B. D. GRAY.

DEVICE FOR SECURING PARTS TO THEIR SUPPORTS.

APPLICATION FILED FEB. 25, 1915.

1,294,792.

Patented Feb. 18, 1919.

2 SHEETS—SHEET 1.

Fig. 2.

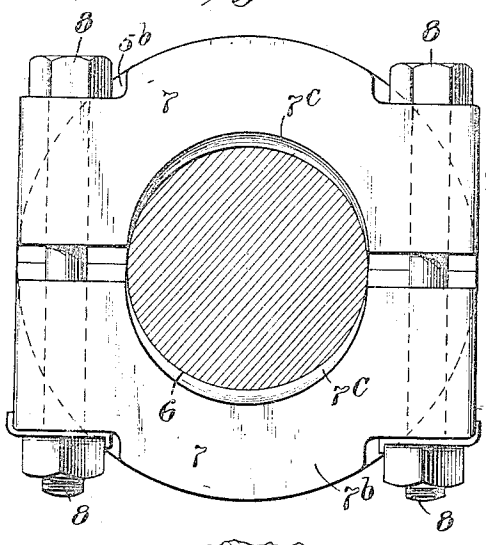


Fig. 1.

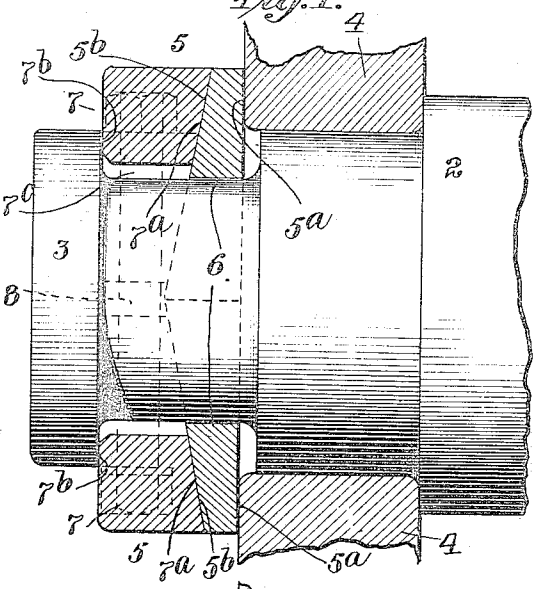
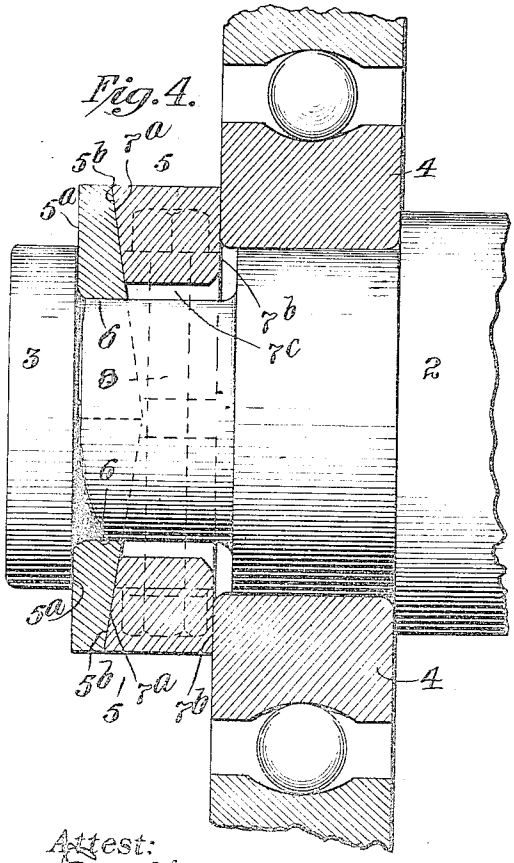


Fig. 4.



