(No Model.) 2 Sheets—Sheet 1.

O. C. WHITE.

UNIVERSAL JOINT.

No. 546,631. Patented Sept. 17, 1895.

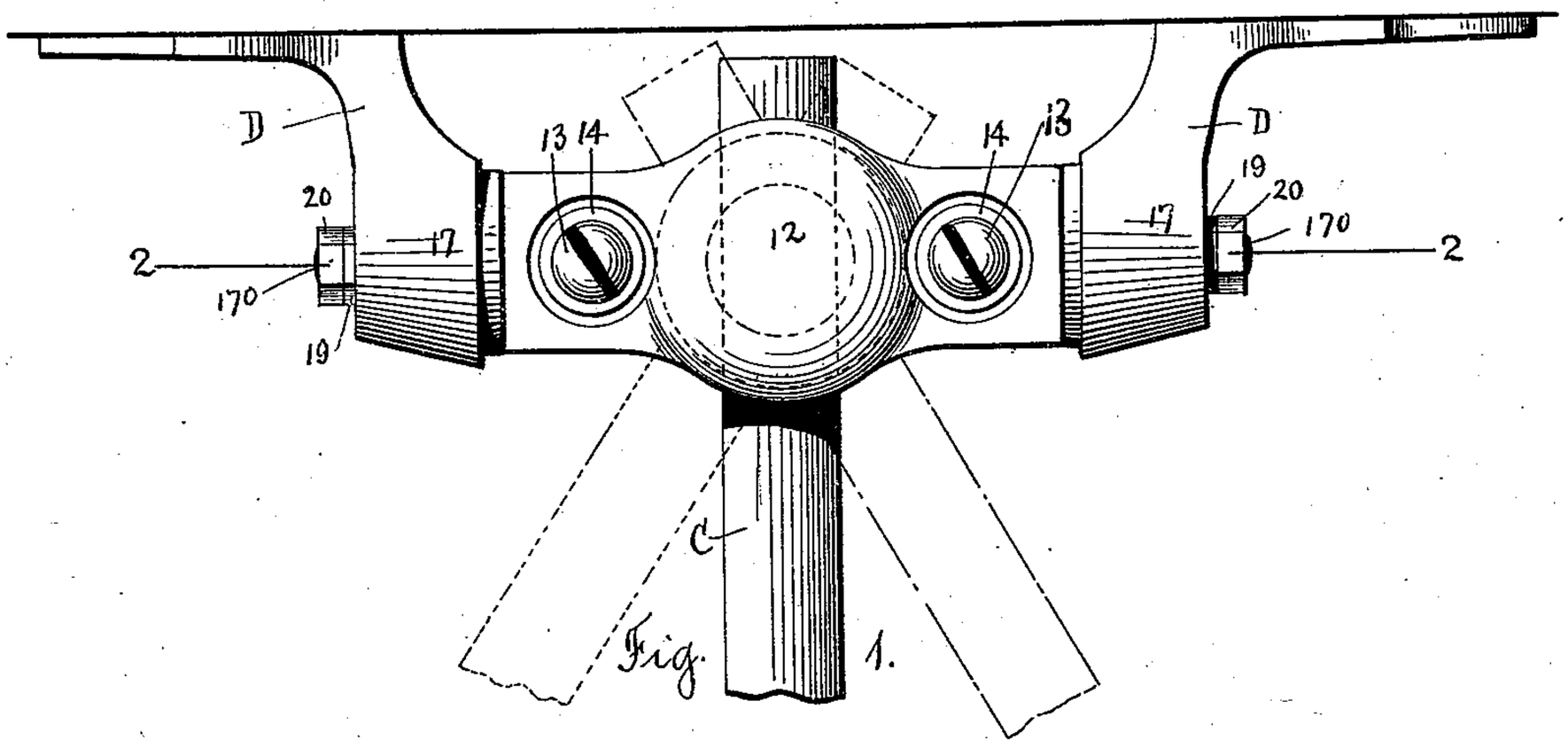

Fig. 1.

