No. 833,868. PATENTED OCT. 23, 1906.

O. T. BOULTON.

SCALE.

APPLICATION FILED FEB. 26, 1906.

3 SHEETS—SHEET 1.

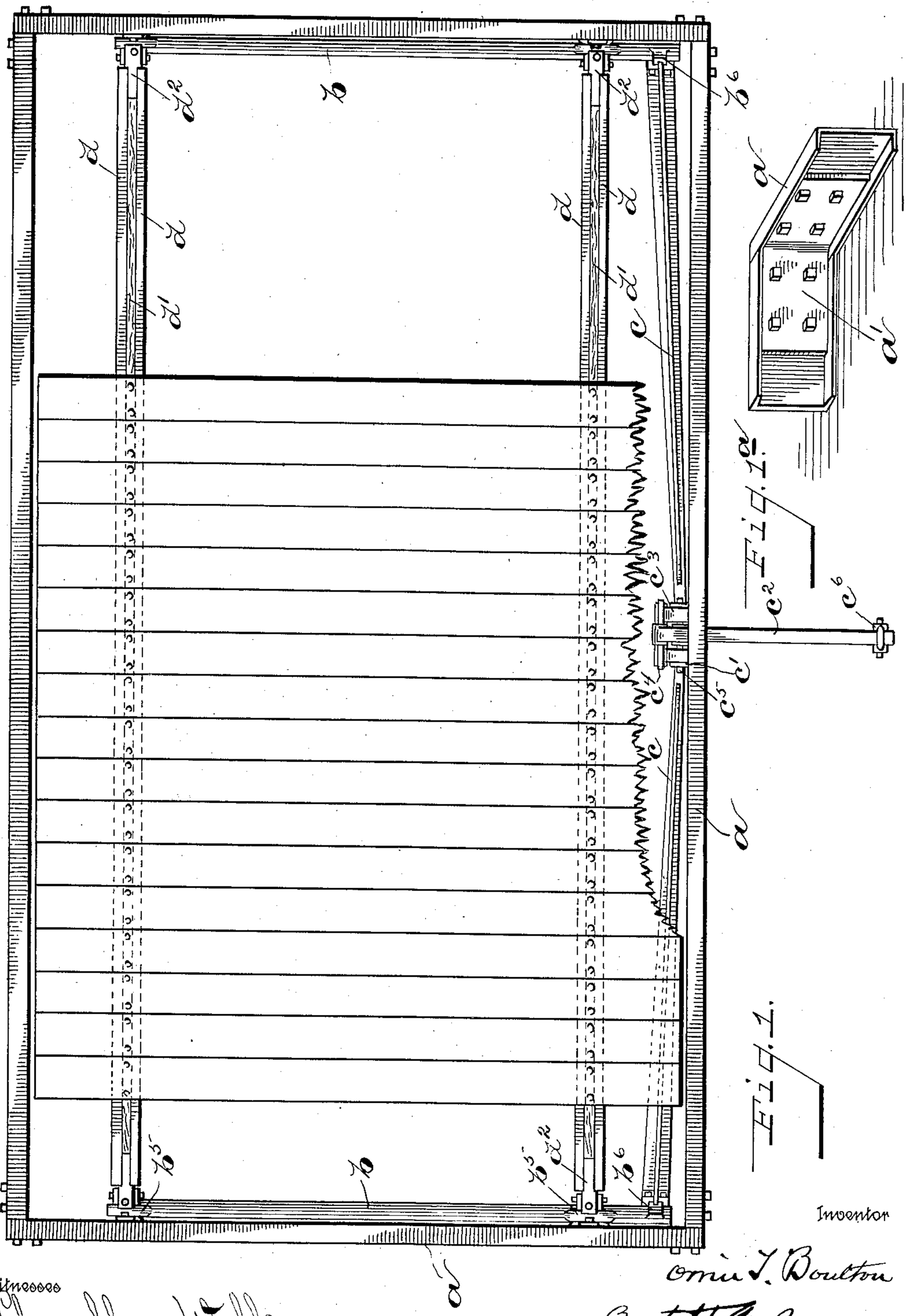

Fig. 1.

Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 2

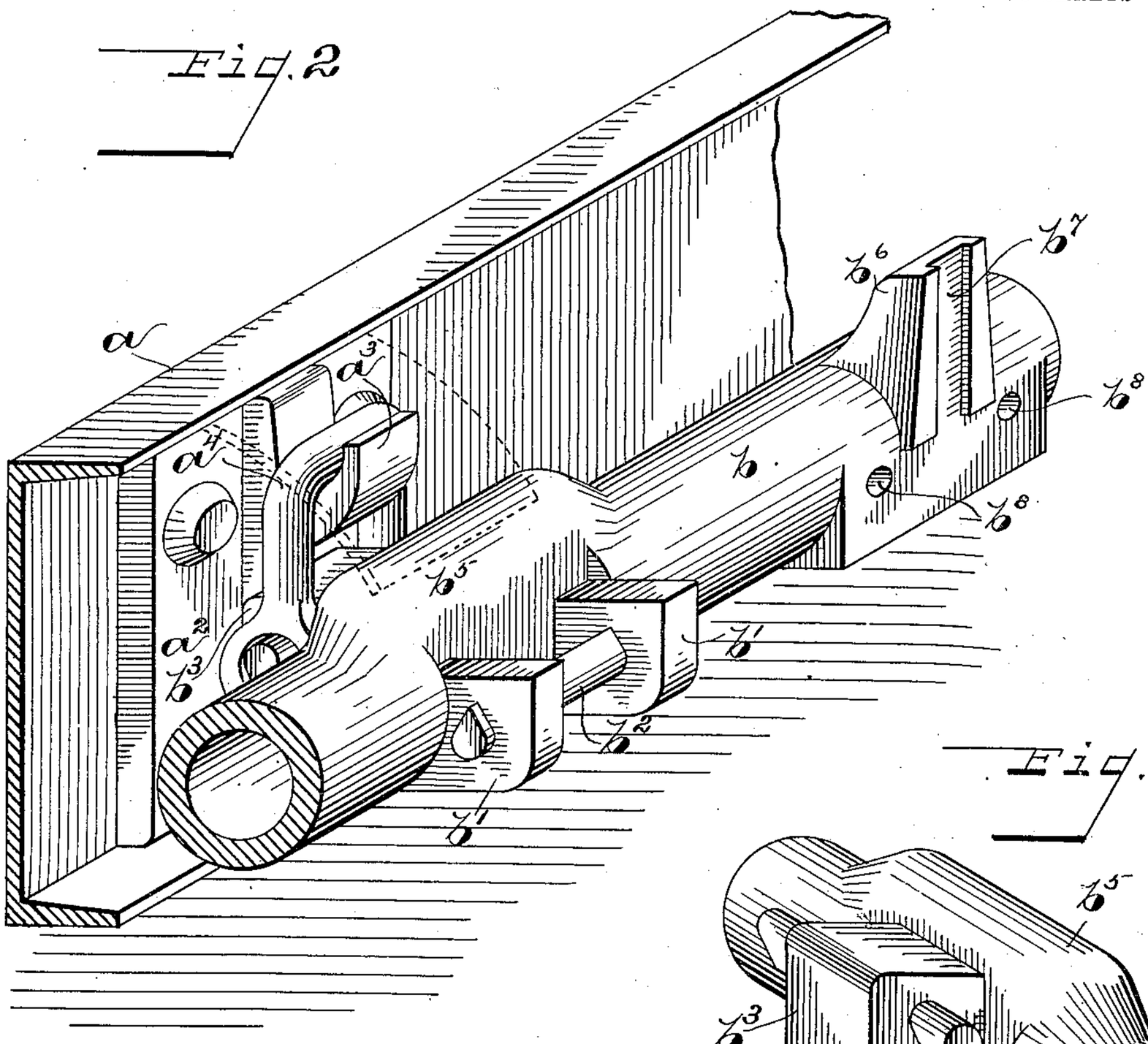


Fig. 3.

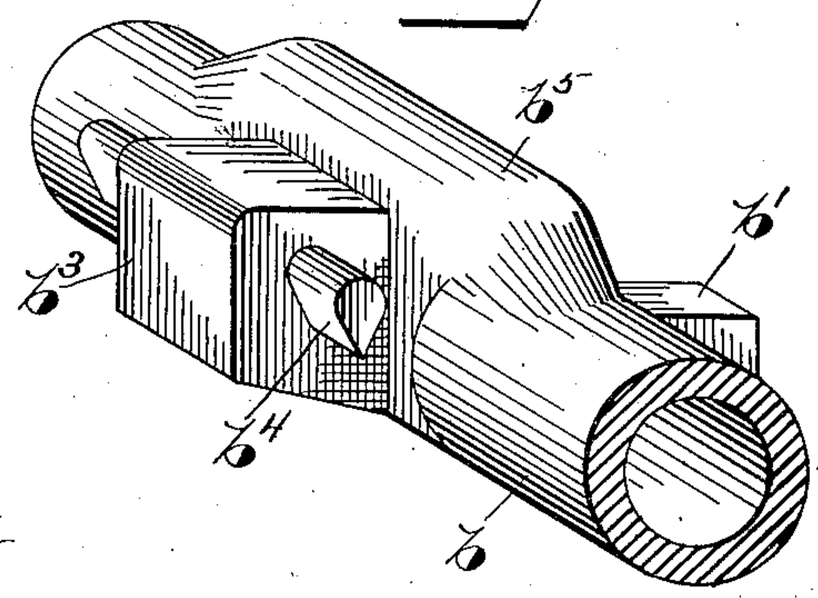
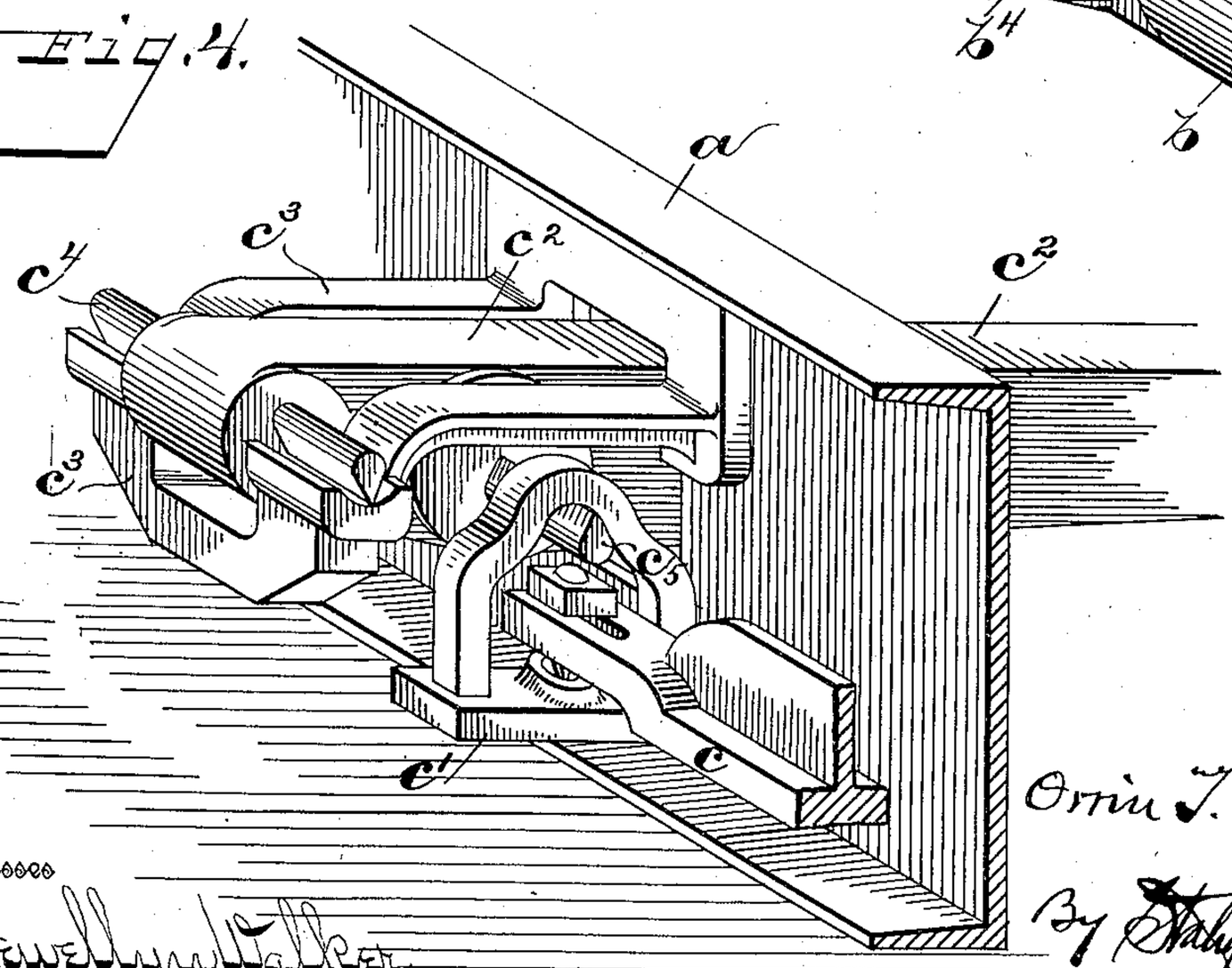


Fig. 4.