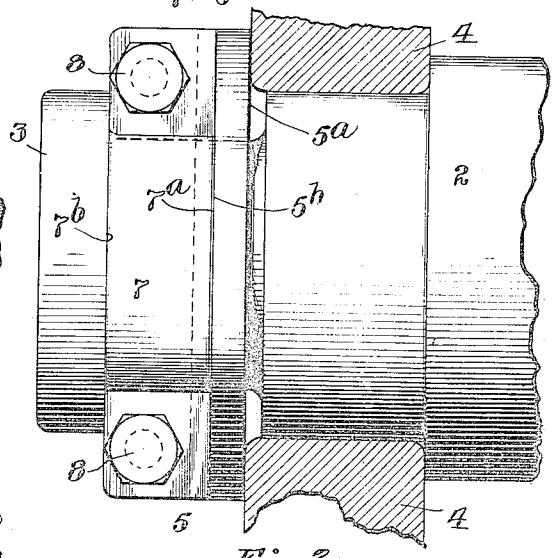


Fig. 3.

Attest:

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2 SHEETS—SHEET 2.

Fig. 5.

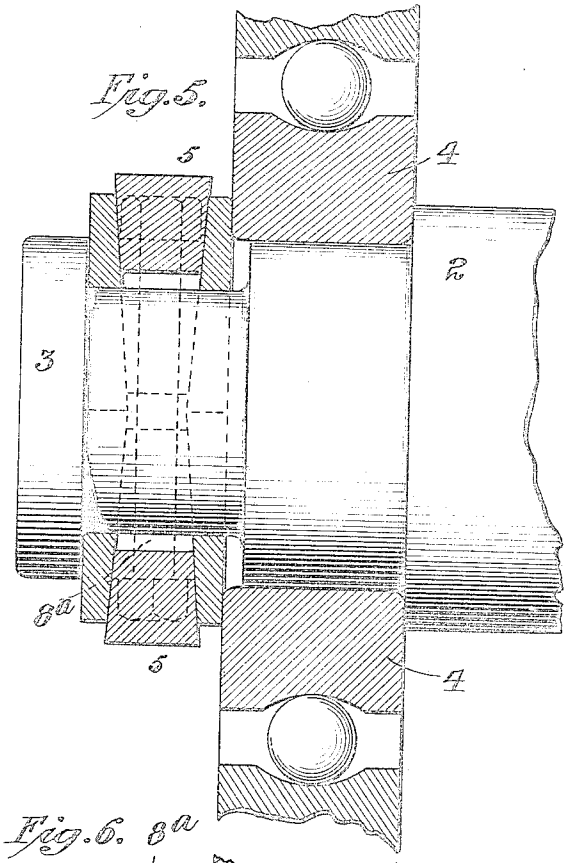
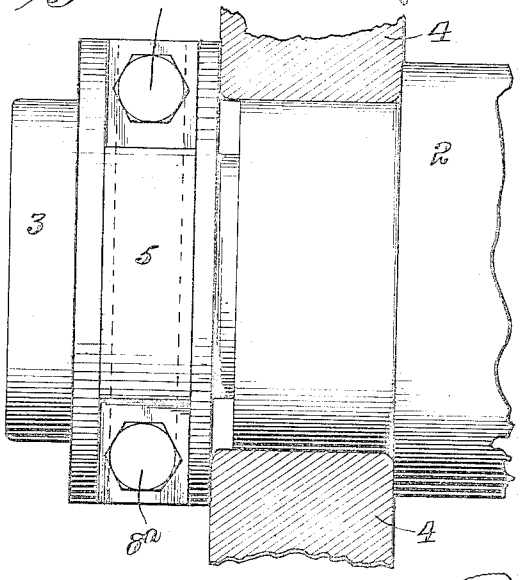


Fig. 6.



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UNITED STATES PATENT OFFICE.

BUDD D. GRAY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE HESS-BRIGHT MANUFACTURING COMPANY, A CORPORATION OF DELAWARE.

DEVICE FOR SECURING PARTS TO THEIR SUPPORTS.

1,294,792. Specification of Letters Patent. Patented Feb. 18, 1919.

Application filed February 25, 1915. Serial No. 10,510.