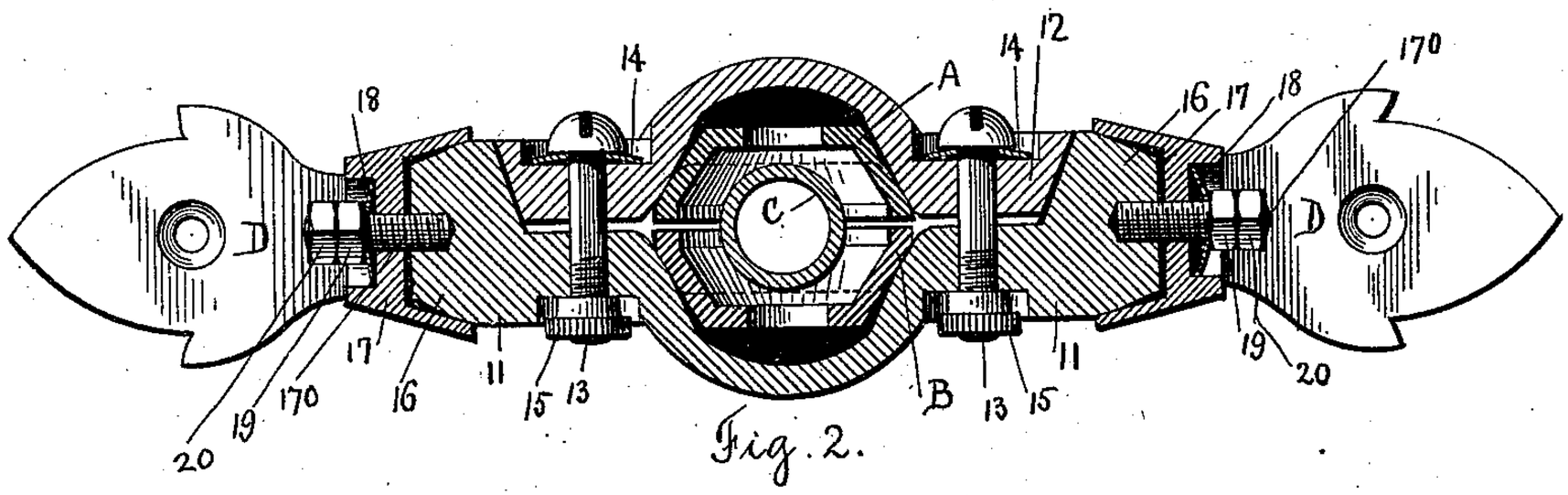

Fig. 2.

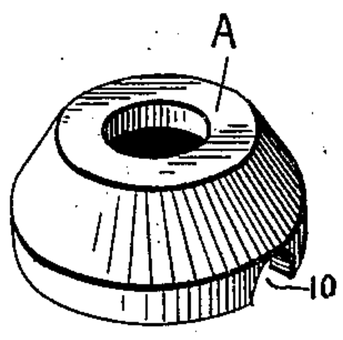

Fig. 3.

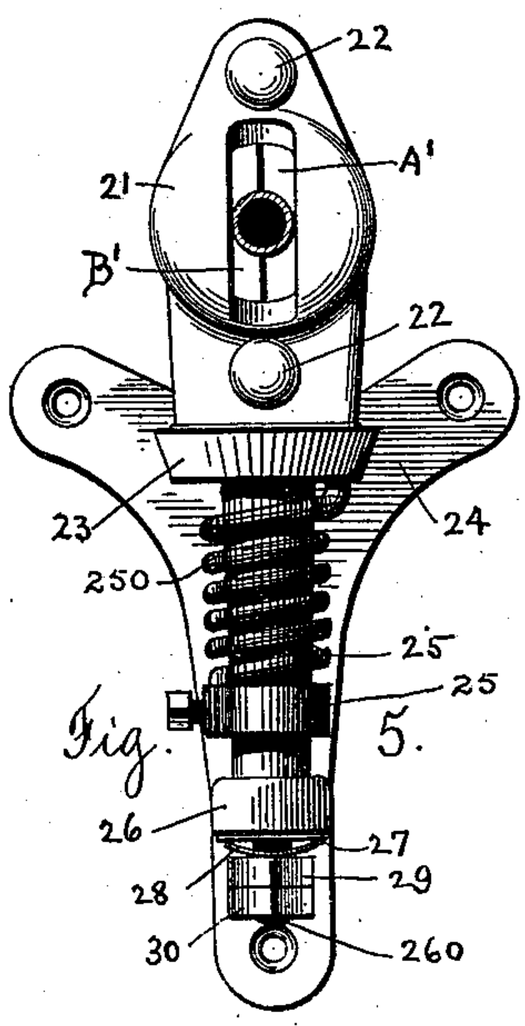

Fig. 5.

