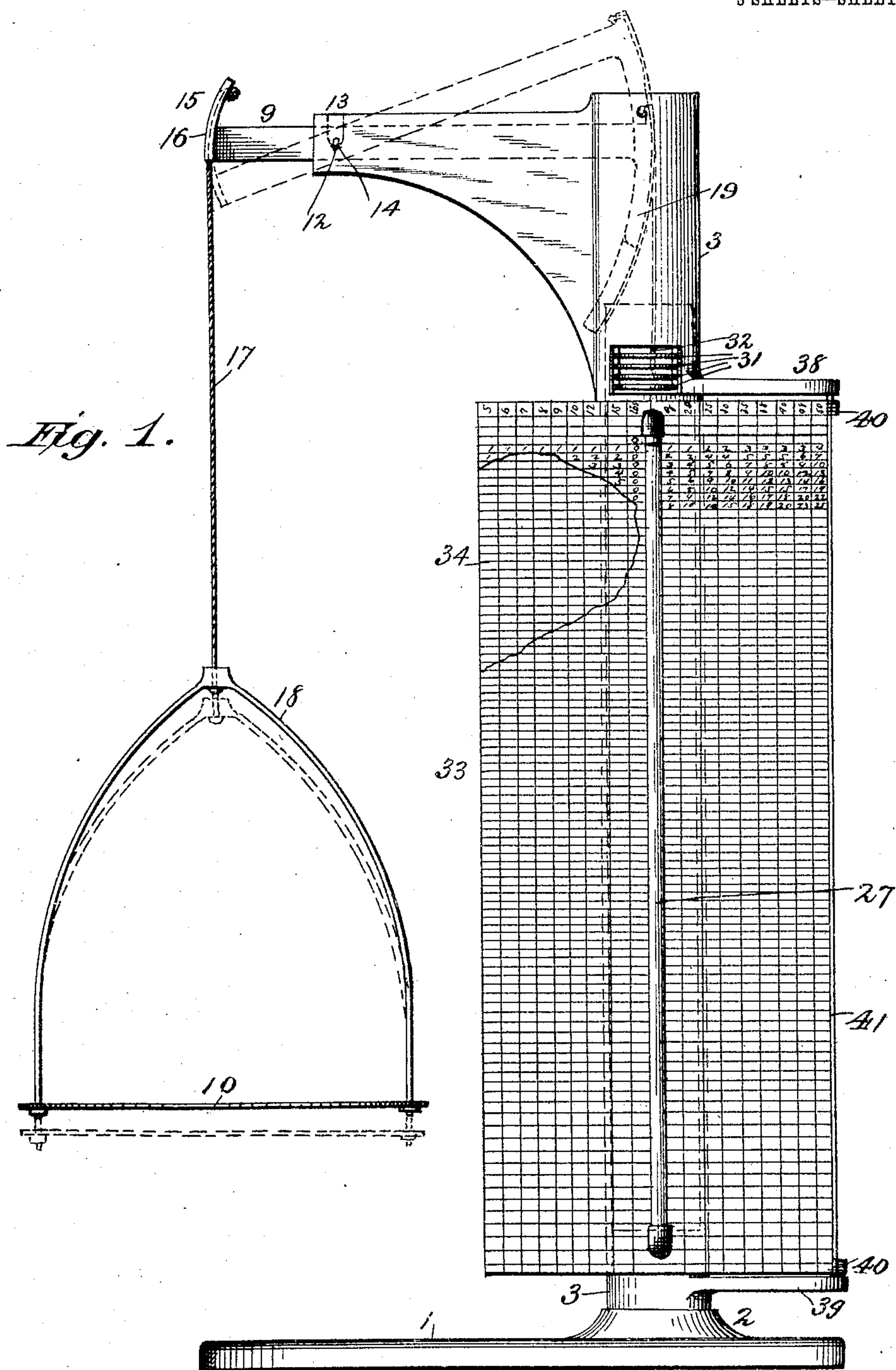


No. 786,478.

PATENTED APR. 4, 1905.

E. T. BATES.
WEIGHING SCALE.
APPLICATION FILED APR. 16, 1902.

3 SHEETS—SHEET 1.



Witnesses
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3 SHEETS—SHEET 2.

Fig. 3.