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3 SHEETS—SHEET 3.

Fig 5

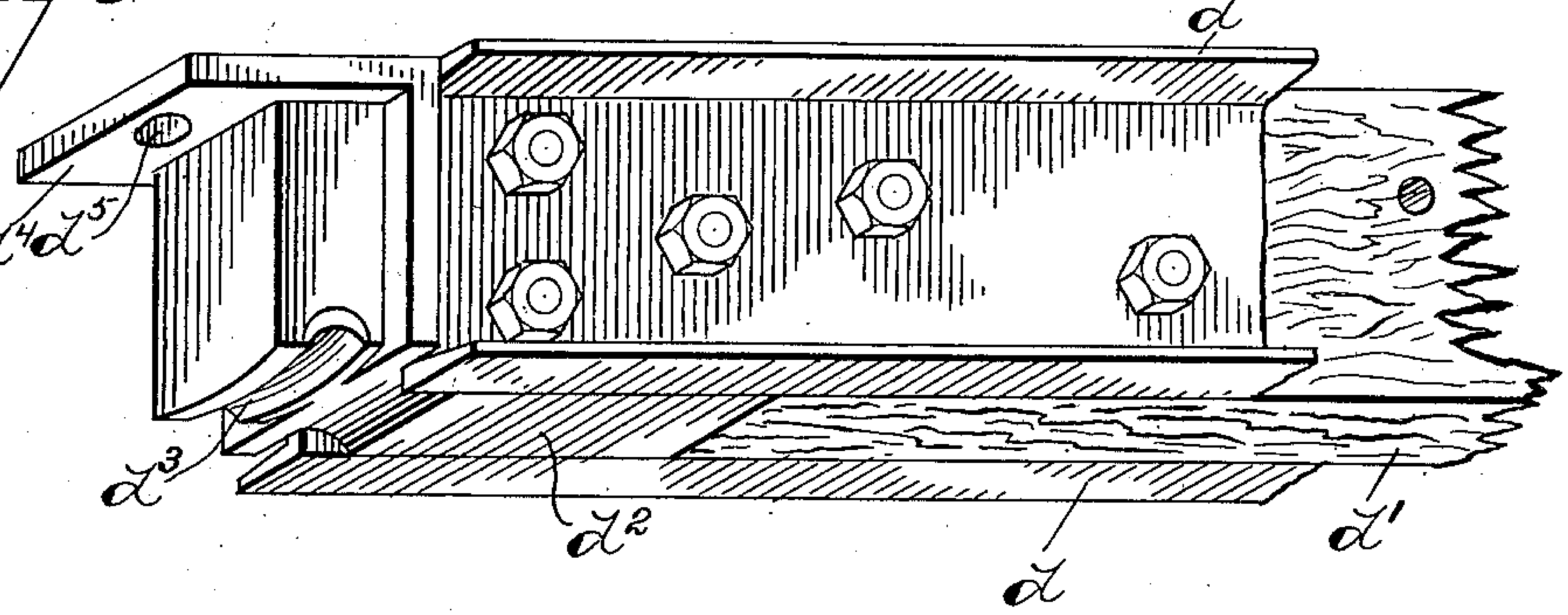

Fig. 8.