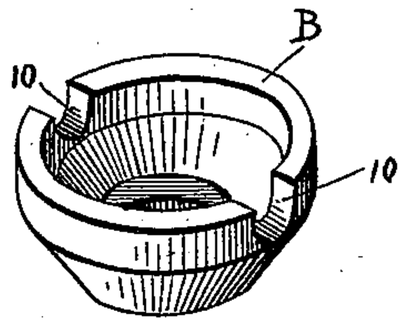

Fig. 4.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

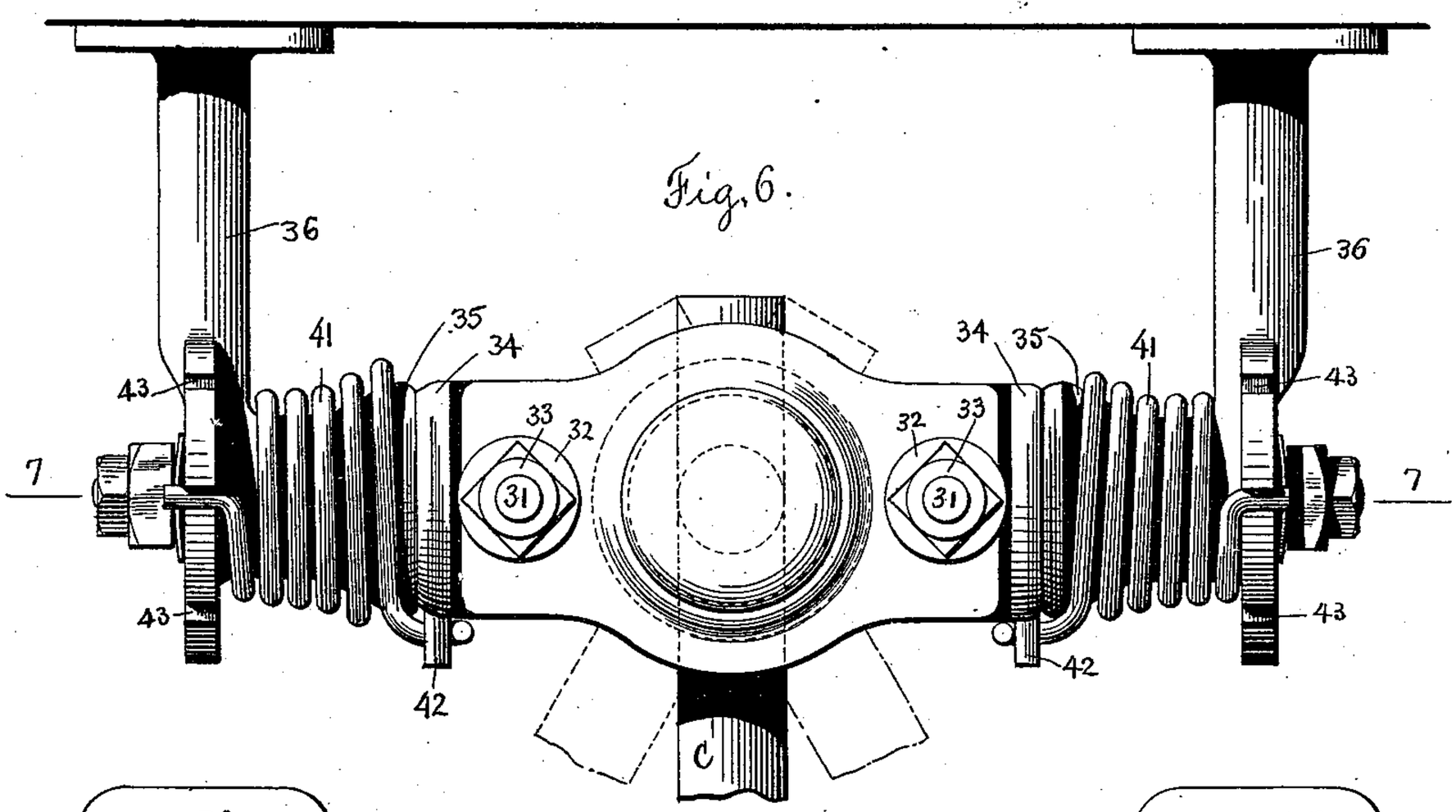


Fig. 7.