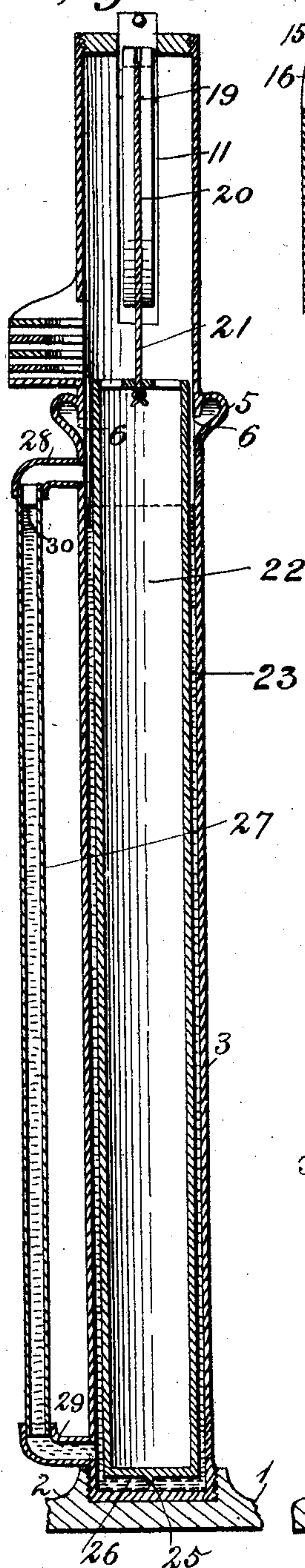


Fig. 5.

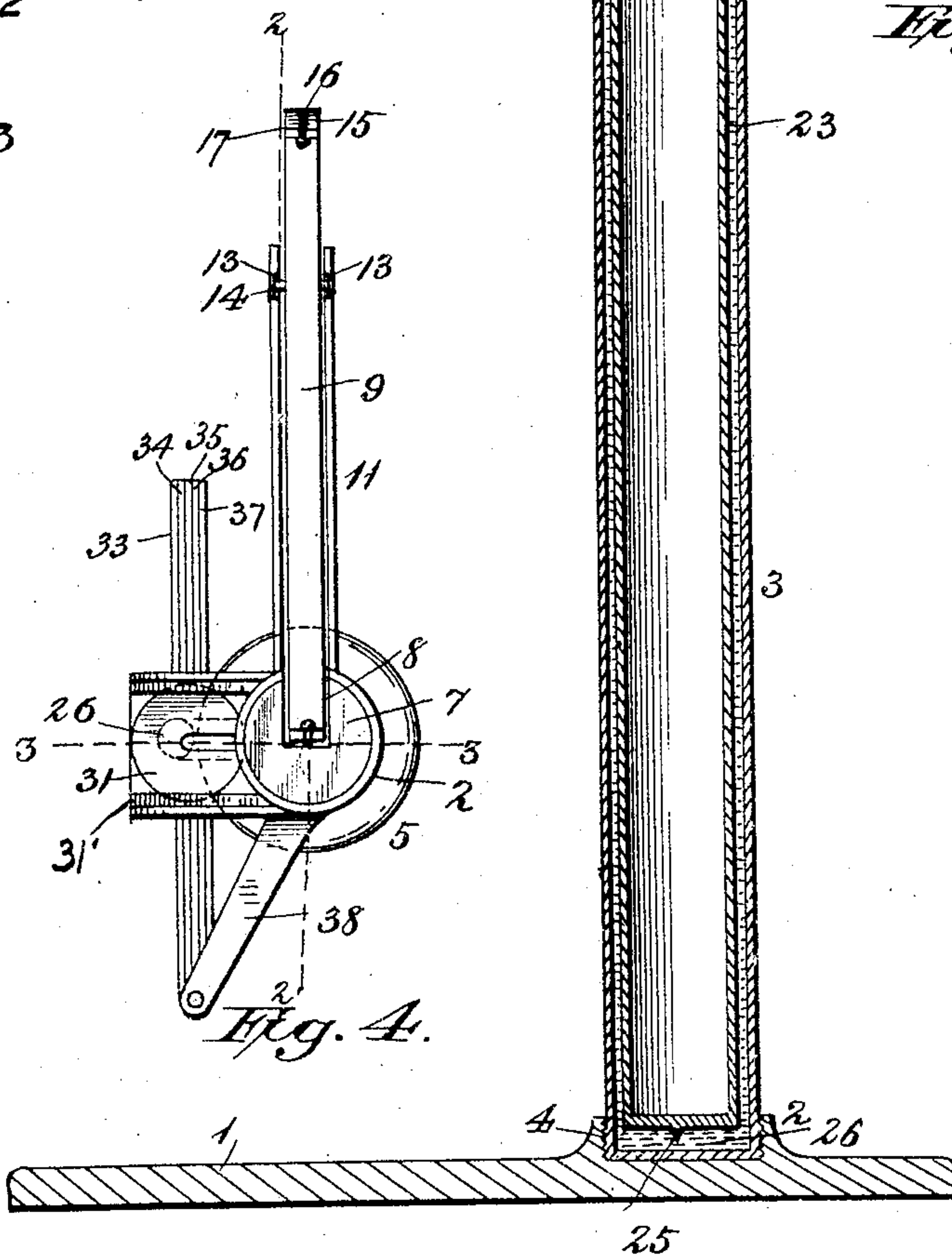
