

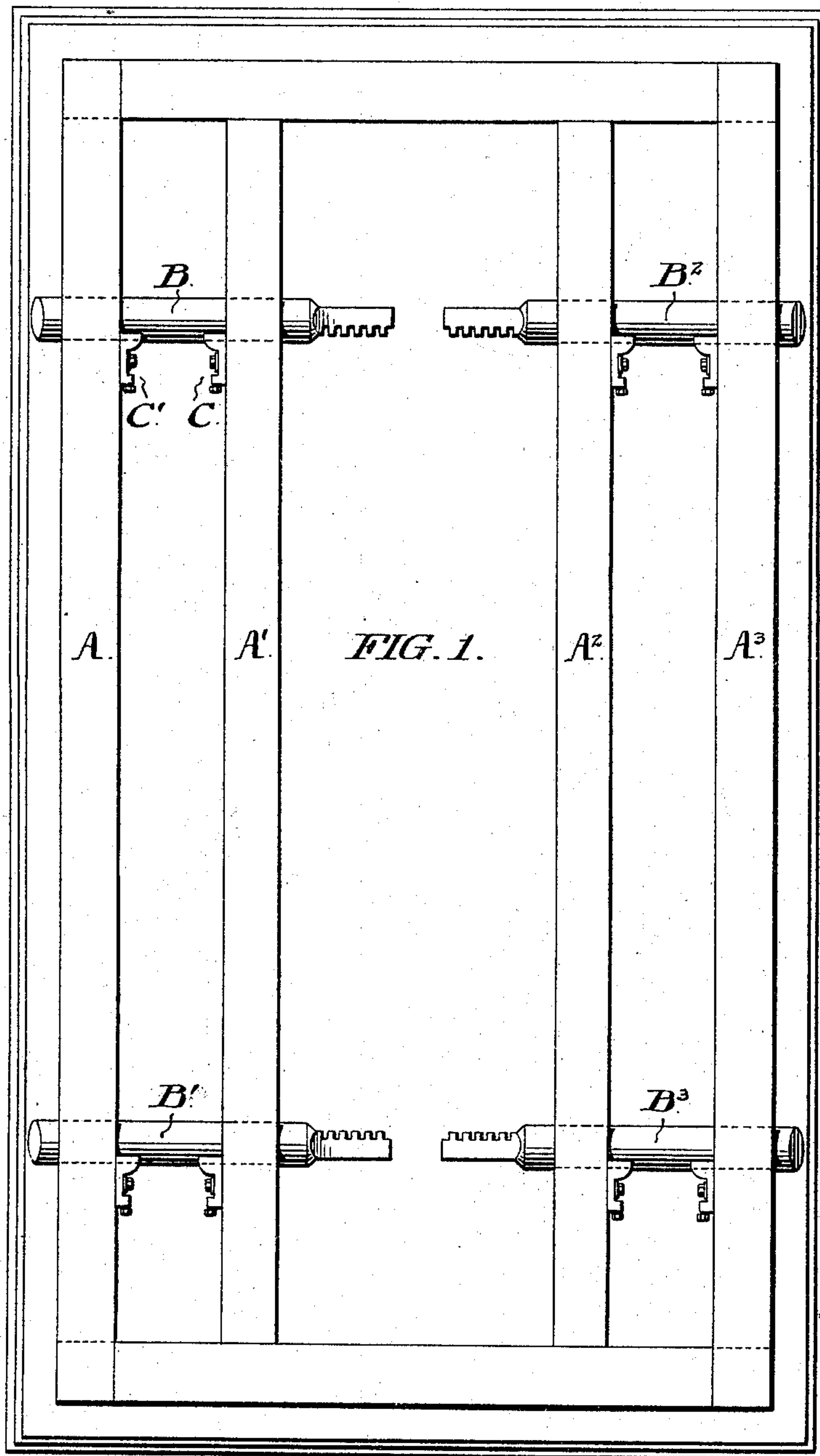
(No Model.)

2 Sheets—Sheet 1.

W. H. HOLLAR.
BEARING FOR SAFE BOLT WORK.

No. 533,299.

Patented Jan. 29, 1895.



WITNESSES:

J. E. Paige
James H. Bell

INVENTOR

William H. Hollar
by his Atty
Henry H. Rice Jr.

