

No. 637,746.

Patented Nov. 21, 1899.

J. S. BROWN.
WEIGHING BALANCE.

(Application filed July 31, 1899.)

(No Model.)

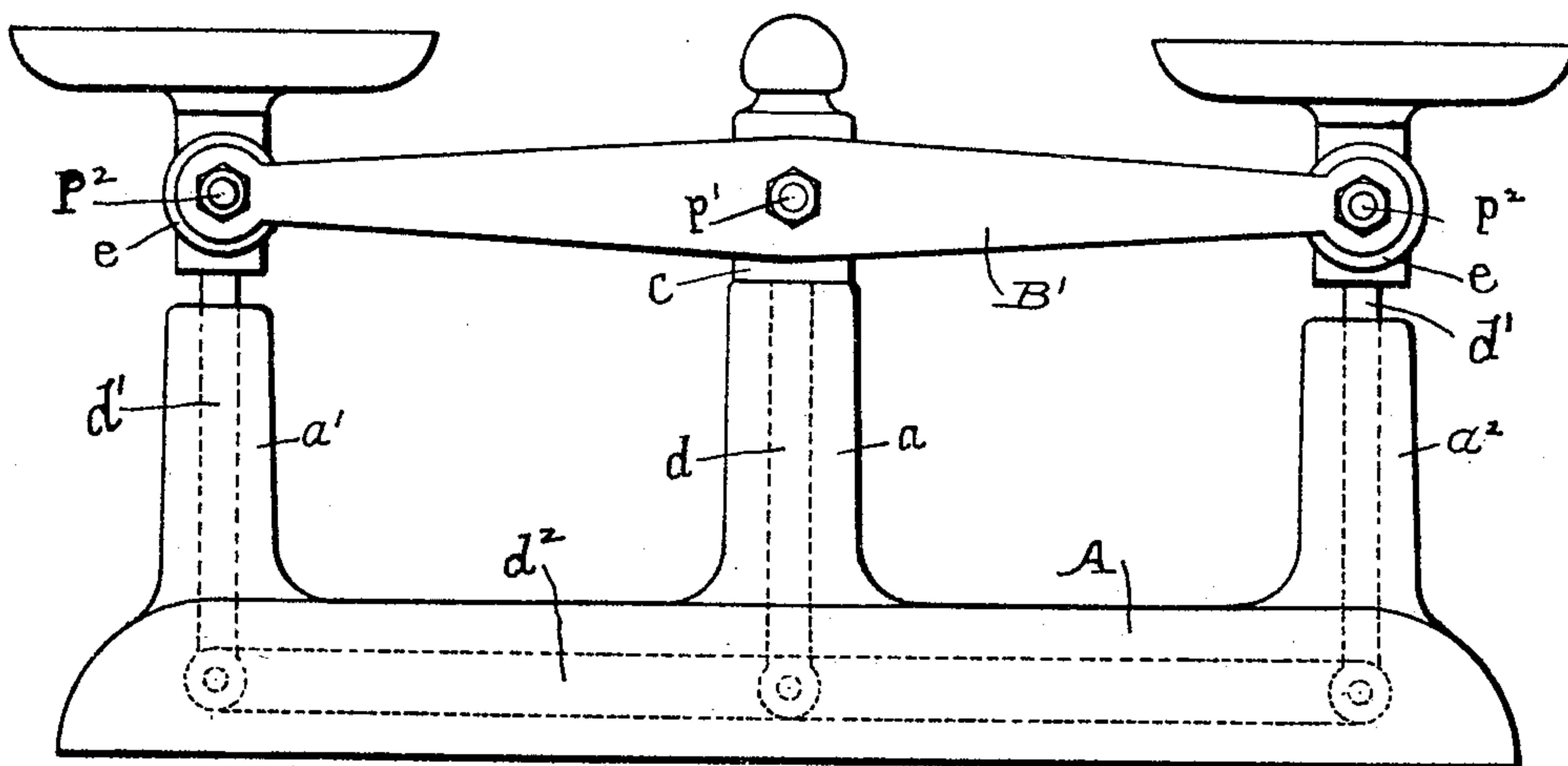


Fig. 1.