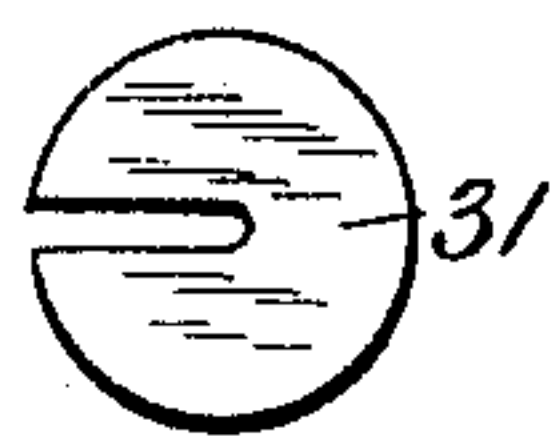
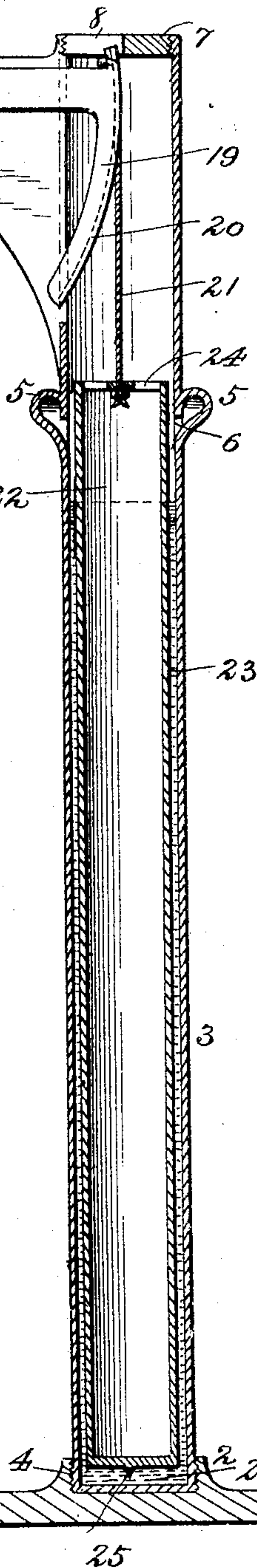