(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

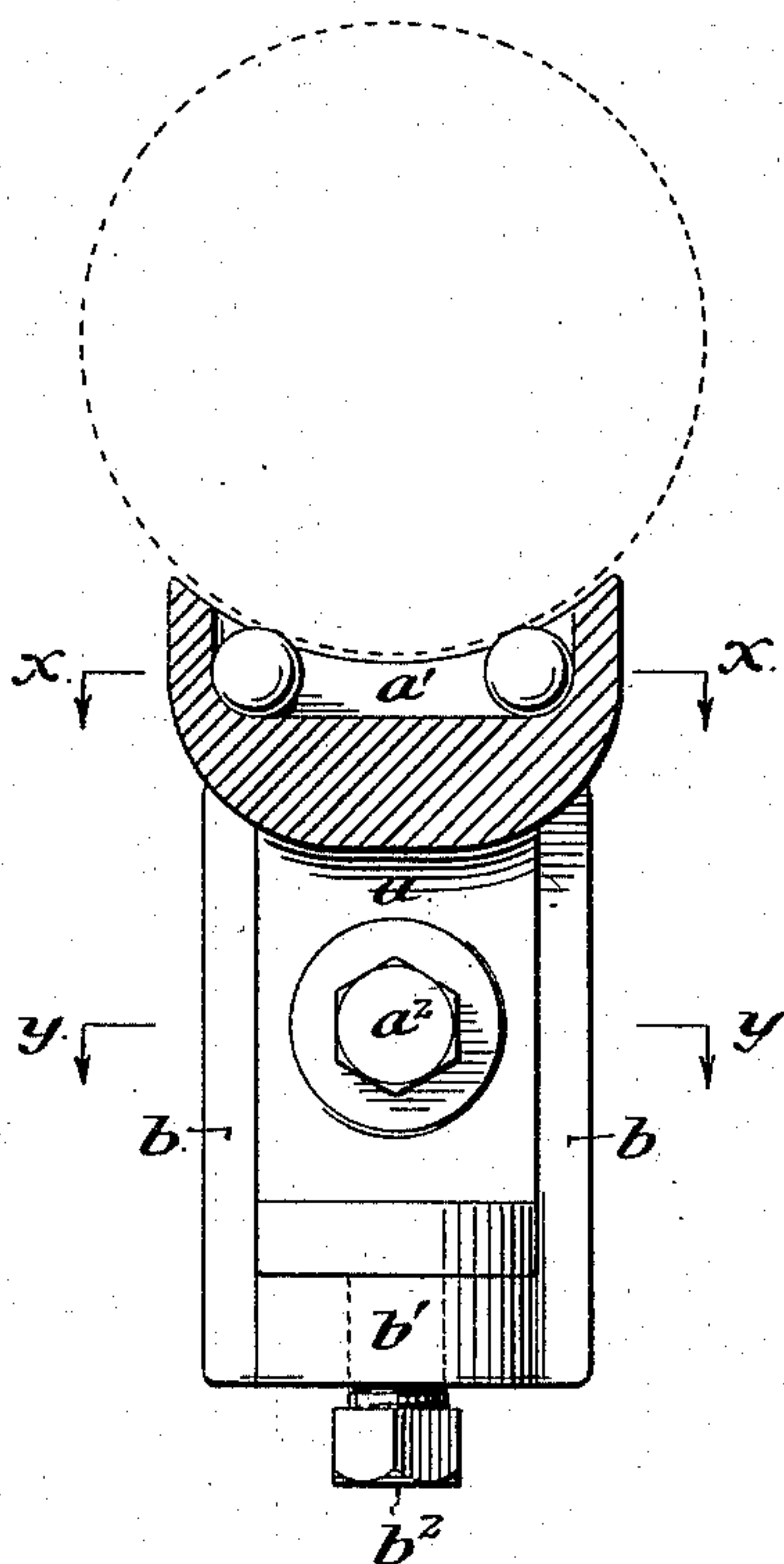


FIG. 3.

