

W. HEUSSER.
BALANCE.

APPLICATION FILED OCT. 26, 1908.

Patented July 14, 1914.

3 SHEETS-SHEET 1.

1,103,513.

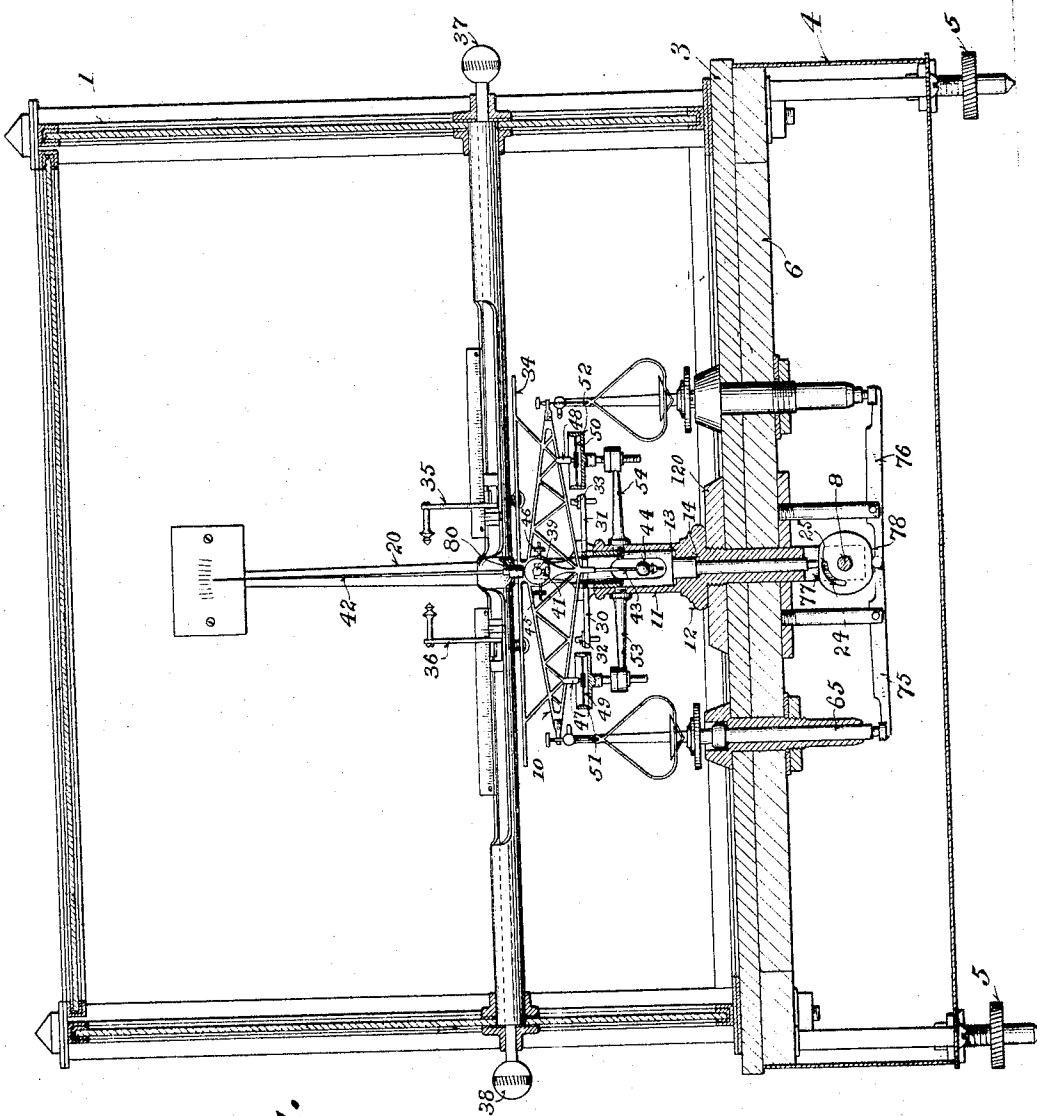


Fig. 1.

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3 SHEETS-SHEET 2.

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Fig. 2.