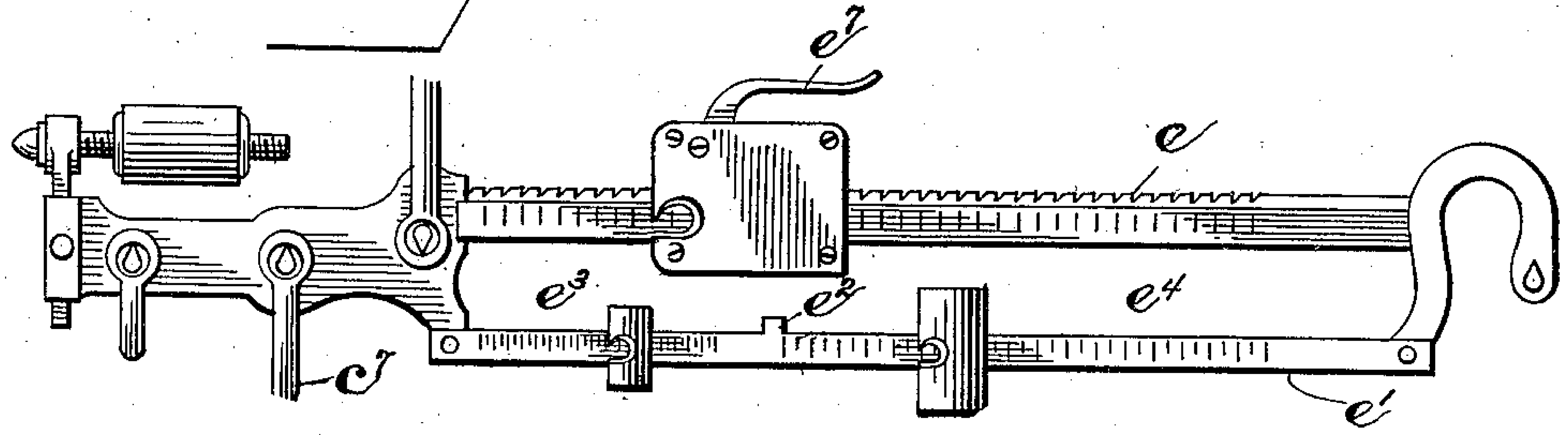

Fig. 9

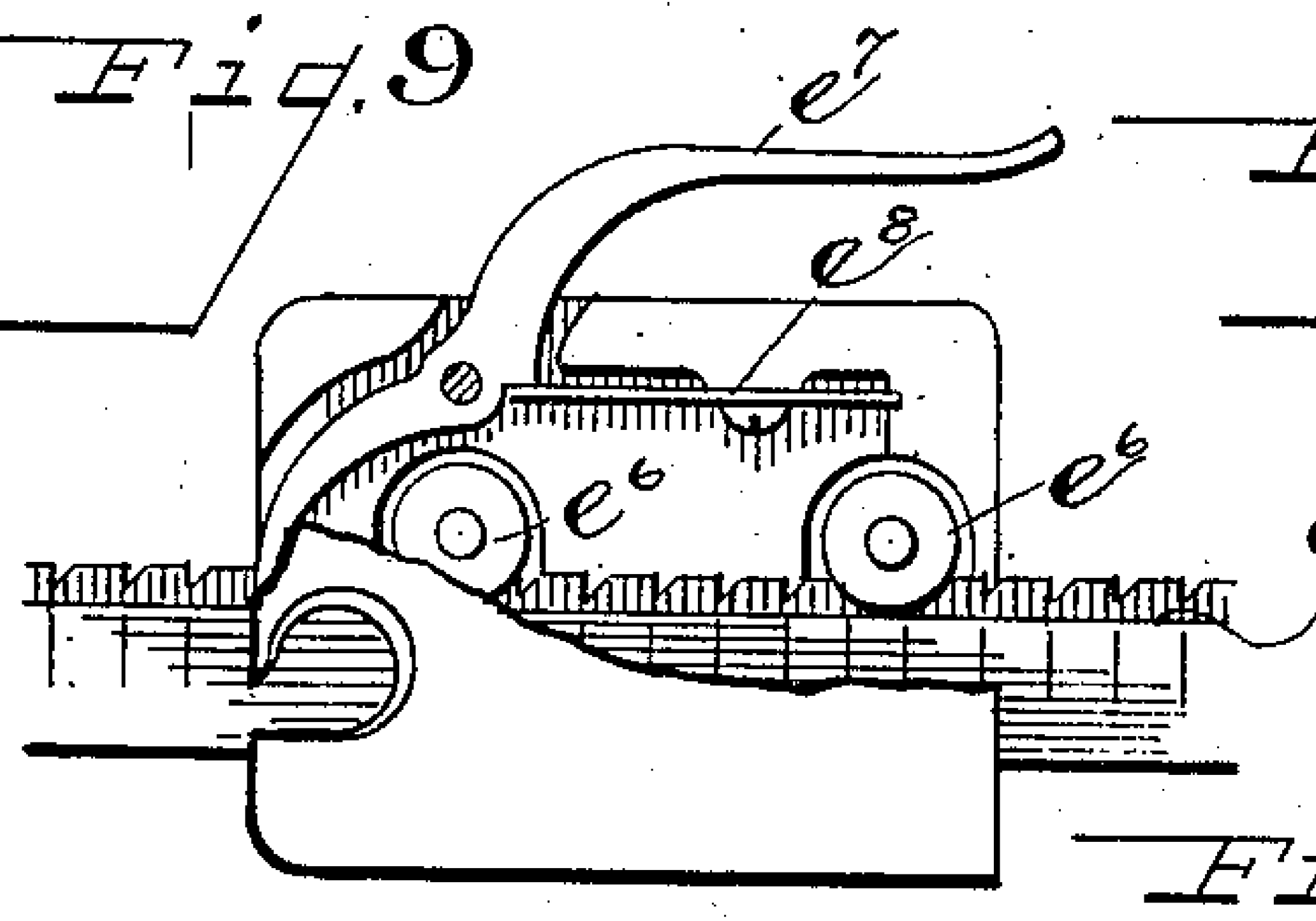

Fig. 10.

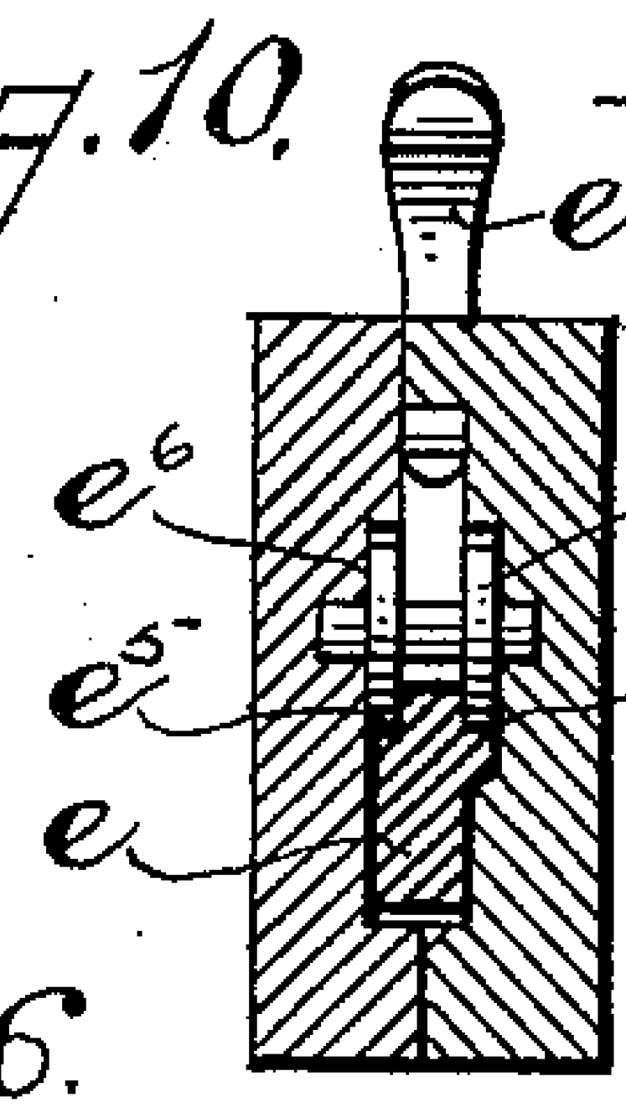

Fig. 12.

