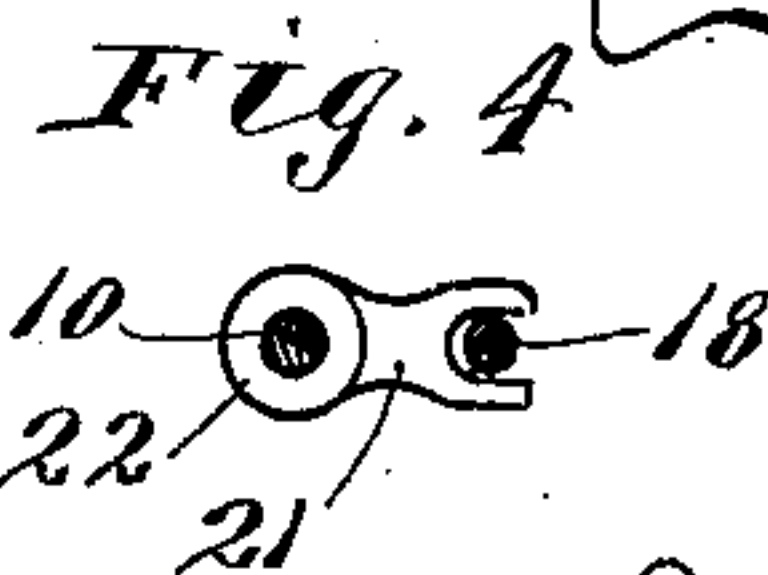