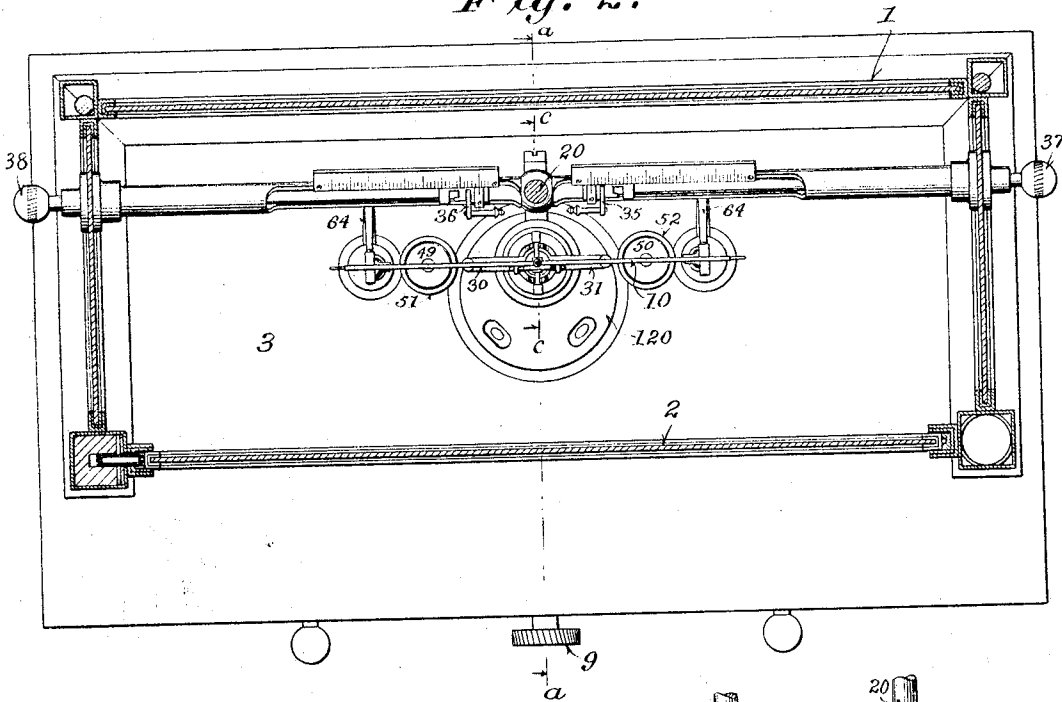


Fig. 5.

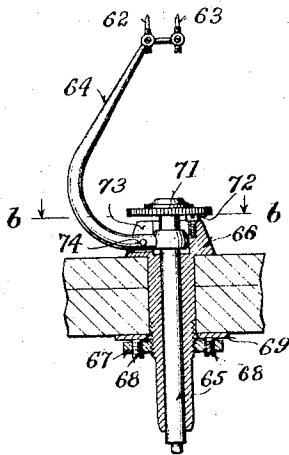


Fig. 6.

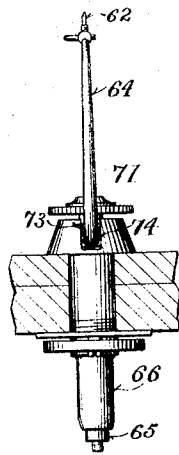


Fig. 9.

Fig. 10.

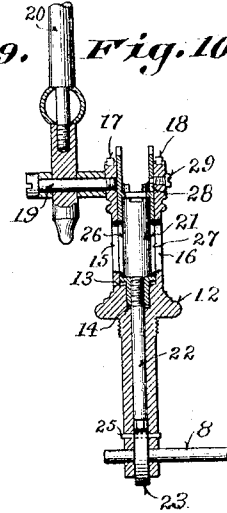
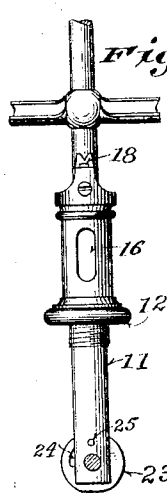
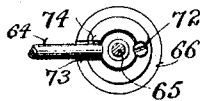
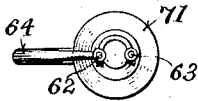


Fig. 7.

Fig. 8.