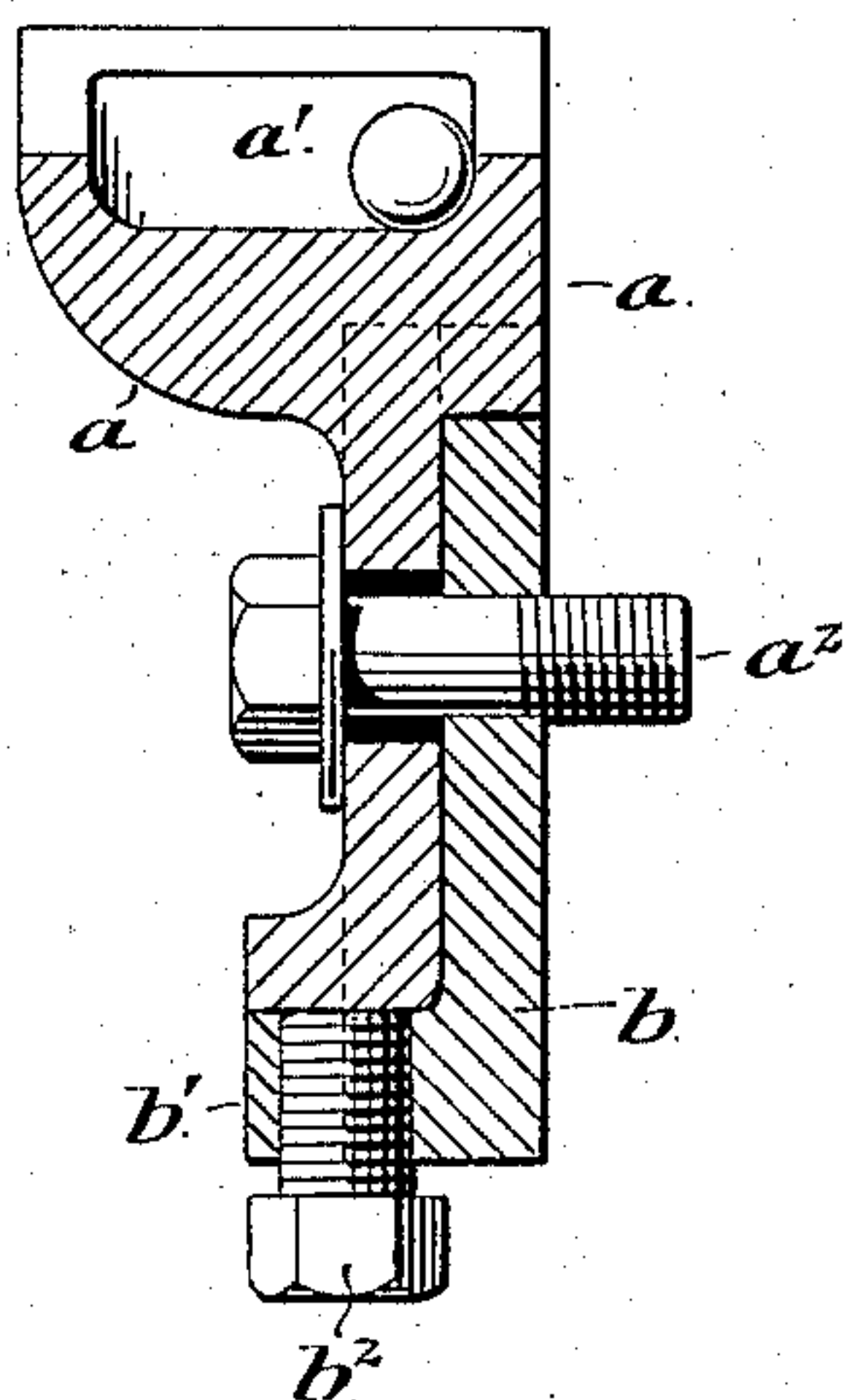


FIG. 4.

