(No Model.)

G. S. PALMER.

Differential Balance.

No. 227,050. **Patented April 27, 1880.**

Fig. 1.

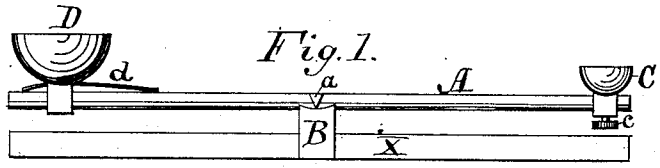


Fig. 2.

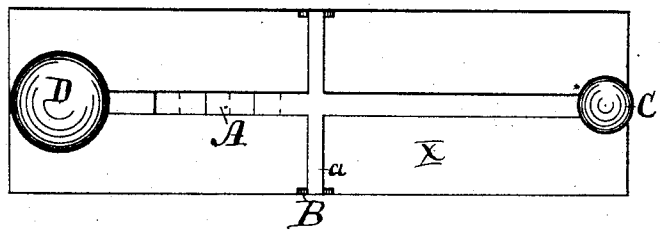
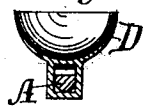


Fig. 3.



Witnesses:
Edwin F. Lyford,
F. A. Waldron.

Inventor:
Gustavus S. Palmer,
per S. N. Bates,
his atty.

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UNITED STATES PATENT OFFICE.

GUSTAVUS S. PALMER, OF WATERVILLE, MAINE.

DIFFERENTIAL BALANCE.

SPECIFICATION forming part of Letters Patent No. 227,050, dated April 27, 1880.

Application filed March 5, 1880. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVUS S. PALMER, of Waterville, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Differential Balances; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to differential or proportional balances for compounding or mixing two substances in certain proportions, and is more especially designed for the use of dentists in mixing amalgams of different kinds for filling teeth.

I carry out my design by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation. Fig. 2 represents a top view or plan. Fig. 3 represents a cross-section through the cup D.

To the bed X are attached the bearings B B. A is a scale-beam, which is supported on the bearings B B by means of the knife-edges or pivots *a a*. On each end of the bar A is a cup, C D. One of these cups, C, is generally intended to remain stationary on the beam, although it may be slid along the beam and secured in any position by means of the thumb-screw *c*. The other cup, D, is so constructed as to slide along the bar A, the spring *d* creating a certain amount of tension and preventing it from moving too easily. The spring *d* also serves as a pointer or indicator by which to set the cup in its proper position.

For the spring *d* may be substituted a set-screw and an independent pointer. The end of the bar which contains the cup D is suitably graduated for convenience in placing the cup D in its proper position.

The mode of operating my invention is as follows, viz: The cup D is slid along the bar A until the indicator *d* points to the graduation-line, indicating the proper proportion of the two ingredients to be mixed and weighed. The two substances are then filled into the two cups, respectively, until they balance.

In weighing amalgam it is designed to place the mercury in the small cup C and the alloy or filings in the larger cup D.

The proper proportion of mercury which will exactly amalgamate each kind of alloy must be determined by experiment, and this will regulate the position of the cup D in each case.

Hitherto it has been the practice of dentists, in compounding amalgams, to estimate the proportions of the mercury and the alloy, always being sure, however, to add an excess of mercury. The two have then been mixed together, the excess of mercury forced out by squeezing, and the amalgam then filled into the tooth. Now this operation of squeezing out the excess of mercury has been found to set or harden the amalgam to a certain extent, and when it is then broken up and filled into the tooth it fails to harden in as thorough a manner as it would had it not been subjected to this squeezing process.

By the use of my invention this defect in mixing amalgam is completely remedied, for the exact proportion of mercury and alloy being easily and conveniently weighed, the two are gently mixed together, leaving no excess of mercury. In this condition, and before it has an opportunity to harden, the amalgam is pressed into the tooth and allowed to solidify into a compact mass, it being a well-known fact that the hardness of amalgam is partially destroyed if it is once disturbed after beginning to set.

My invention thus provides a cheap, convenient, durable, and simple means of mixing amalgams of various kinds in a more economical and perfect manner than that hitherto in use.

I am aware that differential balances may have been in use previous to my invention, but not in the cheap and simple form and adapted to the important purpose as in my invention.

What I claim as my invention, and wish to secure by Letters Patent, is—

1. The differential balance, composed of the cup C, cup D, with its spring *d*, beam A,

knife-edges *a a*, and bearings B, all substantially as and for the purpose set forth.

2. A differential balance for dentists, consisting of the beam A, having knife-edge *a* at its center, on which it is pivoted to the standard B, and sliding cup C on one end of the beam, and sliding cup D on the opposite end, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

GUSTAVUS S. PALMER.

Witnesses:
S. W. BATES,
EDWIN NOYES.