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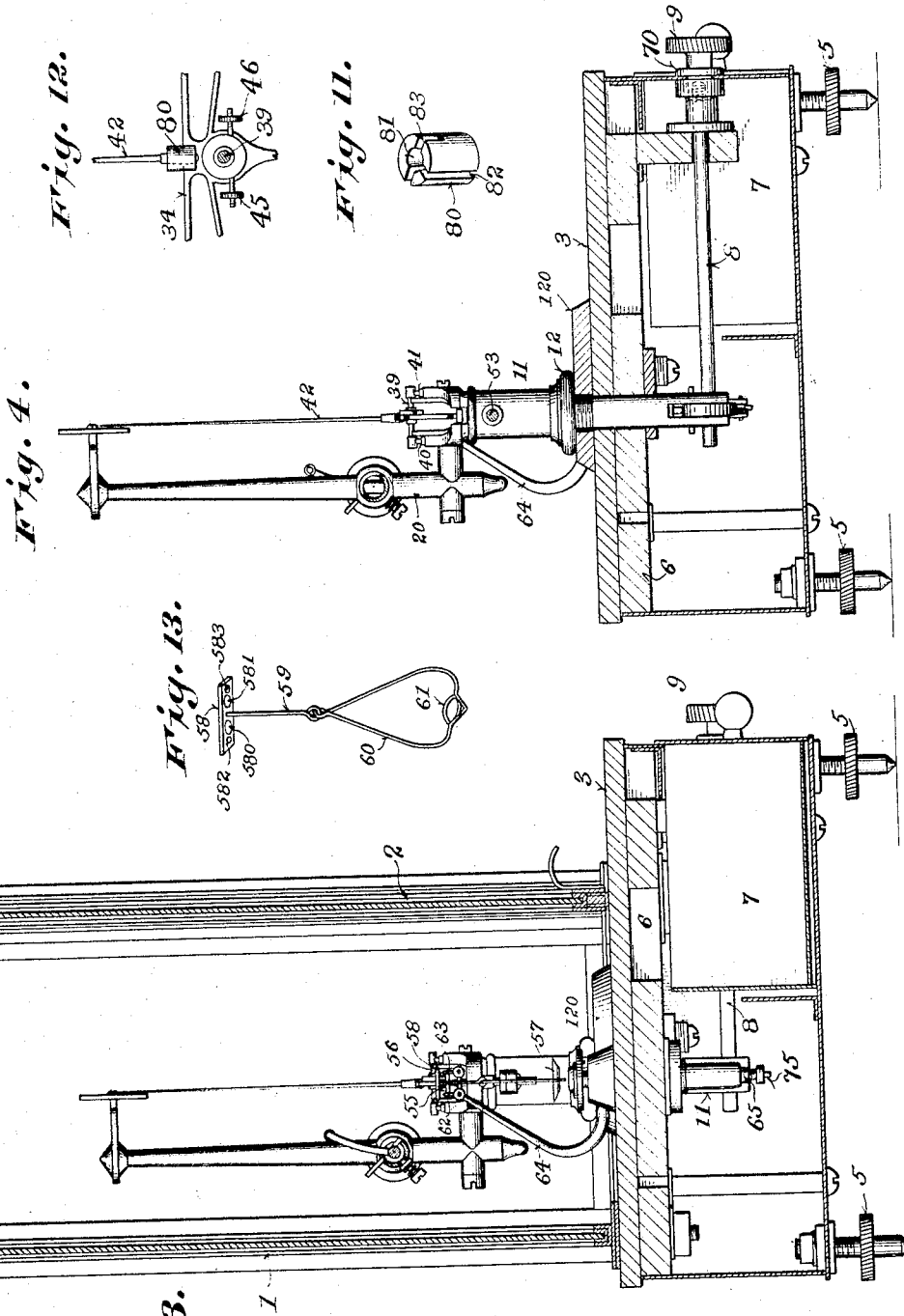
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3 SHEETS—SHEET 3.

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UNITED STATES PATENT OFFICE.

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BALANCE.

1,103,513.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILFRID HEUSSER, a citizen of the Republic of Switzerland, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Balances, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates to balances, and the purpose of the invention is to improve the efficiency, capacity and adaptability of balances, as well as to improve their mechanical structure.

This invention provides a balance with a short column and an improved arrangement of beam lifter, improved hanger lifters, means to vary the sensibility of balances, and means to reduce the number of oscillations of the balance beam, so that a shorter time is required for the beam to come to rest than with balances at present in use.

Referring to the drawings which accompany this specification and form a part thereof, and which illustrate the preferred embodiments of this invention, Figure 1 is an elevation of a balance, parts being shown in section; Fig. 2 is a plan view of the balance, parts being shown in section; Fig. 3 is an end elevation of the balance, parts being shown in section; Fig. 4 is an elevation on the line *a-a* of Fig. 2, parts being shown in section; Fig. 5 is a detail elevation of a hanger lifter, parts being shown in section; Fig. 6 is an elevation of a hanger lifter viewed from the rear; Fig. 7 is a plan view of a hanger lifter; Fig. 8 is a section on the line *b-b* of Fig. 5, looking in the direction of the arrows; Fig. 9 is a vertical elevation of the column; Fig. 10 is a sectional elevation of the column taken on the line *c-c* of Fig. 2; Fig. 11 is a perspective of the sensibility changing weight; and Fig. 12 is an elevation of a fragment of the beam and pointer with the sensibility changing weight positioned thereon. Fig. 13 illustrates in detail a hanger.