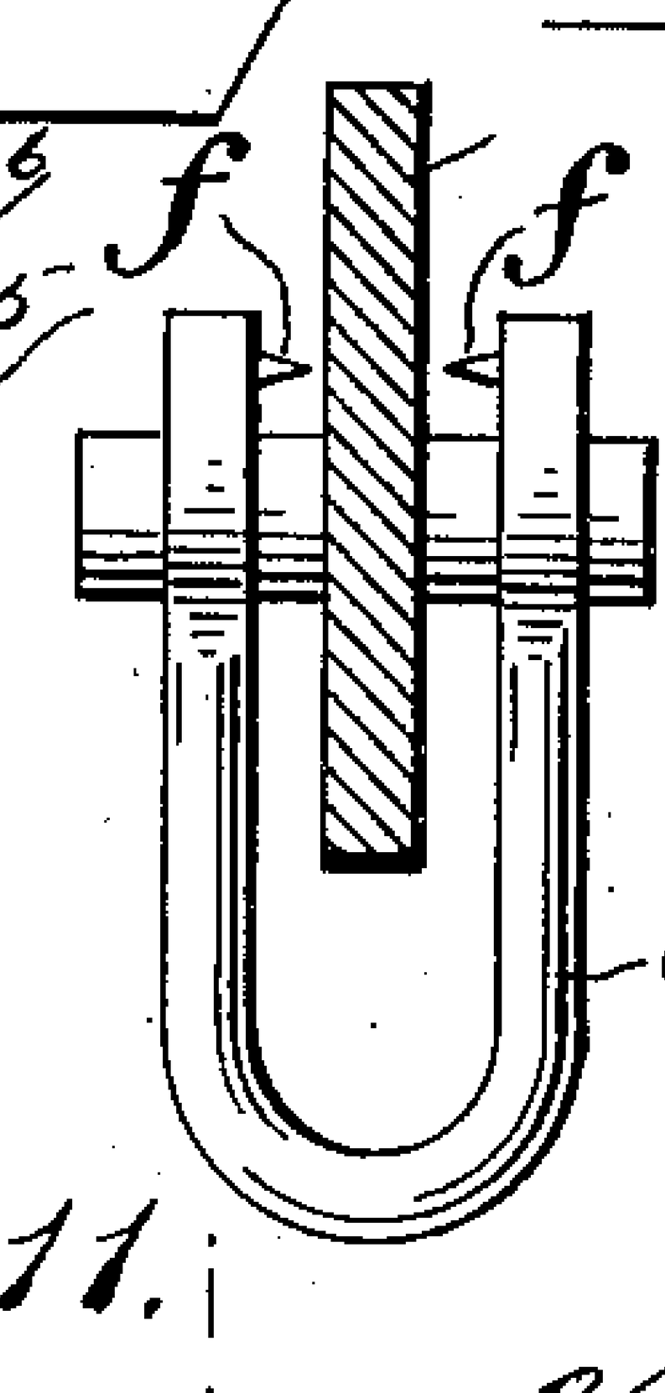

Fig. 13.

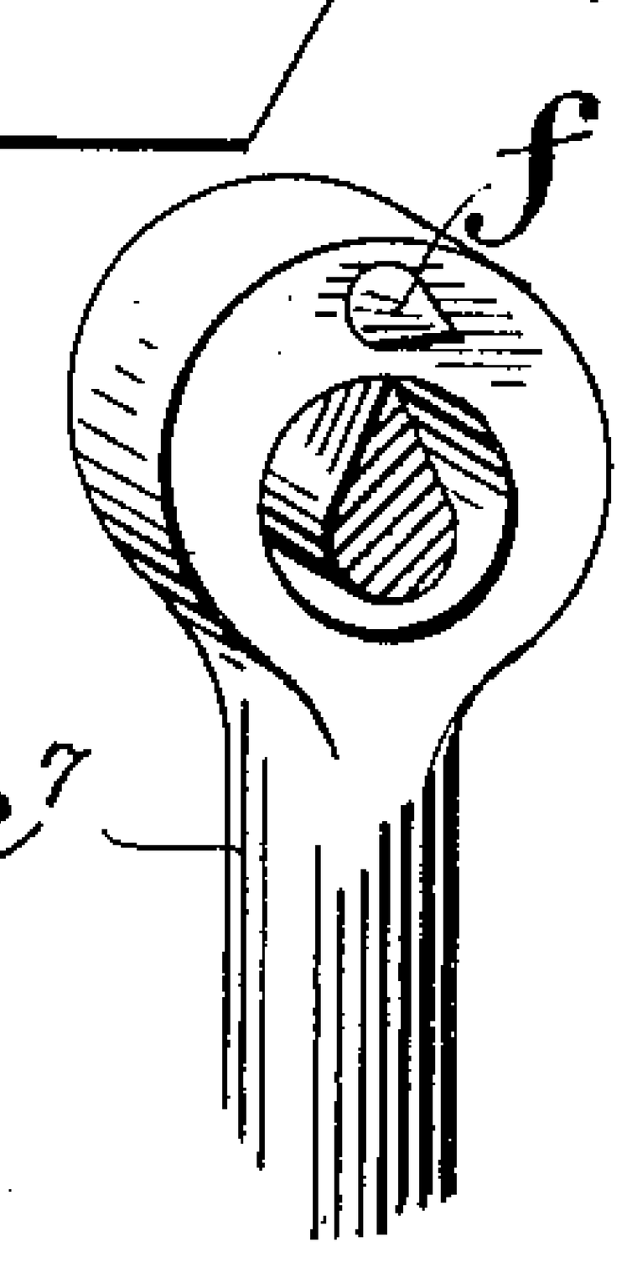

Fig. 6.