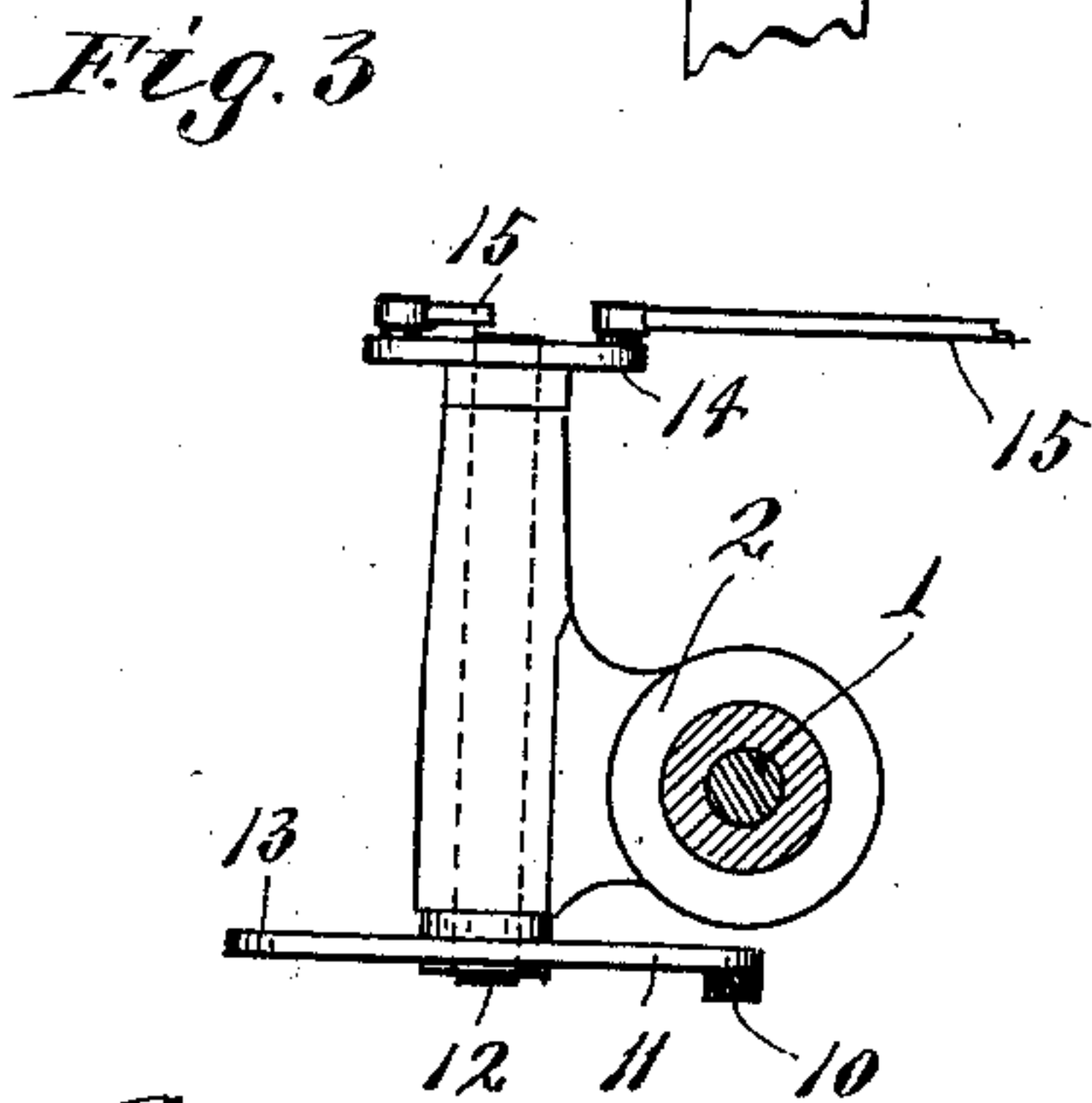
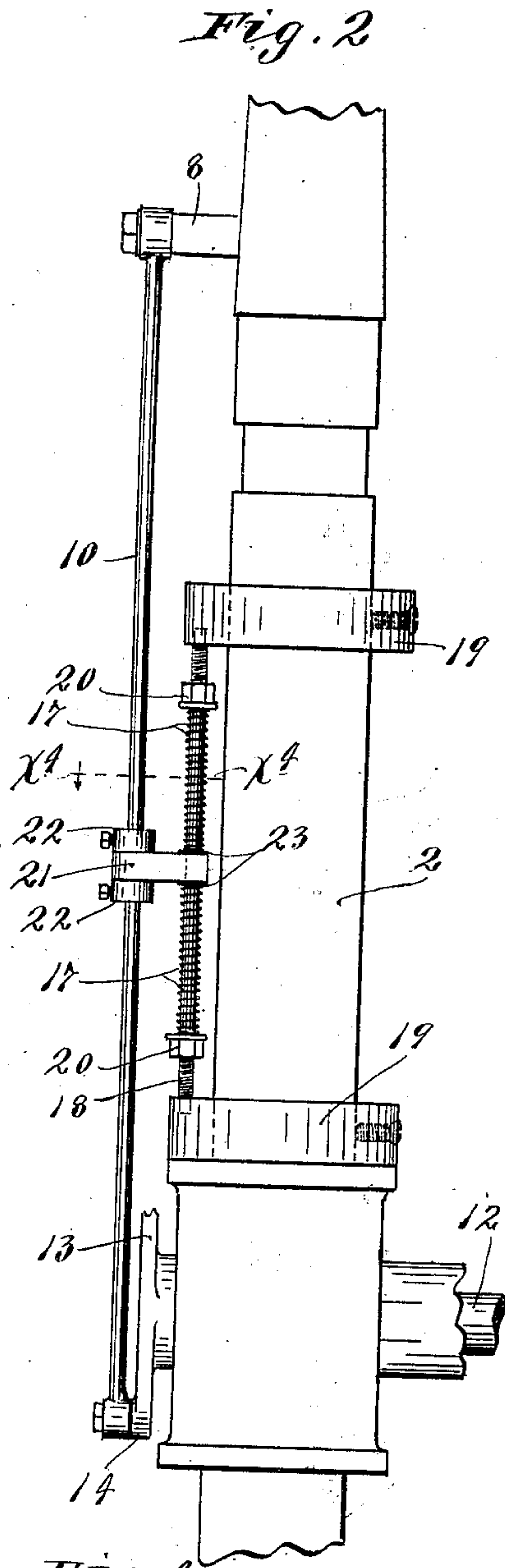