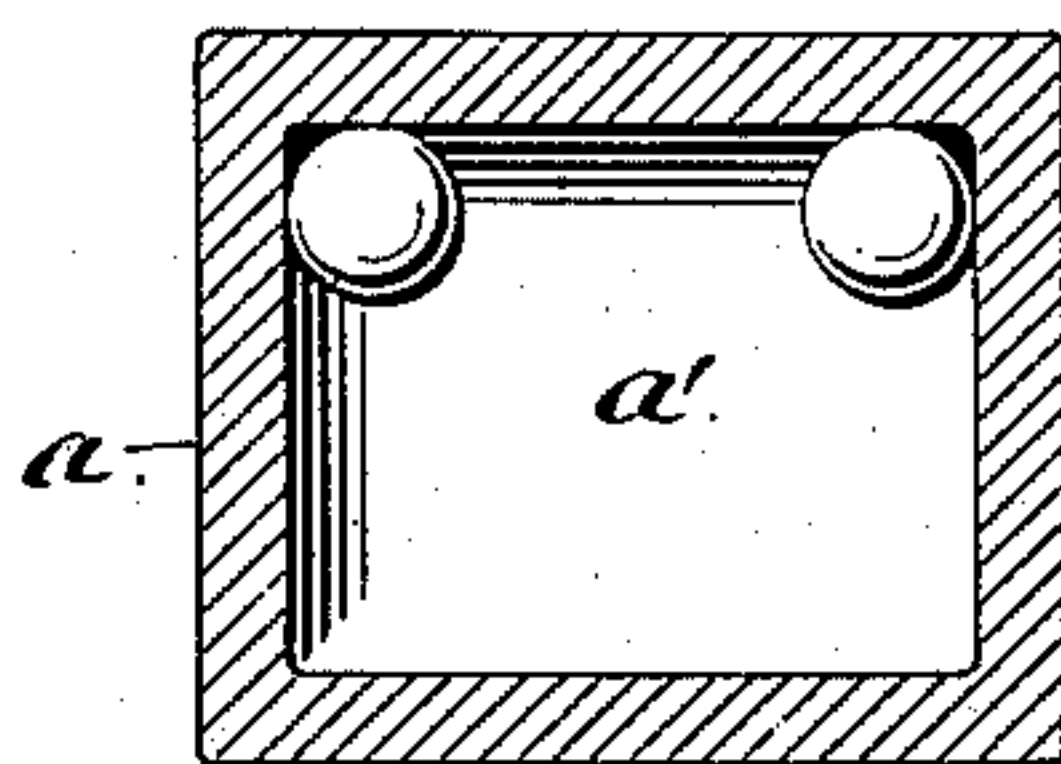
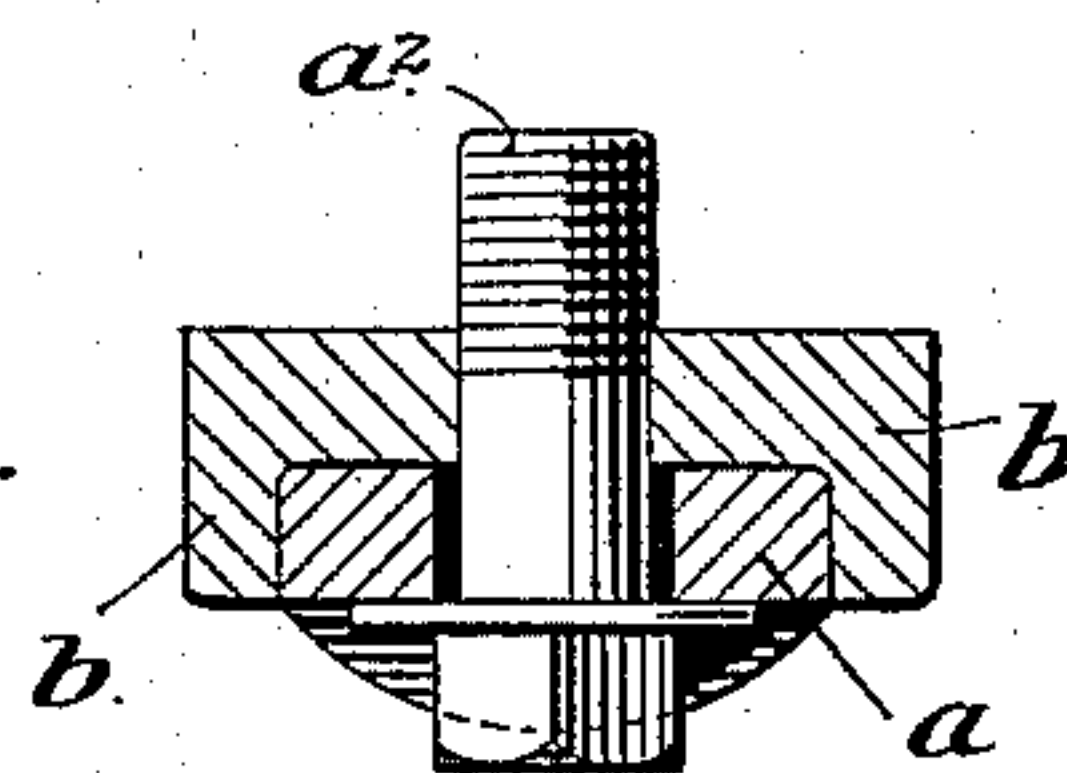