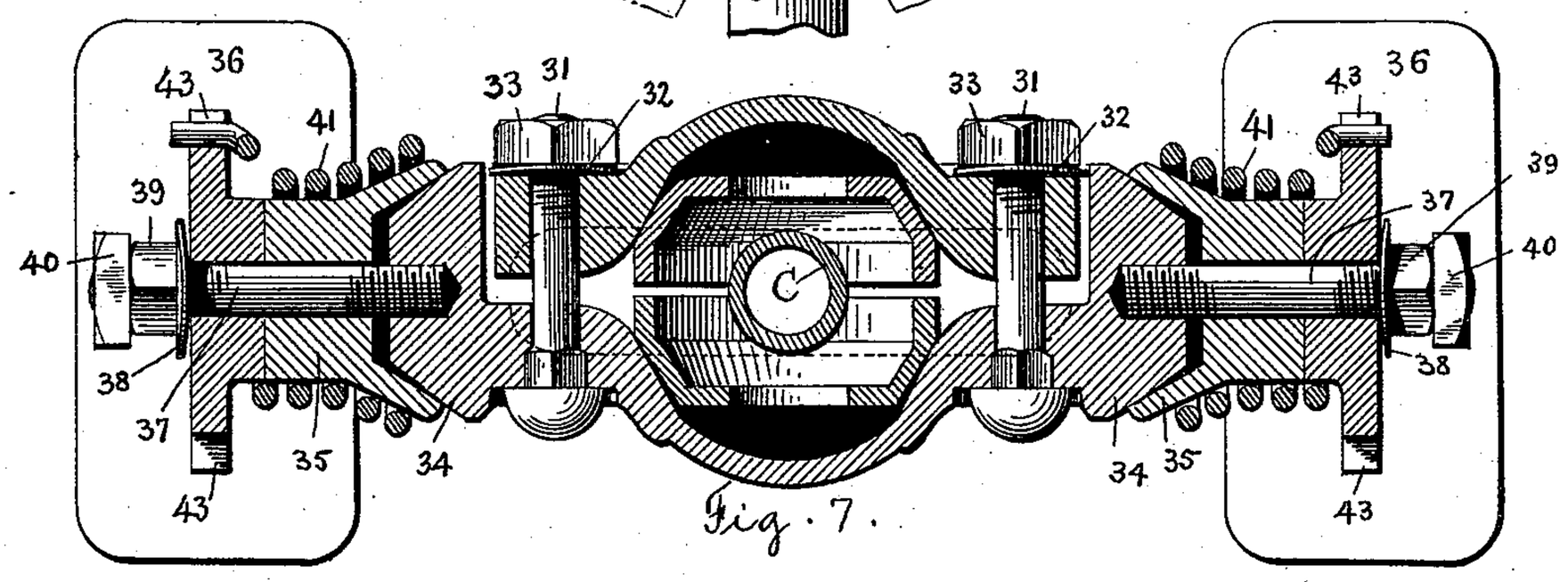
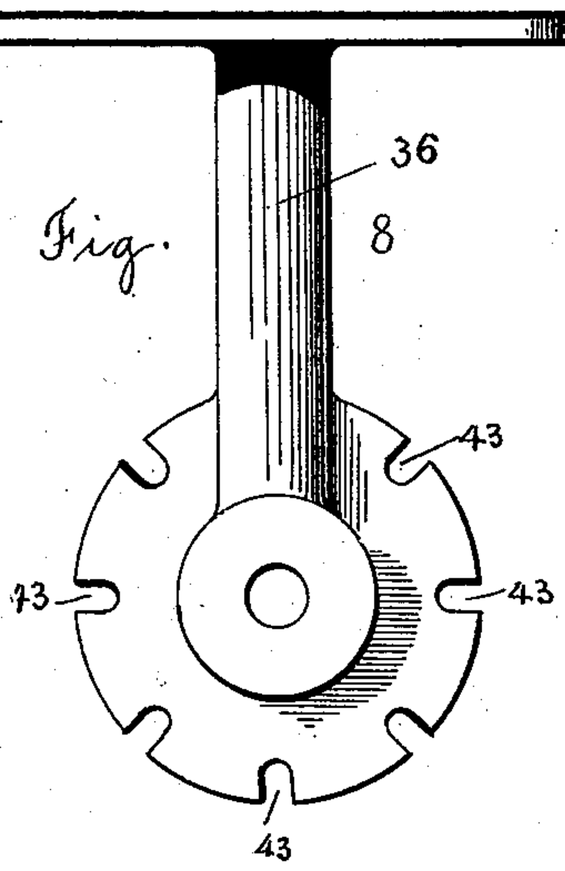


Fig. 8.



