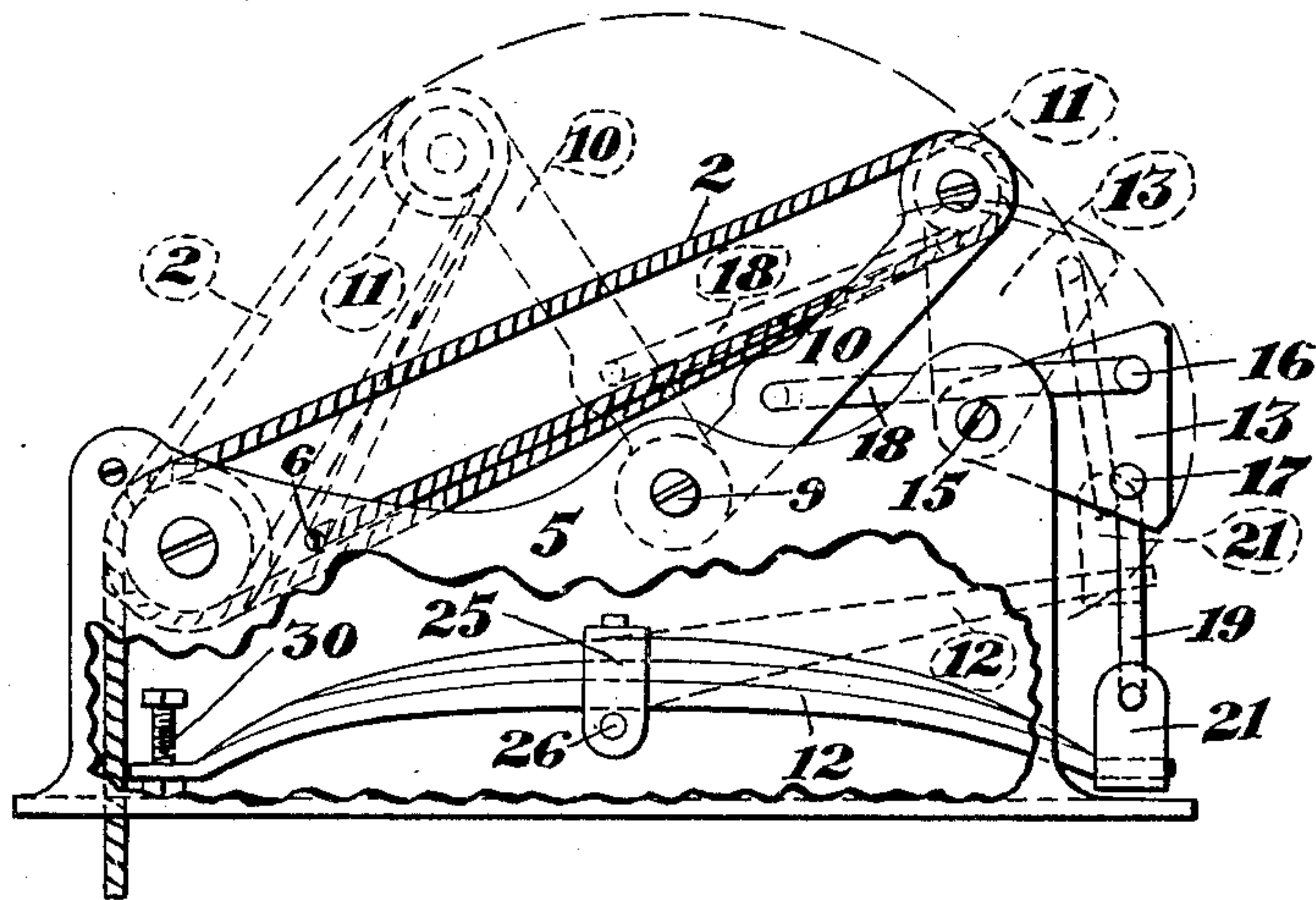