Referring specifically to the drawings, on which the same reference characters are used to designate the same elements wherever they may appear in each of the several views, the numeral 1 designates the balance casing provided with the door 2 and supported upon the base 3. Below the base 3

is a sub-base 4, and the balance as a whole is supported by leveling screws 5 in the ordinary or any preferred manner.

The base plate 3 is preferably formed from a slab of black glass or the like, and below this slab a mahogany frame work 6 is placed.

The sub-base 4 may be provided with drawers 7, and through the front side of the sub-base projects a shaft 8, to which is secured a button 9, through the manipulation of which the beam 10 is raised from its bearings or deposited thereon, and the hangers are lifted from the beam or deposited thereon.

The numeral 11 designates a column preferably provided with a shoulder 12, which column is screwed upon a brass base 120, and is adapted to extend down through the base plate 3 to a point within the sub-base 4 and to be rigidly secured to said base 3. This column is provided with a bore or cavity extending therethrough, shoulders 13 and 14 being provided in said bore, and the column is cut away on its front and rear to form apertures 15 and 16.

The column 11 is provided on its upper end with agates or bearings 17 and 18, to support the balance beam, and projecting from the upper portion of the column is a stud bolt 19, which supports the scale support 20 from said column and rider-shifting device, as clearly shown by Fig. 10 of the drawings.

Located within the bore of the column is a reciprocable shell 21, secured to a rod 22 and adapted to be reciprocated up and down within the bore of the column by means of an eccentric 23 secured to shaft 8, the amount of movement of said eccentric being limited by the slot 24 therein and the pin 25. The shell 21 is provided at its upper end with extensions having notches adapted to engage with the axis of the beam to lift said beam from the agates 17 and 18, and said shell is also provided with apertures 26 and 27, registering respectively with the apertures 15 and 16 in the column, and said shell is further provided with an elongated slot 28 within which a screw 29 in the column 11 projects, to prevent said shell being displaced during transportation. The shell 21 is provided with arms 30 and 31, which extend under and parallel with the beam 10 and are provided with steady

pins 32, 33, to prevent movement of the beam when it is removed from the agates or bearings 17 and 18.

The beam 10 is composed of a truss and a rider bar 34, located above the truss, said rider bar being adapted to receive the rider weights which are manipulated by the fingers 35 and 36, manipulated by the knobs 37 and 38.

The balance beam is provided with an axis 39, to which are secured the knife edges 40 and 41, and is also provided with a pointer 42, a depending screw threaded rod 43, upon which is screwed the adjustment weight 44. Balancing weights 45, 46, of any customary or preferred form are also provided.

Depending from the lower side of the beam 10 are two arms 47, 48, to each of which is secured a light disk 49, 50, which disks are located in receptacles 51 and 52, said receptacles being adjustably supported upon standards 53, 54, which are secured to the column 11.

The beam 10 at each end is provided with two knife-shaped agates, shown specifically by Fig. 3 and designated by the numerals 55 and 56, and the pans 57 are supported upon the two knife-shaped agates at each end of the beam by the hanger plate 58, which is provided with two agates, 580, 581, set therein and adapted to rest upon the agates 55 and 56, and two depressions 582, 583, adapted to receive the pins 62, 63, hereinafter referred to, which are adjustably supported by the bent arm 64 of the hanger lifter, said bent arm being so bent as to not interfere with the scale pan 57 or with the rod 59, and to which plate is rigidly secured the depending rod 59, from which loosely hangs the bail 60, provided with the ring 61, supporting the pan 57.

The hanger lifters comprise the adjustable pins 62 and 63, the bent arm 64, which is rigidly secured to a shaft 65, which projects downwardly through a hollow block 66, which is provided with a head to engage with the top of the base plate and a nut 67 screwed thereon and provided with screws 68 to engage with a washer 69.

The shaft 8 to which the button 9 is secured is supported at its outer end by a bushing 70 secured to the base of the balance, and is supported at its inner end by the lower end of the column 11, the lower end of said column 11 being also bifurcated to receive the eccentric 23.