To all whom it may concern:

Be it known that I, BUDD D. GRAY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Securing Parts to Their Supports, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to means for securing parts in fixed position on their supports, and has special reference to the mounting of antifriction bearings, the construction of the present invention being adapted particularly for the firm and rigid clamping of the inner casing-member of the bearing against a shoulder or abutment on a shaft or other support.

The chief aim of the invention is to avoid the use of screw threads on or in connection with the clamping devices or parts thereof, and to bind the casing-member fixedly against the abutment with great force, and without liability of its working loose or becoming displaced; and with these and other objects in view, my invention consists in a clamping device comprising a plurality of wedge-shaped members, adapted to be applied to a shaft or other support between abutments thereon, and being movable transversely of the support, the form and relative arrangement of the members being such that by their transverse movements, they will operate to apply a clamping pressure to the part to be clamped, in a direction longitudinally of the support, and will bind the same fixedly and firmly in position against the abutment.

In the more specific embodiment of my invention, the support for the casing-member of the bearing, is in the form of a shaft or axle, which is reduced at one end in cross-section so as to form inner and outer abutments or shoulders, the casing-member of the bearing surrounding the reduced portion of the shaft and being seated against the inner abutment. The clamping device is in the form of two sets of coöperating wedge-shaped members, one set comprising two sections disposed respectively on opposite sides of the shaft and extending transversely thereof end to end, and movable relatively to each other in opposite directions transversely of the shaft, and the other set comprising two sections also disposed on opposite sides of the shaft alongside of and in engagement with the movable sections, the arrangement being such that by the movement of the movable sections in opposite directions, one set of the members will cooperate with one of the abutments, and the other set will coöperate with the casing-member of the bearing, and will, by such coöperation, apply a clamping pressure to the casing-member in a direction toward the adjacent abutment; whereby the casing-member will be held firmly and fixedly in position.

In the accompanying drawings, I have represented several forms of embodiment of my invention, including the construction above outlined. It will be manifest, however, that the details of the several forms may be modified and changed by the skilled mechanic without departing from the limits of the invention; and it will be understood that the invention is not limited to any particular form or construction of the parts except in so far as such limitations are specified in the claims.

In the accompanying drawings:

Figure 1 is an elevation of one end of a shaft, showing in longitudinal section, my improved clamping device, and the inner casing-member of an antifriction bearing clamped in position thereto.

Fig. 2 is an end elevation of the parts shown in Fig. 1.

Fig. 3 is a top plan view of the same.

Fig. 4 is a sectional elevation of a modification of the invention.

Fig. 5 is a similar view of another modification.

Fig. 6 is a top plan view of the same.

Referring to the drawings:

Referring particularly to Figs. 1 to 4 inclusive, the support for the part to be clamped is in the form of a shaft or axle, the end of which is necked-down or reduced, thereby forming an inner annular shoulder or abutment 2, and an outer annular shoulder or abutment 3, the latter being on the end of the shaft. An inner casing-member 4 of an anti-friction bearing is applied to the reduced portion of the shaft adjacent the abutment 2 and is seated at its inner end against the latter. Between the outer

end of the casing-member 4 and the outer abutment 3, is applied a clamping device 5, which comprises coöperating inner and outer wedge-shaped members, arranged face to face with their abutting inclined surfaces reversed, one of said members being movable relatively to the other transversely of the shaft, with the result that by the cooperation of said members respectively with the outer abutment 3 and the casing-member 4, the latter will be firmly and forcibly clamped in fixed position, against the inner abutment on the shaft.

The wedge-shaped members are shown as being constructed each of two half-sections, the half-sections 5 of the inner member being formed in their inner ends with semicircular recesses 6 surrounding the reduced portion of the shaft, and the said sections being disposed on opposite sides of the shaft end to end. The inner side faces 5^a of these half-sections extend in a plane transversely of the axis of the shaft so as to bear flatly against the outer end of the casing member 4. Their opposite faces 5^b incline or slope outwardly and in opposite directions from the center of the shaft to the outer ends of the sections, thereby producing in effect a double wedge, which is of greatest thickness at the center of the shaft, and which decreases in thickness outwardly.