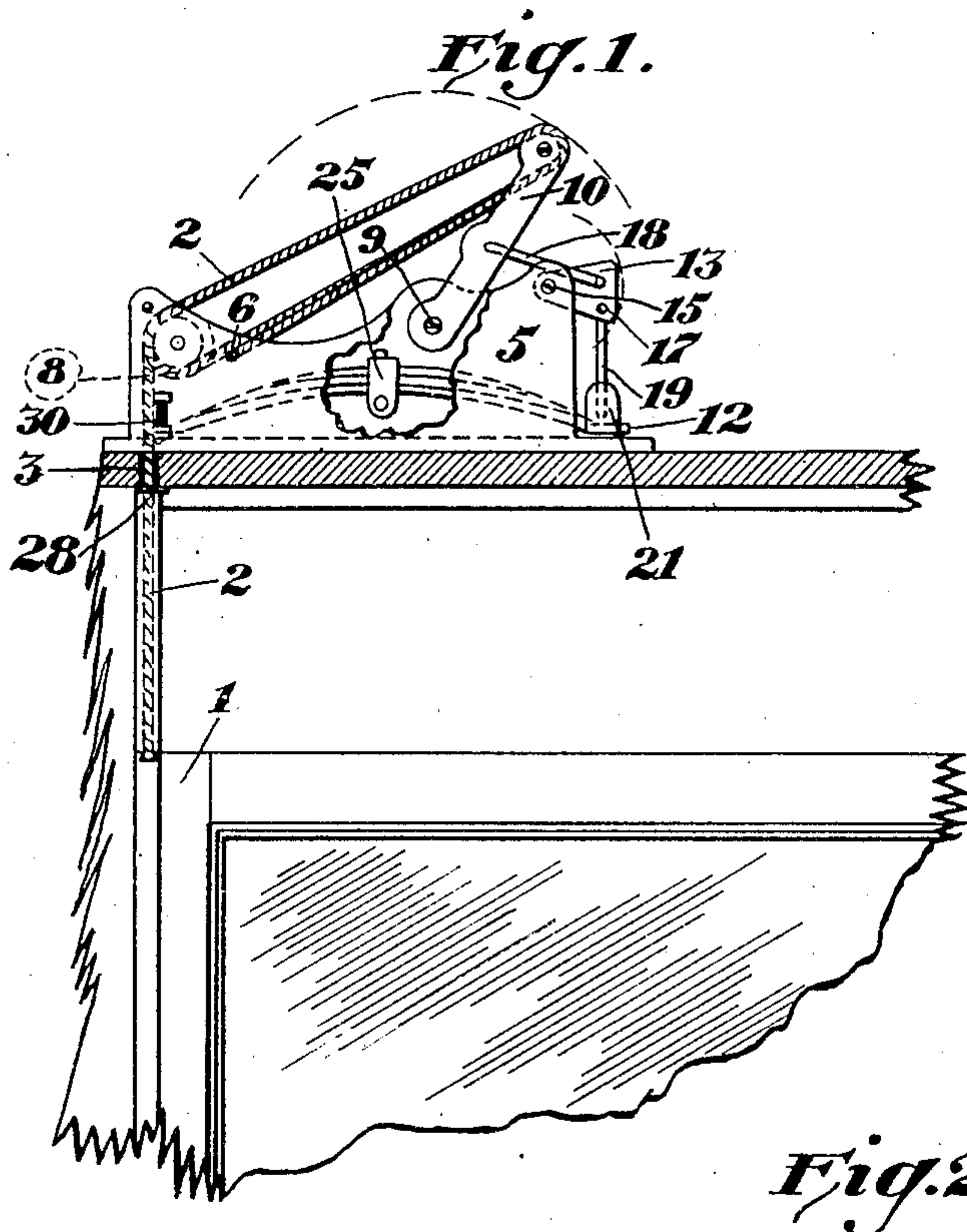