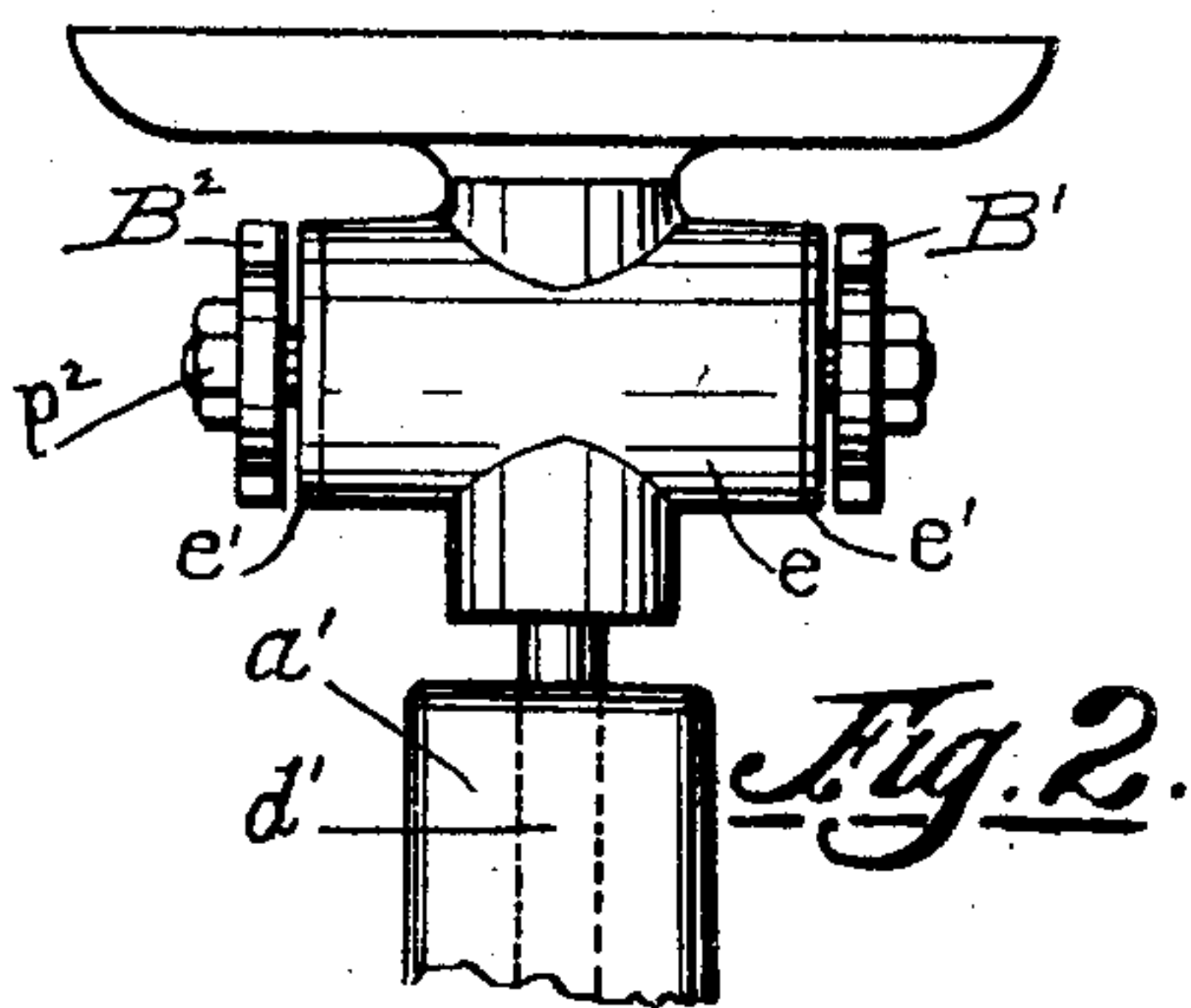


Fig. 2.