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 6.

5¢	6¢	7¢	8¢	9¢	10¢	12¢	15¢	16.5	0¢	20¢	25¢	30¢	35¢	35¢	40¢	45¢	50¢
								0	0								
1	1	1	1	1	1	1	1	0	1	1	2	2	3	3	3	3	4
1	1	1	1	2	2	2	2	0	2	2	4	4	5	5	5	6	7
5	6	7	8	9	10	12	15	0	3	4	5	6	7	8	9	10	10
2	2	2	2	2	3	3	4	0	4	5	7	8	9	10	10	12	13
2	2	3	3	3	3	3	5	0	5	6	9	10	11	12	13	14	16
2	2	3	3	4	4	5	6	0	6	8	10	12	14	15	15	17	19
								0	7								
								0	8								
								0	9								
								0	10								
								0	11								
								0	12								
								0	13								
								0	14								
								0	15								
								1	0								
								1	1								

Fig. 7.

[illegible]

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UNITED STATES PATENT OFFICE.

EDWARD T. BATES, OF WASHINGTON, DISTRICT OF COLUMBIA.

WEIGHING-SCALE.

SPECIFICATION forming part of Letters Patent No. 786,478, dated April 4, 1905.

Application filed April 16, 1902. Serial No. 103,159.

To all whom it may concern:

Be it known that I, EDWARD T. BATES, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Weighing-Scales; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to weighing-scales, has especial reference to that class of scales designated "hydrostatic," has for its object the production of a very sensitive and accurate scale, and consists in certain improvements in construction, which will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a front elevation of my improved scales; Fig. 2, a vertical transverse section on lines 2-2, Fig. 4; Fig. 3, a like view on line 3-3, Fig. 4; Fig. 4, a top plan view; Fig. 5, a like view of one of the interchangeable counterbalancing-weights; Fig. 6, a front view of one of the computing-cards, and Fig. 7 a like view of an interchangeable computing-card.

Reference being had to the drawings and the numerals thereon, 1 indicates the base, made of metal, having a hollow boss 2, internally screw-threaded; 3, a tubular column screw-threaded at its lower end 4 and connected to the boss 2 and designed to hold a liquid, preferably mercury, and is provided with an annular chamber 5, communicating with the interior of the column through a passage 6 in the wall of the column to catch a portion of the mercury and prevent escape or spilling thereof should the scale be accidentally inclined, upset, or knocked over, and the upper end of the column is provided with a removable disk or plug 7, having a slot 8 therein to accommodate the upper rear end of the scale-beam 9 when it is raised by the weight of an article placed upon the pan or plate 10. From one side of the column extends a hollow arm 11, in which the scale-beam 9 is supported on bearings 12, formed

in slots 13 in the sides of the arm 11 and engaged by a transverse pin 14, having a like knife-edged lower surface, as shown in Figs. 1 and 2. This pin in the drawings is applied to the beam at a point which equals one-fourth of the length thereof, and on the front or outer end of the beam is an arc-shaped arm 15, having a groove 16 in its face, and to which arm a cord 17 is secured to lie in said groove and is connected with the frame 18 of the scale pan or plate 10, and on the rear or inner end of the beam is a like arc-shaped arm 19 of greater length than the arm 15, and is also provided with a groove 20 in its face, and to which arm a cord 21 is secured to lie in the groove and is connected to a balancing core or member 22 inside the column 3, and which is of a weight to practically balance the scale-beam and the pan when the member 22 is immersed in liquid 23 substantially throughout its length and the lower end of said member is practically touching the bottom of the column 3. The arms 15 and 19 are segments of circles whose centers are at the balancing-point 12 of the scale-beam. The center of gravity of both the scale pan or support for the article being weighed and the movable member 22 are maintained at an unvarying distance from each other and from the balancing-point 12. The balancing member thus constructed and arranged is surrounded by a thin film of liquid extending nearly to its upper end, as shown in Figs. 2 and 3, and is so sensitive that a single drop of liquid in the column or a very small solid body added to the balancing member through the opening or openings 24 in the upper end thereof will determine its perfect balance for accurate weighings, as required for druggists' use, and when perfectly balanced the member 22 just touches the bottom of column 3 by its projecting point 25 engaging said bottom and leaving a thin strata of liquid 26 under the member 22.

27 is an indicating-tube made of glass and connected to the interior of the column 3 by tubular elbows 28 and 29 and may be provided with a float 30, of cork or other buoy-

ant material, to indicate the rise and fall of the liquid in the column 3 produced by the changes of the position of the member 22 in the liquid by the weight of the article or articles placed upon the scale pan or plate 10 acting upon the member 22.

As shown in the drawings, the unsupported weight of the member 22 when raised to its upper limit is exactly one-third the capacity of the scale. Thus if the capacity of the scale is ten pounds the unsupported portion of member 22 must weigh three and one-third pounds, and to provide for increasing the weighing capacity of the scale interchangeable weights 31, each weighing three and one-third pounds, are provided to be inserted, through an opening 32 in the column 3 and placed on top of the member 22, each weight increasing the weighing capacity of the scale ten pounds. Thus when the scale is put up to weigh ten pounds in its normal condition and it is desired to weigh between ten and twenty pounds one of the weights 31 is placed on the member 22. To weigh between twenty and thirty pounds, another weight 31 is put on, and so on until the maximum capacity of the scale has been reached. The weights 31 are supported on narrow shelves 31' (shown in Fig. 4) and are pushed off the shelves onto the upper end of the member 22, from which they may be removed by hand or by the use of a wire hook. When the member 22 is balanced in the liquid 23 in its normal position in column 3 and afloat or approximately afloat with the liquid 23 in the indicating-tube 27, showing its level at the zero or normal point of the card 33, the unsupported weight of the member 22 just counterbalances the load-pan and beam, such unsupported weight increasing as the level of the supporting-column of liquid is lowered by the withdrawal of member 22, the increase being in the drawings shown at the ratio of one pound of unsupported weight of the member 22 to three pounds of the article being weighed, such ratio of unsupported weight of member 22 to article being weighed being in proportion as the distance of the face of arm 15 of scale-beam 9 from point of contact of pin 14 with bearing 12 is to distance from the face of arm 19 of the scale-beam from such point of contact of said pin 14.