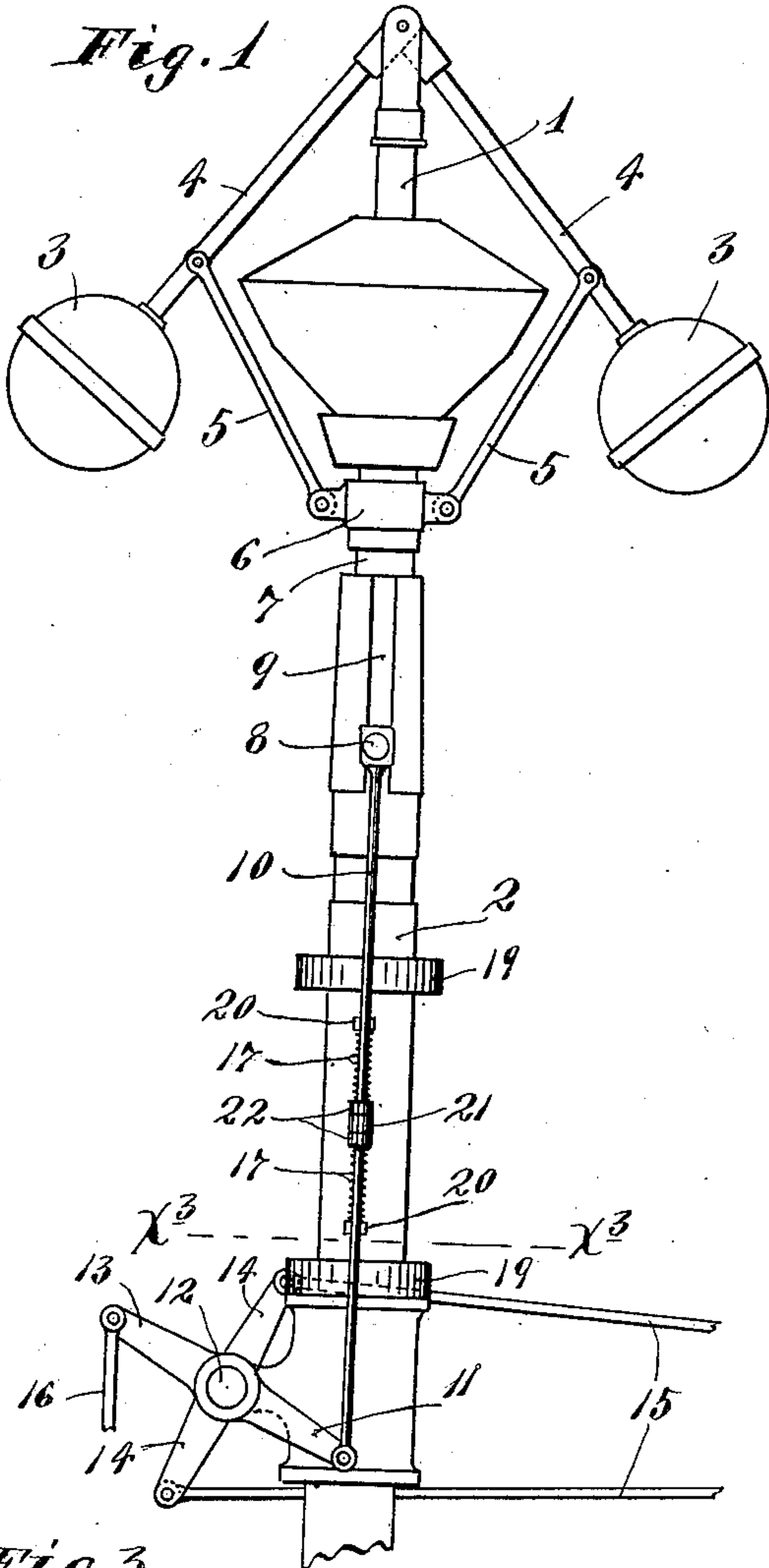