The outer wedge-shaped member of the clamping device is likewise formed of two sections 7 which are applied to opposite sides of the shaft end to end, alongside of the sections of the inner member, the adjacent faces 7^a of these sections being inclined reversely to the faces of the first mentioned sections, and being in engagement therewith, while the outer surfaces 7^b of the sections extend in a plane transversely of the shaft so as to engage flatly against the inner side of the outer abutment 3. The inner ends of the sections 7 are recessed as at 7^c so as to surround the reduced portion of the shaft, and these recesses are of such form, that clearance is provided between the sections and the shaft to enable the sections to be moved in opposite directions toward each other in order to effect the clamping action.

The movement of the sections is effected by means of two through-bolts 8 which extend on opposite sides of the shaft and through alined openings in the sections, these bolts effecting the connection of the sections, and being operable, by the tightening of the nuts thereon to draw the sections inwardly toward each other. This action will, by reason of the coöperation of the inclined side surfaces on the sections 7, with the engaging inclined surfaces on the other sections 5, apply a clamping pressure against the outer end of the casing member in a direction longitudinally of the shaft, and will force the casing-member into firm engagement with the inner abutment 2, and will hold the same fixedly in position.

This construction of the clamping device is advantageous, in that it is free from screw threads, which in practice are liable to strip; and further it is possible to apply to the casing-member a clamping pressure of extreme force, since the slope of the incline or taper of the coöperating side surfaces of the members may be on a small angle. As a result, the casing-member will be held with extreme firmness to its seat, and there will be no liability of the jar or vibration of the parts, producing looseness or displacement of the casing-member.

In Fig. 4 the construction above described is the same except that the position of the clamping device is reversed, the member which is made up of the opposing movable sections being applied next the casing-member 4, and the other member being applied next the outer abutment 3. The clamping operation is in both cases the same, and the operation is attended with the same advantages.

In Fig. 5 a further modification is represented. Here it will be seen that two wedge-shaped members corresponding to the inner member of Fig. 1 are employed, one of which abuts against the casing-member of the bearing and the other of which abuts against the outer abutment 3 on the shaft, the wedge member corresponding to the outer member in Fig. 1, being applied to the shaft between the other two members, and comprising as in the first example described, two relatively movable sections which are connected together, and which are operated to move them relatively to effect the clamping action, by means of through-bolts 8^a. These sections, in order to adapt them to cooperate with the two members between which they act, are inclined on both side faces. The purpose of this construction is to afford a more extended abutting surface for the relatively movable sections, than is afforded by the inner surface of the outer abutment in the arrangement shown in Fig. 1, or is afforded by the outer end of the casing-member as shown in Fig. 4, the inclined surfaces of the movable sections having a bearing throughout substantially their entire extent, against the adjacent surfaces of the members between which they act, the outer surfaces of these latter members engaging respectively the outer end of the casing-member and the inner face of the outer abutment.

While in the accompanying drawings I have shown my improved clamping device as applicable for clamping the inner casing-member of an antifriction bearing to its axle or support, it will be understood that the device may be employed with the same effect

and equal advantages for securing other parts to their supports, provided that the operation will be substantially as above indicated.

Having thus described my invention, what I claim is:

1. In combination with a support provided with fixed abutments adapted to receive between them a part to be clamped, a clamping device applied to the support between the abutments and including two sections disposed at opposite sides of the support and movable in opposite directions relatively to each other transversely of the support, said sections having their side faces inclined, and adapted in such movements to coöperate with one of the abutments in applying clamping pressure to the part to be clamped in a direction toward the other abutment.

2. In combination with a support provided with abutments adapted to receive between them a part to be clamped, a clamping device applied to the support between the abutments, said clamping device comprising two members straddling the support and movable one relatively to the other transversely thereof, and provided respectively with reversely inclined surfaces arranged face to face, said members adapted in their relative movements to coöperate with one of the abutments in forcing the part to be clamped in fixed clamped position against the other abutment.