In the use of vending-scales it is desirable to use cards containing tables on which the price of the article being sold is computed throughout the capacity of the scale and showing the fractional parts of a pound as well as pounds. To illustrate, in my scale the indicating portion of the tube 27 is twenty inches to indicate the range of the travel of the liquid in the column 3 and the weight of the article being weighed. Therefore I provide a card separated by horizontal lines into one hundred and sixty weight-indicating spaces, indicating the number of ounces in

ten pounds, and these spaces are separated by vertical lines into as many spaces as it is desired to apply different prices for articles to be sold by the dealer using the scale. The lines or the spaces may be made in different colors to readily catch the eye as it is run down the card to ascertain the weight and the price of the article being weighed. For this purpose I have provided interchangeable cards 33, 34, 35, 36, and 37, as indicated in Fig. 4, and cards 33 and 34 are shown in Fig. 1, the cards being provided with tables of weight and the value of different-priced articles of merchandise, and the cards are supported on the column 3 by arms 38 and 39, to which the cards are attached by lugs 40 on the cards and a rod 41 engaging the lugs and the arms, so that the cards may be swung out of their normal position to expose the proper card required for the weight of the article to be weighed and the price thereof. Each card contains the same number of spaces, and the computation of the first card runs from one ounce to ten pounds, divided into ounces, the second from ten pounds and one ounce to twenty pounds, the third from twenty pounds and one ounce to thirty pounds, the fourth from thirty pounds and one ounce to forty pounds, and the fifth from forty pounds and one ounce to fifty pounds. Crossing the cards at the upper end is indicated the prices per pound of the article or articles of merchandise handled by the user of the scale. Thus beginning in the first space on the left as viewed from the face of the card with the price "5¢." and increasing across the card and in the spaces across the card below the zero-mark is indicated the total price of a given weight of any article weighed. Thus if an article weighs one ounce and whose selling price is five cents per pound the selling price of one ounce is indicated in the first space by "1." If the article weighs six ounces, the selling price for one ounce is indicated in the proper space in the first column of spaces by "2," and in the same ratio across the card, according to the price given at the upper end of each column of spaces. The ciphers on the left of the slot in the card indicate no pounds and continue down the card until the sixteenth weight-indicating space in the column is reached, when the numeral "1" appears, which indicates one pound. To carry this illustration further, an article selling at twenty cents per pound and weighing six ounces would sell for eight cents. If the selling price is thirty-five cents per pound, the price for six ounces will be fourteen cents, and so on across and down the card. This applies to the first card, (numbered 33.) On the second card, (numbered 34,) the column of spaces next to the slot in the card on the left side thereof indicates ten pounds, while the numerals in the spaces next to the slot on the opposite side indicate the fractional parts of a pound, and the price of an article selling at

five cents per pound and weighing ten pounds and one ounce is given in the left-hand column as fifty-one cents, and the price of an article selling at fifty cents per pound and weighing ten pounds and one ounce is given in the right-hand column as five hundred and four cents. For the convenience of the user or vender the prices of the article given in the upper column of spaces crossing the card may be inserted in spaces along the length of the card as shown. On the third card the column of spaces on the left next to the slot is made to indicate twenty pounds, the fourth card thirty pounds, and the fifth card forty pounds, and the corresponding computation is carried out to the maximum capacity of the scale under each card.

Having thus fully described my invention, what I claim is—

1. A weighing-scale having a base, a tubular column connected to the base, an arm at the upper end of said column, a scale-beam having arc-shaped members at its ends, one of which members extends into said column, and bearings in said arm for said scale-beam;

in combination with a balancing member within said column, and a scale-pan.

2. A weighing-scale having a base, a tubular column connected thereto, an arm at the upper end of said column, a scale-beam supported in bearings in said arm, a balancing member within the column and said column being provided with an opening above said balancing member; in combination with a weight insertible through said opening, and a scale-pan.

3. A weighing-scale having a liquid-receptacle, a member approximately balanced in the liquid in said receptacle, and a tube connected to the receptacle for indicating the weight of an article; in combination with a plurality of interchangeable computing-cards hinged to the scale and provided with a vertical slot to disclose the indicating-tube.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD T. BATES.

Witnesses:

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W. PARKER REINOHL.