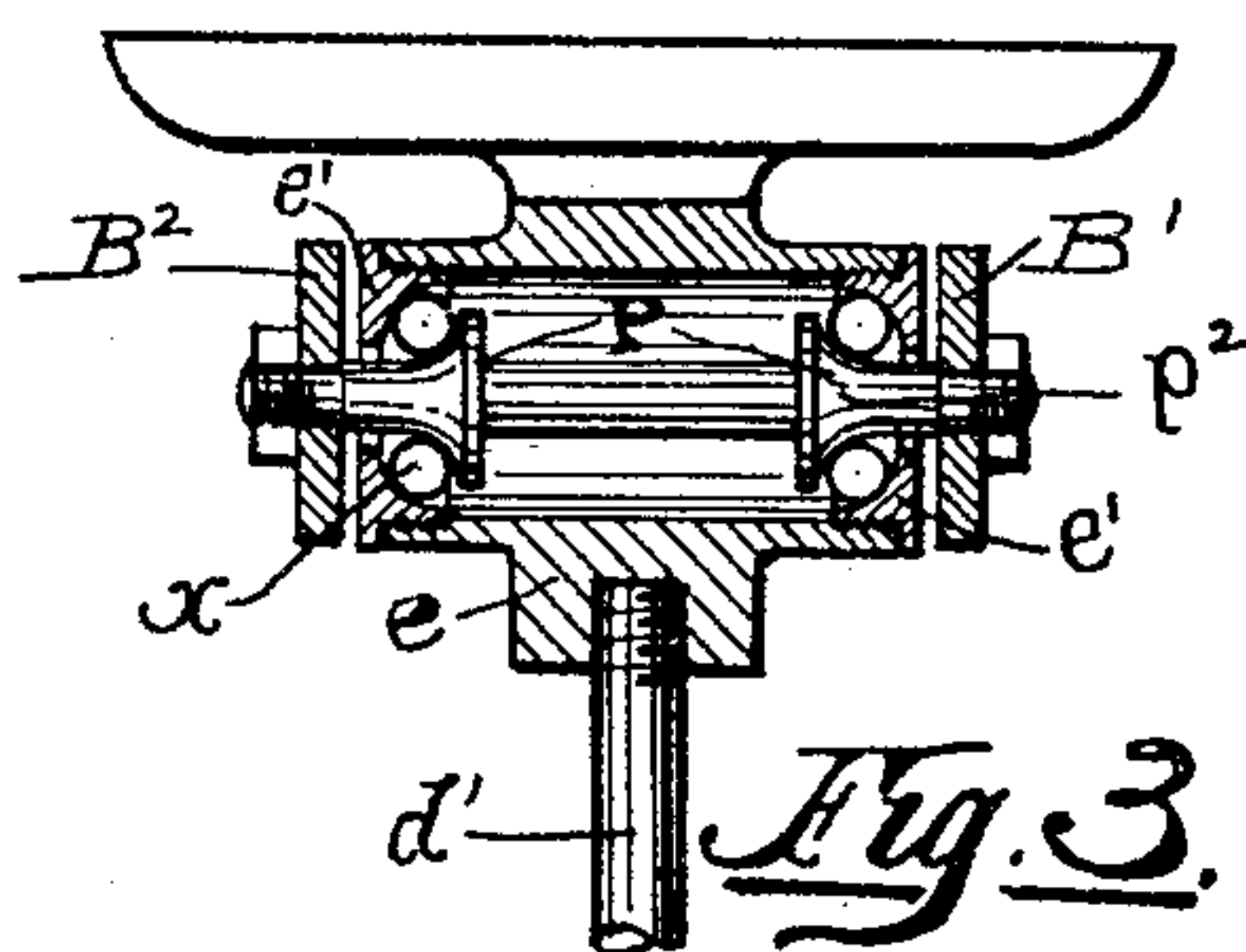


Fig. 3.