FIG. 5.



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WILLIAM H. HOLLAR, OF PHILADELPHIA, PENNSYLVANIA.

BEARING FOR SAFE BOLT-WORK.

SPECIFICATION forming part of Letters Patent No. 533,299, dated January 29, 1895.

Application filed October 20, 1894. Serial No. 526,435. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. HOLLAR, a citizen of the United States, residing in the city of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Bearings for Bolt-Work in Safes, whereof the following is a specification, reference being had to the accompanying drawings.

10 In the drawings Figure 1 represents an interior elevation of the safe door with four horizontal bolts and their bearings shown, the other parts of the mechanism being omitted for the sake of simplification. Fig. 2 is a vertical cross-section through a single bolt and one of its bearings. Fig. 3 represents a vertical longitudinal section of the same. Fig. 15 4 represents a horizontal section upon the line x, x , of Fig. 2, and Fig. 5 a similar section upon the line y, y , Fig. 2.

20 The increased force of modern explosives has caused a corresponding increase in the size and weight of all the parts of safe work and, especially, in the doors of large safe vaults. With this increased weight the following difficulties are met with: first, the increase of the weight of the individual bolts themselves involves an increase in the amount of the initial force necessary to overcome the inertia of the bolts; secondly, the increase in the size of the door increases the number of the bolts and consequently the number and intricacy of the various parts required to effect their movement. As this bolt work is often 35 entirely controlled automatically by appropriate time locking machinery upon the interior of the safe with no exterior connections, the necessity for exceedingly fine adjustments and very easy running of the parts is the greater in order that the interior force which the time lock releases and which, whether a spring or a weight or an electrically actuated armature is necessarily limited in power, may be enabled without fail 45 to actuate the entire series of bolts. A further difficulty frequently experienced occurs where safe doors have been tampered with unsuccessfully by burglars, and the force of the explosive which has been introduced by 50 them into the crevices between the edges of the door and the jamb has been sufficient to so effectually jam the bolts as to prevent their

being thrown by the time actuated mechanism, thus compelling the practical destruction of the door, in order to obtain access to the safe thereafter. In order to obviate these 55 difficulties and to render the operation of the bolts more frictionless, absolutely true, readily adjustable, and yet capable of yielding to an extraordinary force, my invention consists 60 in the application of separate adjustable bearing cups mounted in series of two or more below each bolt and containing ball bearings disposed in a manner especially fitted to facilitate the motion of the bolts. 65

Referring to Fig. 1, A, A', A^2, A^3 , represent the interior vertical bars through which the bearing apertures for the bolts are customarily drilled.

B, B', B^2, B^3 , represent four horizontal bolts 70 two projecting to the left-hand side of the door, and two to the right-hand side. In a door of this size a much larger number of bolts is customarily used, but four only are shown by way of illustration, it being understood that the number of the same may be 75 indefinitely increased. Upon the interior ends of these bolts a short rack is shown in illustration of one method of conveying to them the force which is to actuate them, but it is 80 to be understood that with reference to my invention the character of the connections whereby the bolts are to be actuated is immaterial and, therefore, no actuating mechanism, is shown in the drawings. The apertures in 85 the bearing bars through which the bolts pass are made larger than the bolts themselves in order to allow adjustment therein, and in order to avoid unnecessary friction between the bolts and the sides of the apertures. 90

Referring now to the upper left-hand bolt, B , in Fig. 1, it will be seen that two small bearing cups, C, C' , are attached, the former to the inner edge and the latter to the outer edge respectively of the vertical bearing bars, 95 A, A' , immediately beneath the apertures through which the bolt, B , passes. These bearing cups are precisely similar and therefore a description of the cup, C , will suffice for both of them. Similar cups are similarly 100 placed beneath each of the bolts, B', B^2, B^3 .