C. W. CRAMER.
GOVERNOR REGULATOR.
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924,638.

Patented June 15, 1909.



Witnesses.
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Alice J. Swanson.

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UNITED STATES PATENT OFFICE.

CHARLES W. CRAMER, OF MINNEAPOLIS, MINNESOTA.

GOVERNOR-REGULATOR.

No. 924,638.

Specification of Letters Patent.

Patented June 15, 1909.

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To all whom it may concern:

Be it known that I, CHARLES W. CRAMER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and States of Minnesota, have invented certain new and useful Improvements in Governor-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved governor for steam engines, and to this end, it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view in elevation, illustrating the invention applied to a governor, such as employed in connection with a Corliss engine; Fig. 2 is a side elevation of certain of the parts shown in Fig. 1, said parts being shown on a larger scale than in Fig. 1; Fig. 3 is a horizontal section taken on the line x^3-x^3 of Fig. 1; and Fig. 4 is a detail view in section taken on the line x^4-x^4 of Fig. 2, some parts being removed.

Of the parts of the governor, the numeral 1 indicates the governor shaft which is mounted in the tubular bearing pedestal 2, and is driven from the engine in the usual way through connections not shown. The numeral 3 indicates fly balls of the governor, the same being secured to the lower ends of the arms 4, pivotally attached at their upper ends to the rotary shaft 1, and connected at their intermediate portions by links 5 to a rotary collar 6. This rotary collar 6 is rotatively mounted between the shoulders of a non-rotary sleeve 7, that surrounds the shaft 1 and is movable vertically in the pedestal 2, being provided with a radially extended stub 8 that works in a slot 9 in the said pedestal. The stud 8 is connected by a rod 10 to one arm 11 of a rock shaft 12, mounted in a suitable bearing on the pedestal 2. This shaft 12 is provided with an arm 13 that is alined with the arm 11, and at its other end, the said shaft is provided with diametrically extended arms 14 that are connected to the upper ends of connecting rods 15. The rods 15 are connected in the usual way to the adjustable

eccentrics or speed controlling elements of the valve gear mechanism not shown. The arm 13 is connected by a rod 16 to the customary dash pot not shown. The mechanism so far described, is that found in standard governor mechanisms of Corliss engines.

My invention provides a device which operates upon the governor mechanism with a yielding force, and tends to hold the governor set in some certain predetermined position, and hence, to maintain the predetermined desired speed of the engine. This improved device preferably consists of a pair of opposing coiled springs that operate directly on a part carried by the connecting rod 10. In the drawings, these coiled springs 17 are shown as mounted on a vertical rod 18, secured at its upper and lower ends in bearing collars 19 suitably secured on the pedestal 2. The ends of the rod 18 are threaded and provided with spring adjusting nuts 20, against which the said springs 17 react. On the intermediate portion of the connecting rod 10, an arm 21 is pivotally mounted between secured but adjustable collars 22. The free end of this arm 21 is bifurcated and straddles the intermediate portion of the rod 18. Washers 23 loosely placed on the intermediate portion of the rod 18, bear against the upper and lower portions of the arm 21, and afford movable bases of reaction for the adjacent ends of the springs 17.

The springs 17, as is evident, act in opposition to each other, and tend to maintain the arm 21, and hence, the connecting rod 10 and fly balls 3, in some predetermined set position, but their tension, is not, of course, sufficient to overcome the action of centrifugal force and gravity upon the fly balls of the governor. They simply have a tendency to hold the said fly balls set in some predetermined position, which position will, of course, be that which is required to maintain the desired speed of the engine under normal working load. The said springs therefore, make the action of the governor more steady, and retard or yieldingly resist the movements of the governor fly balls from such predetermined positions.

It will be understood, that by adjustments of the nuts 20 on the supporting rod 18, or by adjustments of the collars 22 on the connecting rod 10, the predetermined engine speed which the opposing spring 17 will tend to maintain, may be varied as desired.

The improved governor attachment, may,

as is evident, be very easily applied to standard forms of engine governors, and at small cost. In actual practice, this improved device has been found to very greatly increase the efficiency of the governor to which it has been applied.

What I claim is:

1. In a governor mechanism, the combination with a transmission rod movable in the direction of its length connected with the speed responsive element of the governor mechanism, of a guide rod secured adjacent to said connecting rod, a pair of opposing springs on said guide rod, and an arm movable with said connecting rod and subject to the opposing action of said two springs, substantially as described.

2. In a governor mechanism, the combination with a transmission rod movable in the direction of its length connected with the speed responsive element of the governor mechanism, of a guide rod secured adjacent to said connecting rod, a pair of opposing springs on said guide rod, an arm movable with said connecting rod and subject to the opposing action of said two springs, and nuts on said guide rods for adjusting said springs, substantially as described.

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

CHARLES W. CRAMER.

Witnesses:

ALICE J. SWANSON,
HARRY D. KILGORE.