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UNITED STATES PATENT OFFICE.

OTIS C. WHITE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE O. C. WHITE COMPANY, OF SAME PLACE.

UNIVERSAL JOINT.

SPECIFICATION forming part of Letters Patent No. 546,631, dated September 17, 1895.

Application filed January 19, 1895. Serial No. 535,474. (No model.)

To all whom it may concern:

Be it known that I, OTIS C. WHITE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Universal Joints, of which the following is a specification.

My invention relates to that class of fixtures or joints which are employed to form one part of an adjustable supporting device; and the object of my invention is to provide a strong, simple, and durable form of universal joint.

To these ends my invention consists of the parts and combinations of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying two sheets of drawings, Figure 1 is a side elevation of a universal joint constructed according to my invention. Fig. 2 is a sectional view taken on the line 2 2 of Fig. 1. Figs. 3 and 4 are detail perspective views of the sections or clamping-jaws which constitute a double cone. Fig. 5 is a side elevation illustrating a modified form of construction. Fig. 6 is a side elevation illustrating a further modified form of construction. Fig. 7 is a sectional view taken on the line 7 7 of Fig. 6, and Fig. 8 is a detail view to be hereinafter referred to.

A universal joint constructed according to my invention consists, essentially, of two similar clamping-jaws or sections, a socket which is arranged to be adjustably clamped into frictional engagement with said clamping-jaws, bearings for said socket, and means for adjustably clamping said socket into frictional engagement with its bearings.

Referring to Figs. 1 to 4, inclusive, A and B designate two similar sections or clamping-jaws, which are substantially of frustum shape, and which may be united to form a double cone. The sections A and B are each provided with notches 10, as shown, said notches 10 being arranged to form a diametric perforation or socket to receive the end of a rod or pipe C, as most clearly illustrated in Fig. 2. The socket which receives and may be clamped into frictional engagement with the sections A and B consists of a body portion or casting 11 and a removable section or cover 12. The parts 11 and 12 are secured together and adjustably clamped into engagement with the conical sections A and B by means of the clamping-screws 13, the spring-washers 14, and the knurled or milled nuts 15, as shown. As most clearly illustrated in Fig. 2, it will be seen that the substantially conical recesses for receiving the sections A and B are formed upon a somewhat steeper incline than are the sections A and B. By means of this construction the conical sections A and B bear against and engage a comparatively small section of the recesses or sockets into which they fit, and I prefer this construction, as I have found in practice that when the recesses for receiving the conical sections are made to correspond exactly with such sections these parts are liable to become stuck together and cannot be readily turned with relation to each other. The ends 16 of the section or casting 11 are substantially conical in shape, are arranged to fit into, and are rotatably mounted in bearings 17, carried by brackets D. The bearings 17 may be adjustably clamped into frictional engagement with the conical ends of the piece 11 by means of clamping-screws 170, spring-washers 18, and clamping-nuts 19. The clamping-screws 170 are also preferably provided with check-nuts 20, for preventing the clamping-nuts 19 from becoming unscrewed and the parts from becoming loosened. The brackets D are provided with suitable feet, which may be perforated to receive securing-screws for fastening the device in any desired position where it is to be employed. As shown most clearly in Fig. 2, the bearings or sockets 17 are formed upon a somewhat steeper incline than are the conical ends 16. By means of this construction these joints have a comparatively small surface of contact and the parts are not liable to become stuck together. By using a universal joint or fixture as thus constructed the pipe or rod which is secured therein can be freely turned in any desired direction and the clamping screws or nuts can be readily adjusted to secure the desired degree of friction between the parts which may be found necessary to hold the rod or pipe in its adjusted position.

While my universal joint has been espe-

cially designed to form part of a fixture for supporting electric lights and may be used with advantage in place of the ball-and-socket joint illustrated in my Patent No. 505,583, it is obvious that my construction may be also employed with advantage for many other purposes.