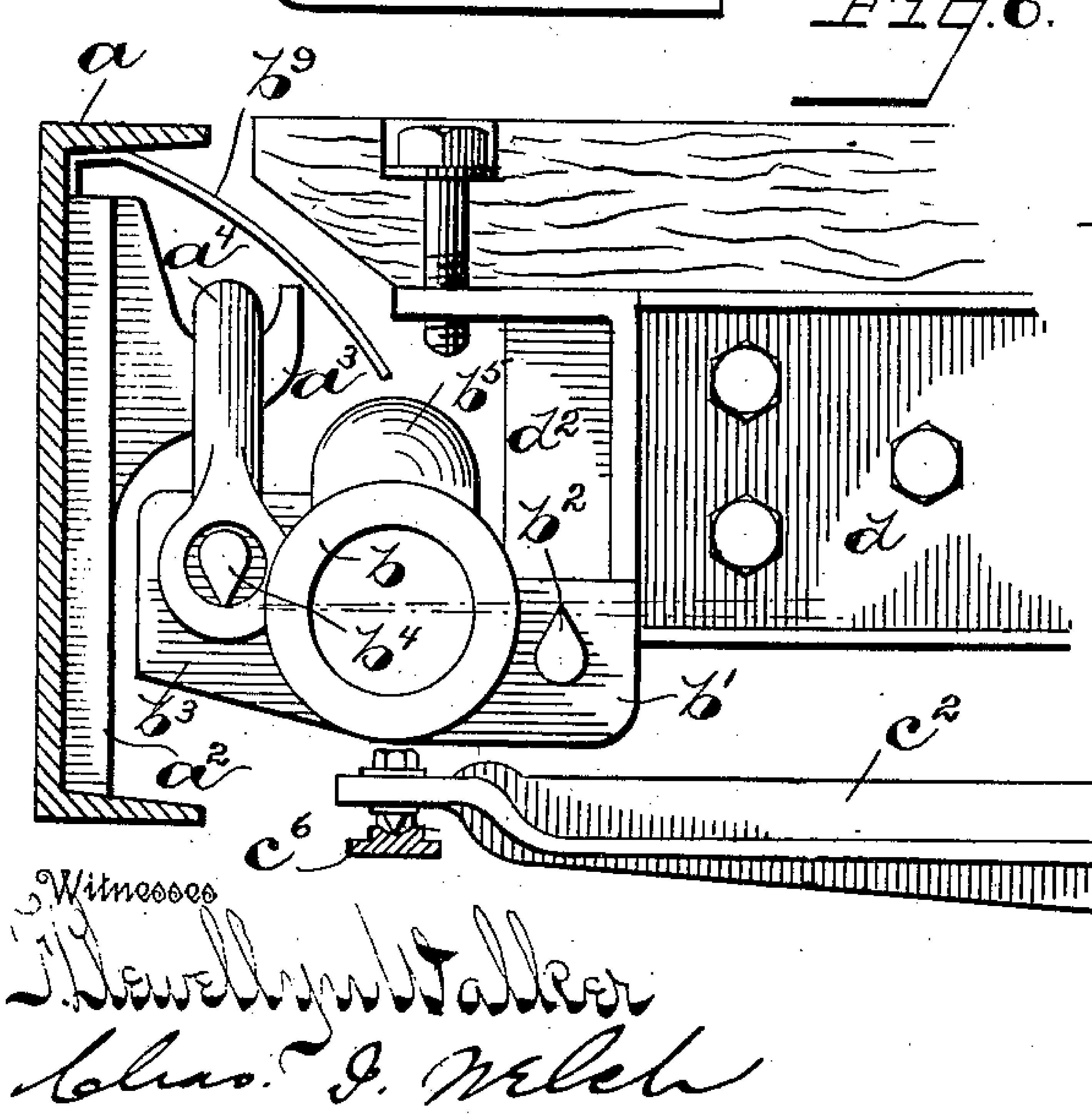

Fig. 11.

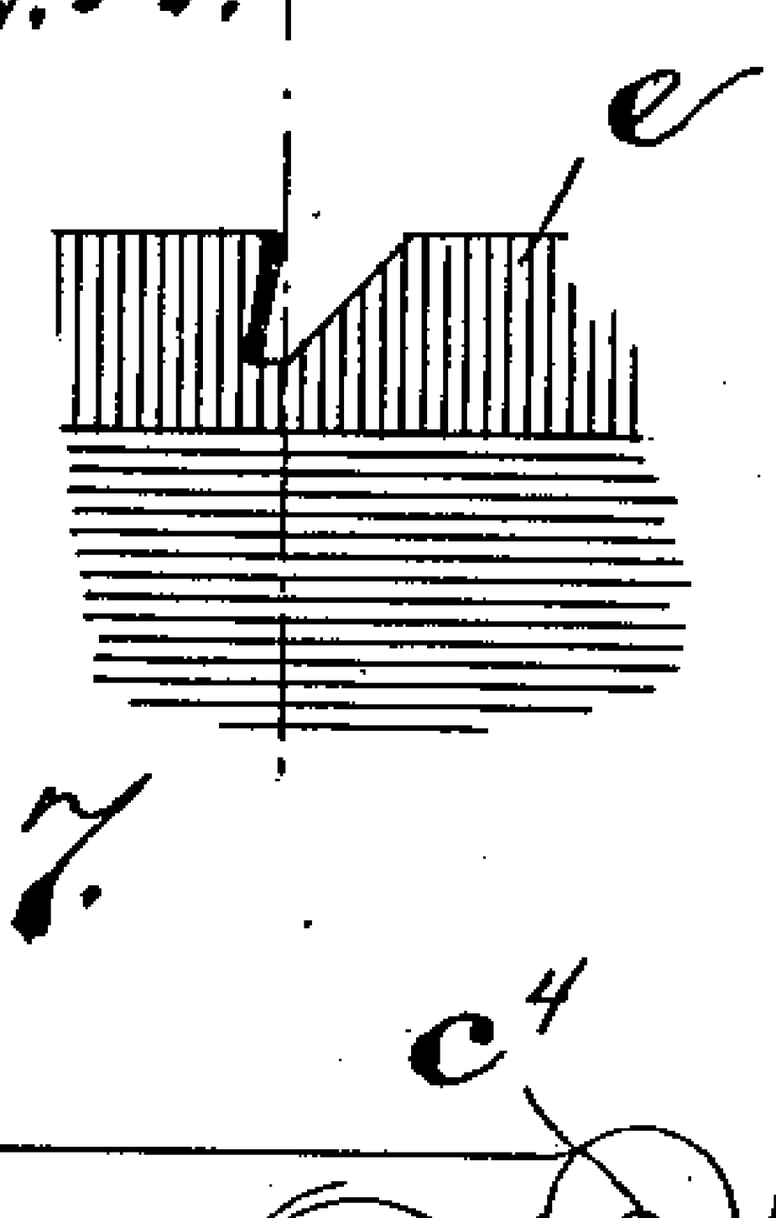

Fig. 7.

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UNITED STATES PATENT OFFICE.

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SCALE.

No. 833,868. Specification of Letters Patent. Patented Oct. 23, 1906.