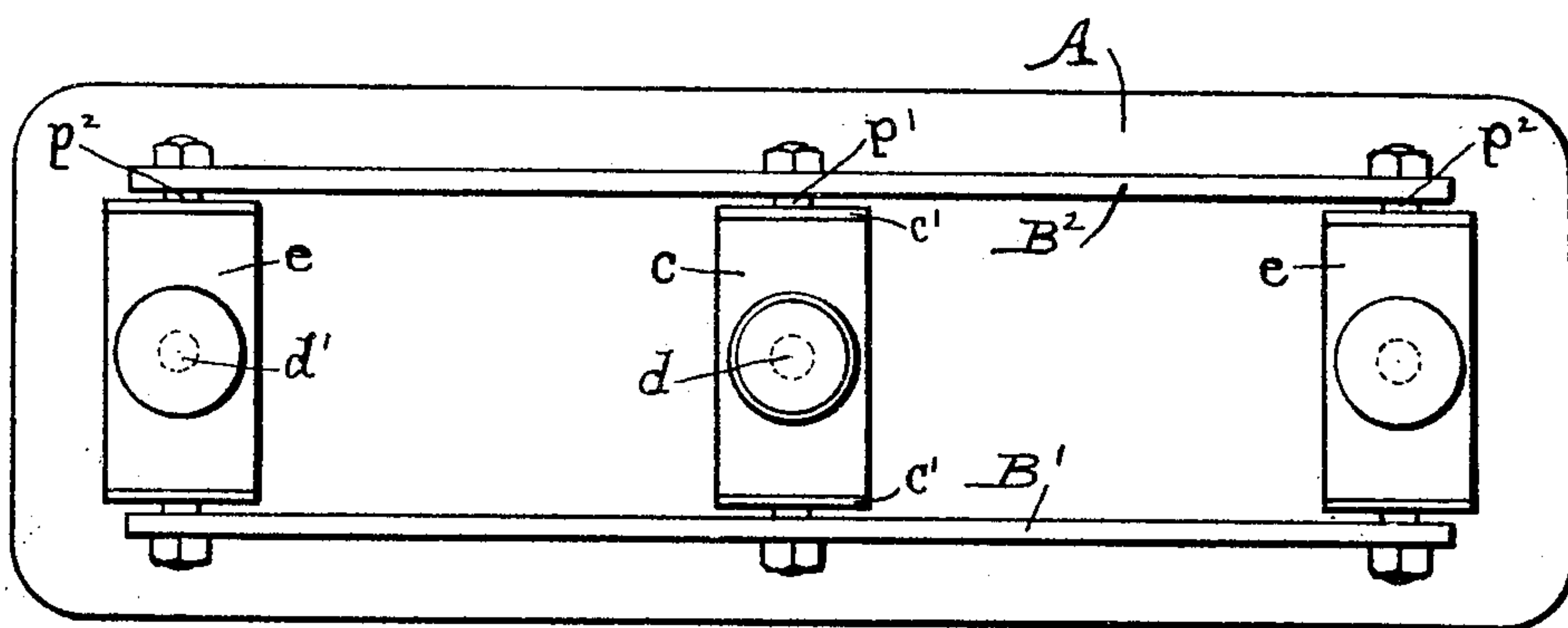


Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN S. BROWN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE SPRINGER
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WEIGHING-BALANCE.

SPECIFICATION forming part of Letters Patent No. 637,746, dated November 21, 1899.

Application filed July 31, 1899. Serial No. 725,937. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. BROWN, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Weighing-Balances, of which the following is a specification.

My invention relates to weighing-balances, its object being to provide a construction that shall be more durable in its sensitive action under the varying conditions of use and not be easily injured or become sluggish and inaccurate.

To this end it consists in the scale construction hereinafter described, wherein the usual "knife-edge" bearings are dispensed with and a system of "ball-bearings" substituted, thereby deriving the benefit of certain latent advantages inhering in such ball-bearings when constructed and applied in the manner hereinafter pointed out to this especial use.

It is well known that the knife-edge bearings for scales rapidly deteriorate by use, even where great care is exercised, since the weight and friction constantly tend to destroy the delicate edge required for sensitive action. Moreover, the surfaces are necessarily exposed to dust and dirt, and as the wear takes place always at the same contact-surfaces the bearings soon become dull and the scale inefficient for its purpose. This inherent condition entails expense in material and construction and especial care in maintenance thereafter.