The shaft 65 of each hanger lifter is provided with a head 71 which is adapted to contact with a screw 72. The screw 72 is located in a screwthreaded recess in the block 66, and the head of said screw projects toward shaft 65 to prevent said shaft from falling out of block 66 during transportation by contacting with the enlarge-

ment of the bent arm 64 through which said shaft 65 passes.

The block 66 and the bent arm 64 of the hanger lifter are preferably made of brass, and the head of the block 66 is provided with a radial slot 73, within which the bent arm 64 can move vertically but without any rotating movement, and a steel pin 74 is provided in the bent arm 64 to accurately maintain the hanger lifter in its predetermined position for engagement with the plate 58 of the hanger.

The numerals 75 and 76 designate two levers suitably supported so that at their inner ends they each bear against the eccentric 23, while at their outer ends they contact with or are closely adjacent to the lower ends of the shafts 65 of the hanger lifters. This eccentric 23 is provided with two cam surfaces 77 and 78, so proportioned and arranged with respect to the limit of movement permitted by slot 24 and pin 25, that in the operation of lifting the beam from its agates or bearings and the hangers from the beam, the beam will first be lifted to the proper height and a further rotation of the button 9 will lift the hangers from the beam.

The weight 44 and the weights 45 and 46 are the ordinary weights for adjusting the balance and sensitiveness of the beam.

With the ordinary balance there is only one degree of sensibility, as for example 1/100 milligram, but never more than one degree of sensibility for a single balance. This invention provides however, for changing the sensibility of the beam of a balance, so that it will be sensible to 1/100 of a milligram, or 1/200 of a milligram, or 1/300 of a milligram, &c., and this is accomplished by providing removable weights of different sizes which can be placed upon the beam or removed therefrom at will.

The numeral 80 designates such a weight and it is formed preferably with a central aperture 81 therethrough, a radial slot 82 and a cross slot 83 at right angles and on the bottom of the weight. This weight when used to increase the sensibility of the balance is slipped over the pointer 42, so that the pointer lies within the aperture 81 and the cross slot 83 engaged with the rider bar so that the weight is held securely and safely in position.

The specific concentric arrangement of the shell 21 within the column 11 affords a very compact and efficient arrangement of the parts for supporting the bearings for the balance beam and for removing the beam from its bearings, and dispenses entirely with levers and other forms of motion transmitting apparatus which are at present in use to effect the removal of the beam from its bearings and to replace it thereon, and the construction adopted is more efficient, as it eliminates all the lost

motion which it is impossible to avoid in the forms of apparatus at present in use for this purpose.

The short column arrangement illustrated and described, which provides for a part of the balance operating mechanism being contained within the sub-base enables the height of the balance within the casing to be reduced to a minimum, thereby diminishing the size of the case and the volume of the air inclosed therein to a minimum, whereby the effect of air currents within the casing upon the balance beam and the parts which it carries, is practically eliminated.

While the drawings show the preferred form of mechanism for reducing the number of oscillations or vibrations of the balance beam and the preferred form is of the nature of a dash pot, it is to be understood that the claims appended to this specification are intended to cover any equivalent form of mechanism for accomplishing the same result, and in the claims the expression "vibration reducing means" is intended to include not only the specific structure of disks and receptacles illustrated by the drawings and described in this specification, but also all equivalent means for effecting the same result.

What is claimed is:

1. The combination in a balance, of a base plate, a casing and a sub-base, a column provided with a bore and a shoulder adapted to project through said base plate into said sub-base with its shoulder resting against the base plate, said column being provided

at its upper end with bearings, a balance beam provided with an axis, knife edges carried by said axis, a shell concentrically located within the bore of said column and provided with notches adapted to engage with the axis of said beam, and an eccentric for reciprocating said shell within the bore of said column.

2. A hanger lifter comprising in combination, a hollow block provided with a head, said head having a radial slot therein, a shaft provided with a head, and a bent arm secured to said shaft and extending outwardly through said radial slot and provided at its upper end with two pins, said hollow block being provided with a screw to prevent said shaft from falling out during transportation.

3. The combination with the balance beam and its bearings, said balance beam being provided at each end with two knife-shaped agates, of hanger lifters provided with two pins and hanger plates with pans suspended therefrom, each of said hanger plates being provided with two agates adapted to rest upon the two knife-shaped agates at an end of the beam, each of said hanger plates also being provided with two depressions adapted to receive the two pins of one of said hanger lifters.

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

WILFRID HEUSSER.

Witnesses:

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