3. In combination with a support provided with abutments adapted to receive between them a part to be clamped, a clamping device applied to said support between the abutments and comprising two sections disposed on opposite sides of the support and movable in opposite directions transversely of the support, and two coöperating sections also disposed respectively on opposite sides of the support and engaged with the movable sections, the adjacent engaging surfaces of said sets of sections being reversely inclined, and adapted to coöperate with each other, when the movable sections are moved, to apply a clamping pressure to the part to be clamped, in a direction toward the adjacent abutment.

4. In combination with a support provided with abutments, a part to be clamped applied to the support and seated against one of the abutments, two members applied to and straddling said support between the abutments and coöperating with each other, one of said members being movable relatively to the other transversely of the support, and said members coöperating respectively with the other abutment and with said part, to bind the latter against the adjacent abutment.

5. In combination with a support provided with abutments adapted to receive between them a part to be clamped, a clamping device applied to said support between the abutments and comprising coöperating wedge members straddling the support and arranged with their inclined faces in contact and reversely disposed, one of said members being movable transversely of the support relatively to the other member, and said members adapted to coöperate respectively with one of the abutments and with the part to be clamped in forcing the same in fixed clamped position against the other abutment.

6. In combination with a support provided with abutments adapted to receive between them a part to be clamped, two reversely disposed wedge members applied to and straddling the support between the abutments and arranged with their inclined surfaces face to face, and one of said members being movable relatively to the other transversely of the support, and means for controlling the movements of said movable member, one of said members adapted to coöperate with one of the abutments, and the other member being adapted to coöperate with the part to be clamped in forcing the same in fixed clamped position against the other abutment.

7. In combination with a support provided with abutments, an annular member surrounding the same and bearing against one of the abutments, and a clamping device applied to and straddling said support between the annular member and the other abutment, said clamping device including two members arranged side by side and having their adjacent faces oppositely inclined and engaged with each other, and bearing at their opposite faces respectively against the annular member and said other abutment, one of said members being movable transversely of the shaft relatively to the other member; whereby the annular member will be clamped longitudinally against the adjacent abutment, and will be held firmly in position on the support.

8. In combination with a support provided with abutments adapted to receive between them a part to be clamped, a clamping device applied to said support between the abutments and comprising two oppositely movable sections disposed on opposite sides of the support end to end, and having their adjacent sides sloping in opposite directions, means for moving said sections in opposite directions transversely of the support, and two coöperating sections also disposed on opposite sides of the support end to end and having their adjacent sides sloping in opposite directions and engaging the sloping surfaces of the movable sections, one of said sets of sections engaging one of the abutments, and the other set of sections adapted to engage the part to be

clamped, and said sections operating, when the movable sections are moved, to bind the part to be clamped firmly against the adjacent abutment.

9. In combination with a shaft provided with annular projecting abutments, an anti-friction casing-member surrounding the shaft and seated against one of said abutments, two sections disposed end to end on opposite sides of the shaft between the abutments and provided in their inner ends with recesses to receive the shaft, said sections having their adjacent sides sloping in opposite directions outwardly from the shaft, and being movable in opposite directions relatively to each other, means connecting said sections together and operable to move them relatively to each other, and two co-operating sections also disposed end to end on opposite sides of the shaft and having their adjacent sides sloping in opposite directions and engaging the sloping sides of the movable sections, one of said sets of sections bearing against one of the abutments, and the other set bearing against the casing-member.

10. In combination with a support provided with fixed abutments adapted to receive between them a part to be clamped, a clamping device applied to the support between one of the abutments and the part to be clamped and including a wedge-shaped clamping member straddling the support and movable transversely thereof and acting in such movement to coöperate with said abutment in forcing the part to be clamped away from said abutment in fixed clamped position against the other abutment.

11. In combination with a support provided with fixed abutments forming definite and positive stops, a member to be clamped disposed between said abutments, a clamping device applied to the support between one of the abutments and the member to be clamped, said device comprising two members formed on their side faces with sloping wedging surfaces and movable toward each other and being adapted in their movements to coöperate with the said abutment in forcing the member to be clamped into fixed clamping position against the other abutment.

In testimony whereof, I have affixed my signature in presence of two witnesses.

BUDD D. GRAY.

Witnesses:
A. T. BRUEGEL,
CHARLES S. BUTLER.