Instead of using two conical sections which unite to form a double cone, it is obvious that I may employ a ball made in sections, and I have illustrated such a construction in Fig. 5. Referring to this figure, A′ and B′ designate two sections of a ball. The ball which is formed by the sections A′ and B′ fits into a socket 21, which may be clamped into engagement with said ball by means of bolts 22, which may be provided with spring-washers and nuts, substantially as above described. The socket 21 is provided near its lower end with a conical section which fits into and engages a conical bearing 23, carried by a bracket or casting 24. A spindle or pin 25 is also carried by the socket 21 and extends down through a bearing 26, carried by the bracket 24, as shown. The pin or spindle 26 is provided at its lower end with a threaded securing-screw 260, having the clamping-nut 29 and a check-nut 30 threaded thereon; also mounted on the screw 260 is a spring-washer 28 and a flat washer 27. By means of this construction the clamping-nut 29 and the check-nut 30 may be employed to adjustably clamp the socket 21 into frictional engagement with its conical bearing 23.

It will be seen that this form of universal joint is characterized by the same features of construction as that before described, except that a ball is substituted for the double cone and the socket is provided with a single conical section which can be adjustably clamped into frictional engagement with its bearing, instead of being provided with a conical section at each end, and while this last-described form of universal joint has been especially designed as a side bracket or fixture to be secured upon the wall it may be used in other locations, if desired. In some cases, where a fixture of the form illustrated in Fig. 5 is to be located overhead or secured upon the ceiling, it may be desirable to provide a counterbalancing-spring for normally tending to turn the pipe C into a fixed position. In such cases I may provide the spindle 25 with a coiled spring 250, one end being fixed or secured to the bracket 24 and the other end being fastened to a collar 251, which may be adjustably clamped upon the spindle 25 by means of a set-screw, as shown.

In Figs. 6 to 8 I have illustrated the manner in which counterbalancing-springs can be used in connection with a universal joint of substantially the same form as illustrated in Figs. 1 to 4. Referring to these figures, it will be seen that instead of providing clamping-screws for adjustably clamping the socket into engagement with the double cone I have illustrated small securing-bolts 31, which are provided with spring-washers 32 and are threaded into small square nuts 33. At its ends the socket is provided with conical ends 34, which fit into bearing-pieces 35. The bearing-pieces 35 are formed separately from the brackets or end pieces 36. The conical ends of the socket may be adjustably clamped into frictional engagement with the bearing-pieces 35 by means of clamping-bolts 37, which extend through the bearing-pieces 35 and the brackets 36 and are provided with spring-washers 38 and clamping-nuts 39. I also preferably provide check-nuts 40 for holding the parts firmly in their adjusted position. Coiled around the bearing-pieces 35 are counterbalancing-springs 41. The inner ends of the springs 41 are bent around and engage pins or projections 42, carried by the socket, and the outer ends of the springs 41 may be secured in any one of a series of slots 43, formed in the bracket 36. By means of this construction it will be seen that the tension of the springs 41 will tend to turn or rotate the socket in its bearings. Further, in this construction it is to be noted that the tension of the springs can be adjusted or varied to counterbalance or compensate for the weight of various fixtures which may be carried by the rod or pipe C. It is evident that instead of employing two counterbalancing-springs, one at each end of the socket-piece, I may employ a single counterbalancing-spring, if desired.

The feature which I regard of particular importance in a universal joint constructed according to my invention resides in the fact that the rod or pipe may swivel or turn in two directions, the joint being provided with two sets of friction devices which may be readily adjusted to control the motion in either direction.

I am aware that many changes may be made in the construction of my universal joint by those who are skilled in the art, and I do not wish, therefore, to be limited to the construction which I have shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. A universal joint comprising a clamping device for receiving the end of a rod or pipe, said clamping device being mounted to swivel or turn in two directions, and two sets of adjustable spring tension friction devices for controlling the motion of the clamping device in either direction, substantially as described.

2. A universal joint comprising clamping jaws formed by two similar sections, a two-part socket for said clamping jaws, screws and spring washers for clamping the socket into frictional engagement with the clamping jaws, bearings for said socket, and clamping screws and spring washers for adjustably clamping the socket into frictional engagement with its bearings, substantially as described.

3. A universal joint comprising clamping

jaws, a pivoted socket for said clamping jaws, a counter-balancing spring normally tending to move the socket in one direction, and means for adjusting the tension of said counter-balancing spring, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OTIS C. WHITE.

Witnesses:
HENRY E. HILL,
PHILIP W. SOUTHGATE.