Application filed February 26, 1906. Serial No. 303,015.

To all whom it may concern:

Be it known that I, ORRIN T. BOULTON, a citizen of the United States, residing at Covington, in the county of Miami and State of Ohio, have invented certain new and useful Improvements in Scales, of which the following is a specification.

My invention relates to weighing-scales, and particularly to "pitless" wagon-scales.

The object of the invention is to provide a construction for scales of this type wherein the factor of safety will be increased by a variation in the ratio of levers, whereby the load will be supported nearer the fulcrum than is possible in such scales as ordinarily constructed. The said variation in the leverage will further decrease the proportionate pull exerted upon the weighing-beam and intermediate parts, thus avoiding undue straining of said parts.

A further object is to provide a construction wherein the bearings may be protected from dirt or grit and the effects of inclement weather, while not interfering with the necessary swing or vibratory movements of the platform.

Further objects are to provide means to prevent undue friction between the various clevises and adjacent parts, to provide an improved form of engagement-notch for the weighing-beam, and to arrange the respective knife-edge bearings of the various levers in more efficient relation.

With the above primary and other incidental objects in view, as will appear from the specification, the invention consists of the construction, the devices and parts, or their equivalents hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a plan view of the scale with a portion of the platform-flooring removed and also the weighing-beam. Fig. 1^a is a detail showing the method of connecting the scale-frame. Fig. 2 is a perspective view showing a portion of the transverse or rock shaft with its supporting connection to the scale-frame, the bearing for the platform-beam, and the connection for the long or flat lever. Fig. 3 is a perspective detailed view of a portion of the rock-shaft from the side opposite that shown in Fig. 2. Fig. 4 is a perspective view of the cross-lever connections. Fig. 5 is a perspective view of one end of one of the platform-beams. Fig. 6 is a side elevation of the rock-shaft connections, showing the protecting-shield for the support-bearing, also diagrammatically illustrating the relative location of the knife-edged bearings. Fig. 7 is a side elevation of the cross-lever, showing the relative location of the respective bearings. Fig. 8 is a side elevation of the weighing-beam. Figs. 9 and 10 are details of the poise. Fig. 11 is an enlarged detail view of one of the engagement-notches of the weighing beams. Figs. 12 and 13 are detail views of improved form of clevis.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawings by letter, a represents a rectangular frame formed of sections of channel-iron set on edge and secured at the corners by reinforcing-plates a', as shown in Fig. 1^a. Secured on the interior of the end portion of the said frame by bolts or rivets are brackets a^2, having supporting-hooks a^3 for engagement of the clevises a^4, by which the respective rock-shafts are supported. The rock-shafts b are located at opposite ends of the scale-frame and consist of a shaft or pipe, having at suitable intervals lugs b', carrying thereon knife-edged bearings b^2. Projecting from the rock-shaft b directly opposite the lugs b' is a lug b^3, having a knife-edged bearing b^4 engaging with the supporting-clevises a^4. The rock-shaft b at points adjacent to the said lugs b' and b^3 is reduced in thickness in order that the knife-edged bearings b^2 and b^4 may be located comparatively close to each other. In order to retain the required strength, the rock-shaft b at the point of its reduced thickness is increased in height, as shown at b^5.

Formed at one end of the rock-shaft b is a lug b^6 for engagement with the end of the long or flat lever c, which at its opposite end bears on the stirrup c', supported upon the cross-lever c^2. By decreasing the thickness of the rock-shaft, as at b^5, and the distance between the knife-edged bearings b^2 and b^4 greater loads may be safely supported without danger of straining or breaking the parts, and, further, by the ratio of the distance between the said bearings b^2 and b^4 and the distance between the bearing b^4 and the bearing of the long or flat lever c upon the stirrup c' the proportionate load carried by said stirrup c' and the cross-lever c^2 will be decreased. The lug b^6 for the engagement of the long or

flat lever is formed with a recess b^7, into which projects a corresponding rib on the end of said long lever, the long lever being secured to the rock-shaft by two bolts passing through suitable openings b^8. The cross-lever c^2 is supported upon the main frame of the scale entirely independent of the platform-beams or the levers by a chair c^3, which projects inward from the side of the main frame and has formed therein suitable bearings for the fulcrumed bearing c^4 of said cross-lever c^2. The bearing c^5, upon which is supported the stirrup c', is located quite close to the fulcrumed bearing c^4 in proportion to the length of the cross-lever, which further tends to reduce the pull transmitted to the weighing-beam.

Referring to Figs. 6 and 7, it will be noted, as indicated in the dot-and-dash lines, that the bearing b^2 of the rock-shaft and the bearing c^5 of the cross-lever are located slightly above the fulcrum-point of said levers when the levers are in their normal position. This has been found in practice to be the most effective arrangement for the knife-edged bearings. Referring also to Fig. 6, b^9 is a shield of sheet metal secured to the main frame a immediately over the bracket a^2 and extending to a point substantially over the center of the rock-shaft b. This shield b^9 protects the knife-edged bearing b^4 from dirt and grit or rain and snow which may sift through between the edge of the platform-flooring and main frame. The cross-lever c bears at its outer extremity on the stirrup c^6, which in turn is connected to clevises c^7 of the weighing-beam, heretofore described. The platform-beams, which rest at their opposite extremities on the knife-edged bearings b^2 of the respective rock-shafts b, are formed of two pieces of channel-iron d d, turned back to back, having an interposed strip of wood d', the parts being secured together by a plurality of bolts. The strip of wood d' is not so long as the channel-irons d d. Between the projecting ends of the channel-irons d d at the opposite extremities of the beam is secured by suitable bolts a lug d^2, having on its bottom a bearing-surface d^3 to engage the knife-edged bearing b^2. The bearing-surface d^3 is slightly concave in cross-section, taken on its shortest dimensions, but is slightly convex throughout its greater dimension, somewhat in the nature of a rocker. By this construction any inaccuracy due to the construction of the platform or the subsequent settling of the frame will be compensated for. The lug d^2 is provided with a flange d^4, having therein a bolt-hole d^5, by which the end boards of the platform may be secured in place. The object of the wooden strip d' is to provide means whereby the remaining floor-boards may be secured to the platform-beams by nails or screws.