The limitations and disadvantages of spring-balances are also well known and need not be here referred to.

The special object of my invention is to construct a scale embodying the advantages of a balance-beam, yet with bearings adapted to preserve an efficient condition under all vicissitudes of use for a much longer time than is possible with other constructions by reason both of the special functions of the bearing itself and of the form of construction which conduces to an efficient protection from deteriorating influences.

My invention also consists in the special construction of the scale-bearings whereby all advantages are realized with a minimum

of cost and maximum of adaptability to various uses.

My invention is embodied and illustrated in the construction shown in the accompanying drawings, in which—

Figure 1 exhibits a side elevation of a common form of "counter-scale," to which my invention is applied. Fig. 2 is an end elevation of the same; Fig. 3, an axial longitudinal section of one of the ball-bearing pivot constructions, and Fig. 4 a top plan of the balance-beams and connections.

Referring to the drawings, the reference-letter A indicates the hollow base-plate, provided centrally with a hollow pedestal a and hollow end risers a' a^2 . Two parallel balance-beams B' B^2 are rigidly secured at the center and ends, respectively, to cross-pivots p' p^2 of hardened metal, as hereinafter made more apparent. Each of the end cross-pivots p^2 is formed near its opposite ends with cones P, and disposed about said pivot is a cylindrical casing e , the ends of which are internally threaded, and in said threaded ends are screwed perforated cup-shaped screw-caps e' . Arranged between the cones P and the screw-caps e' are disposed antifric-tion-balls.

Arranged on the central pedestal a is a cylindrical casing C. In the ends of this cylindrical casing are fitted perforated screw-caps c' , through which passes the pivot p' , said pivot being formed with cones, and antifric-tion-balls being arranged between said cones and the screw-caps c' precisely in the manner before described with reference to the end bearings shown in Fig. 3. The ends of the pivot extend out through the screw-caps c' and through the balance-beams B' B^2 , which are securely bolted thereto. An arm d is rigidly secured at its upper end to the casing C and extends down through the pedestal a to a connection d^2 , presently to be described, whereby the casing C is held to its seat on top of the pedestal. Additional means of any suitable character may also evidently be employed, if desired, for holding the casing in place on the pedestal.

The ends of the beams B' B^2 are firmly secured to the ends of the pivots p^2 , as shown in Fig. 3; but the cylindrical casings e are

not attached or held to the end risers in any manner and are carried by the beams $B' B^2$ instead of supporting the beams, as is the case with the central casing C.

5 The cylindrical casings e are extended below by arms d' , passing through the hollow end risers $a' a^2$.

The lower ends of the arms d and $d' d'$ are pivoted to a connecting-rod d^2 , extending from
10 end to end of the structure within the hollow base. The function of the arm connections $d' d'$, rigidly secured to the heads e and pivotally secured to the balance-beams above and to the central arms d below by the con-
15 necting-rod d^2 , is to maintain the scale-pans y always in proper position, as will be readily understood.

The operation of the balance is as usual, except that the entire load is taken by the
20 three systems of ball-bearings at the center and ends of the balance-beams. The minimizing of friction in the bearings conduces to the sensitiveness of action, while the continual change of contact-surfaces enhances
25 durability. The balance thus constructed

will stand abuse and heavy loads with little wear, and consequently maintain its condition of sensitive action practically unimpaired. The protected position of the ball-races is such as to be practically inaccessible to dirt 30 and affords also ample facilities for cleaning, repairs, &c.

I claim as my invention and desire to secure by Letters Patent of the United States—

A balance-beam comprising two parallel 35 levers rigidly united at the center and ends by pivots, in combination with cylindrical casings inclosing the pivots, antifriction-balls disposed between the pivots and the cylindrical casings and forming rolling bearings 40 between said pivots and casings, and a fixed support for the central cylindrical casing, substantially as described.

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

JOHN S. BROWN.

Witnesses:

ARCHIBALD WHITE,
DONALD STUART.