The bearing cup, C , is seen partly in vertical cross section in Fig. 2, and similarly in vertical longitudinal section in Fig. 3. It

consists of a bracket-piece, a , and a wall-plate, b . The downwardly projecting portion of the bracket-piece is received within a slide-way between two lateral flanges formed upon the outer edges of the wall-plate. From the lower end of this wall-plate projects a horizontal shoulder, b' , through which passes an adjusting screw, b^2 , the end of which bears against the lower end of the depending member of the bracket. Through a vertical slot in the center of this depending member passes the set-screw, a^2 , which also serves as a means of affixing the entire bearing cup to the surface to which it is applied. By the combined action of the two screws, a^2 , and b^2 , the position of the bearing surfaces may be adjusted with the greatest nicety. Upon the upper surface of the sole of the bracket-piece is formed a rectangular box, a' , within which are placed the two balls upon which the bolt rests, one upon either side, in which position they are maintained by the configuration of the bolt. The walls of the sides of this box are higher than the walls at the end, so as to conform to the shape of the bolt when in place above it, to the surface of which they nearly reach, so as to shut out all dirt or foreign substances. The length of the box is sufficient to allow the balls to roll from one end of it to the other according as the bolt is at one or the other extremity of its throw. It will therefore be seen that each bolt rests upon but two points in each bearing cup, or four points in all, this being the smallest number possible with which to hold the bolt in a position of stable equilibrium against all movement except endwise translation; and as each of the four points is the rotating surface of a ball, this endwise movement of the bolt is as nearly frictionless as possible. There is thus secured to the bolt the most accurate and at the same time easy running motion possible.

In operation the bracket piece of each of the cup bearings is elevated by its adjusting screw, b^2 , until each bolt rests upon the ball bearings alone, and is exactly in the center of the bearing aperture, the sides of which it almost but not quite touches. The adjustment having been completed, it is fixed by the set screw, a^2 . Each one of the bolts is thus so lightly, but accurately supported as to very much decrease the force needed to actuate them, notwithstanding the increase in their weight which, as above mentioned, it is the object of this invention to provide for. Furthermore, the adjustment is so true that there is no possibility of any of the bolts becoming jammed and consequently interfering

with the proper automatic action of the moving force when released by the time lock or other automatic mechanism. Notwithstanding this exceedingly accurate adjustment my invention nevertheless leaves room for considerable yielding of the bearing parts in case of the application of an extraordinary force as, for instance, the use of an explosive introduced unsuccessfully by a burglar or the ill applied force of an unskillful attendant in endeavoring to pry the door open when for any reason it may have become temporarily caught. In such case each one of the cup bearings, being united to its supporting surface by but a single set-screw parallel to the bolt, is capable of swiveling thereon and as the circular bearings through which the bolts pass are slightly larger than the bolts, the extraordinary force above spoken of may partially, if not wholly, expend itself in twisting the bearing cups upon their set screws in the direction to accommodate itself to the forced position of the bolt arising from the unusual pressure.

Having thus described my invention, I claim—

1. The combination in a safe door, of a circular horizontal bolt; spherical ball bearings upon which the same runs longitudinally; and suitable bearing cups for containing said balls, substantially as described.

2. The combination in a safe door, of a circular horizontal bolt; two or more spherical ball bearings for supporting the same; and a bearing cup having a rectangular box with one or more balls upon each side along the length of which they are capable of rolling in order to accommodate themselves to the thrust of the bolt, substantially as described.

3. The combination in a safe door, of a horizontal bolt; ball bearings for supporting the same; and vertically adjustable bearing cups for containing said ball bearings, substantially as described.

4. The combination in a safe door, of a horizontal bolt; ball bearings for the same; and bearing cups for containing said ball bearings, which bearing cups are affixed to the safe door by a single set-screw parallel to the bolt upon which the said bearing cups are capable of swiveling under the influence of an extraordinary force, substantially as described.

WILLIAM H. HOLLAR.

Witnesses:

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