The weighing-beam, as illustrated in Fig. 8, consists of a main beam e, graduated in large units of weight—for instance, units of two hundred pounds. Below the main beam e is an auxiliary beam e', divided by a stop e^2 into two scale-beams e^3 and e^4. The beam e^3 is divided into fractional parts of the unit employed on the beam e. Thus if the units of the beam e are two hundred pounds the beam e^3 would be graduated to weigh from zero to two hundred pounds. The beam e^4 is a tare-beam. It has been found in practice that when using a poise having a spring-detent with the scale-beam having the ordinary V-shaped notches the detent would not always be properly centered in the notches by a careless operator, but would stop to one side the notch center, which variation, though slight, would be serious when it occurred on a beam graduated in large units of weight, as our previous example of two hundred pounds. To obviate this difficulty in the present device, there has been provided an improved form of notch, as illustrated in Fig. 11, the side of the notch nearest the fulcrum of the beam being slightly undercut. The customary operation in weighing is to move the poise outward from the fulcrum of the beam. With the notch as shown in Fig. 11 the detent upon reaching the notch will fall directly to the proper point and cannot after entering the notch stop short of the center. In Figs. 9 and 10 are illustrated the poise especially adapted to be employed with a beam having such notches. The beam is preferably provided with opposite projecting ledges e^5, the poise being provided with rollers e^6, supporting the same on said ledges e^5. A lever e^7 is pivoted within the poise and is engaged by a spring e^8, which tends to throw the forward end of said lever downward into engagement with the notches of the beam.

In scales subject to rough usage, as are wagon-scales, it sometimes happens that the various clevises by accidental jar are moved laterally until they come in contact with the beam or the lugs of the beam supporting the knife-edged bearings and retard the operation of the scale. To obviate this difficulty, there is provided on the inner surface of the clevises a^4 of the rock-shafts and the respective clevises of the weighing-beam inward-projecting points f, preferably located as near the knife-edged bearing as practical. These points f are not normally in contact with the beam or lug, but are designed only to come in contact with said beam or lug upon the undue movement of the clevises, and in such cases provide a reduced bearing-surface.

From the above description it will be apparent that there has been produced a weighing-scale possessing the particular features of advantages hereinbefore enumerated and which obviously is susceptible of modification in its form, proportion, detailed con-

struction and arrangement of parts without departing from the principle of novelty or sacrificing its many advantages.

Having thus described my invention, I claim—

1. In a weighing-scale, a rectangular frame, upwardly-disposed hooks carried by said frame, a rock-shaft, outward-projecting lugs on said shaft, oppositely-disposed knife-edge bearings on said lugs, clevises engaging said knife-edge bearings and supported on said hooks, inward-projecting lugs, knife-edge bearings connecting said lugs in pairs, longitudinal platform-beams resting on said bearings and intermediate said lugs, and a shield connected to the frame and extending beyond the opening between the platform and frame to protect the supporting-bearings of said rock-shaft, substantially as specified.

2. In a weighing-scale, a rectangular frame, upwardly-disposed hooks carried by said frame, a rock-shaft having projecting bearings supported on said hooks, said rock-shaft being reduced in thickness at points adjacent to said bearings whereby said bearings may be more closely arranged in their relation to each other, a platform supported on one set of said bearings, a weighing-lever, and connections from said weighing-lever to said rock-shaft, substantially as specified.

3. In a weighing-scale, a rectangular frame, a rock-shaft supported on said frame, bearings on said rock-shaft, a reduced portion in said shaft adjacent to said bearings, said bearings being so arranged that they will be out of alinement when in their normal position, a platform, and a weighing-beam connected to said rock-shaft, substantially as specified.

4. In a weighing-scale, a rectangular frame, a rock-shaft supported on said frame, projecting lugs on said rock-shaft having knife-edge bearings, platform-beams engaging said bearings, comprising two channel-irons, an interposed strip of wood, lugs secured to said channel-irons to engage said bearings, and a weighing-beam connected to said rock-shaft, substantially as specified.

5. In a weighing-scale, a rectangular frame, rock-shafts supported on said frame, long levers secured to said rock-shafts, a platform supported on said rock-shafts, a cross-lever supported entirely independent of said platform, a chair by which said cross-lever is supported secured to said frame, stirrups connecting said long levers and said cross-lever, a weighing-beam connected to said cross-lever, substantially as specified.

6. In a weighing-scale, a rectangular frame, rock-shafts supported on said frame, reduced portions in said rock-shafts, long levers secured to said rock-shafts, a cross-lever supported independent of the movable parts of said scale, a chair for said cross-lever projecting from the main frame, connections between the long levers and said cross-lever, and a weighing-beam connected to said cross-lever, substantially as specified.

7. In a weighing-scale, a rectangular frame, a system of levers, a weighing-beam connected thereto, a platform comprising longitudinal beams and transverse flooring, said longitudinal beams comprising two channel-irons placed back to back, a strip of wood interposed between said channel-irons, to which said flooring is secured, substantially as specified.

8. In a weighing-scale, a main frame, a platform, a system of platform-levers, a cross-lever, a scale-beam connected thereto, a supporting-chair for said cross-lever, comprising arms projecting inward from the main frame and rigidly secured thereto, bearings on said arms for the knife-edge bearings of said cross-lever, whereby said cross-lever will be fulcrumed in close proximity to its load and working points, substantially as specified.

9. In a weighing-scale, a main frame, a platform, a transverse shaft forming a part of a system of platform-levers, and a weighing-beam, said transverse shaft being supported on the main frame and in turn supporting said platform, reduced portions in said transverse shaft adjacent to the bearing-points whereby the leverage between said bearing-points will be shortened, substantially as specified.

10. In a weighing-scale, a main frame, a platform, a system of platform-levers, a cross-lever, a scale-beam connected thereto, said cross-lever projecting beyond the main frame, a supporting-chair for said cross-lever comprising arms rigidly secured to the main frame and projecting toward the fulcrum of said lever, and bearings on said arms for the fulcrum-bearings of said lever, substantially as specified.

11. In a weighing-scale, a main frame, a platform, a system of platform-levers, a cross-lever, a scale-beam connected thereto, arms rigidly secured to the main frame and projecting inward on opposite sides of said cross-lever upon which said cross-beam is fulcrumed, substantially as specified.

In testimony whereof I have hereunto set my hand this 16th day of February, A. D. 1906.

ORRIN T. BOULTON.

Witnesses:
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CLARA GALLAGHER.