No. 875,963.

PATENTED JAN. 7, 1908.

W. C. STEPHEN.
WEIGHT COMPENSATOR.
APPLICATION FILED FEB. 23, 1907

2 SHEETS—SHEET 1.



Witnesses:

Chas A. Becker,
Elliott R. Goldsmith.

Inventor:

William C. Stephen,
By Hugh H. Wagner
His Attorney.

No. 875,963.

PATENTED JAN. 7, 1908.

W. C. STEPHEN.
WEIGHT COMPENSATOR.
APPLICATION FILED FEB. 23, 1907.

2 SHEETS—SHEET 2.

Fig. 3.

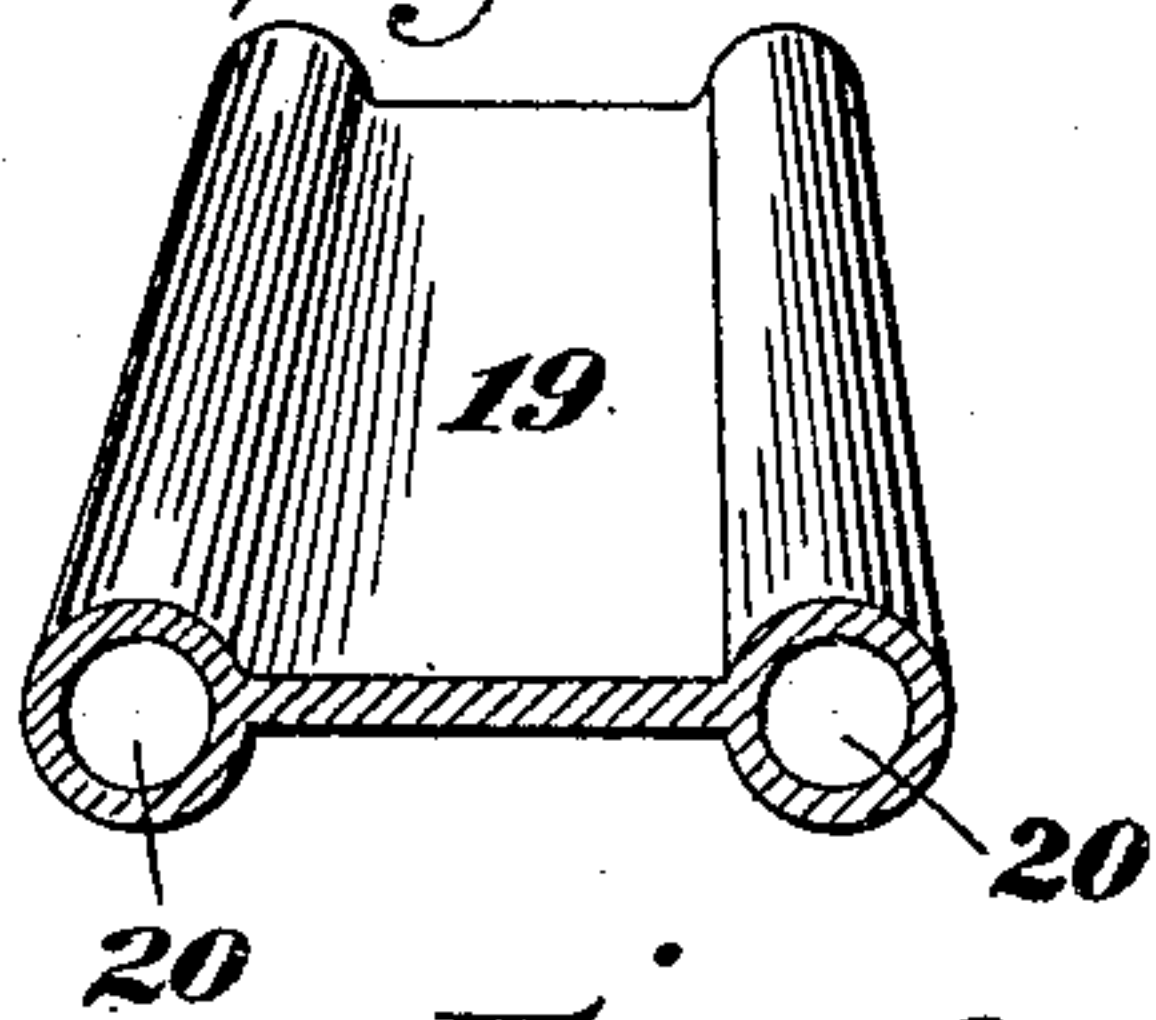


Fig. 4.

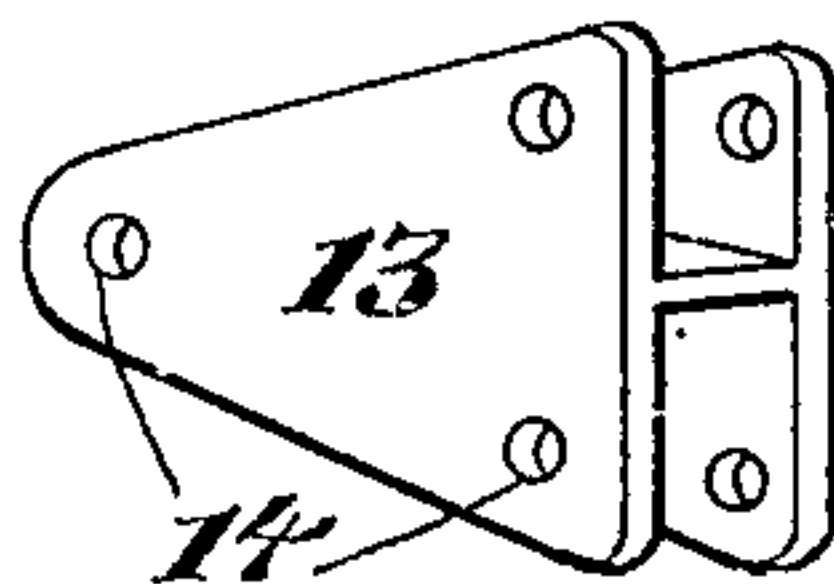


Fig. 5.

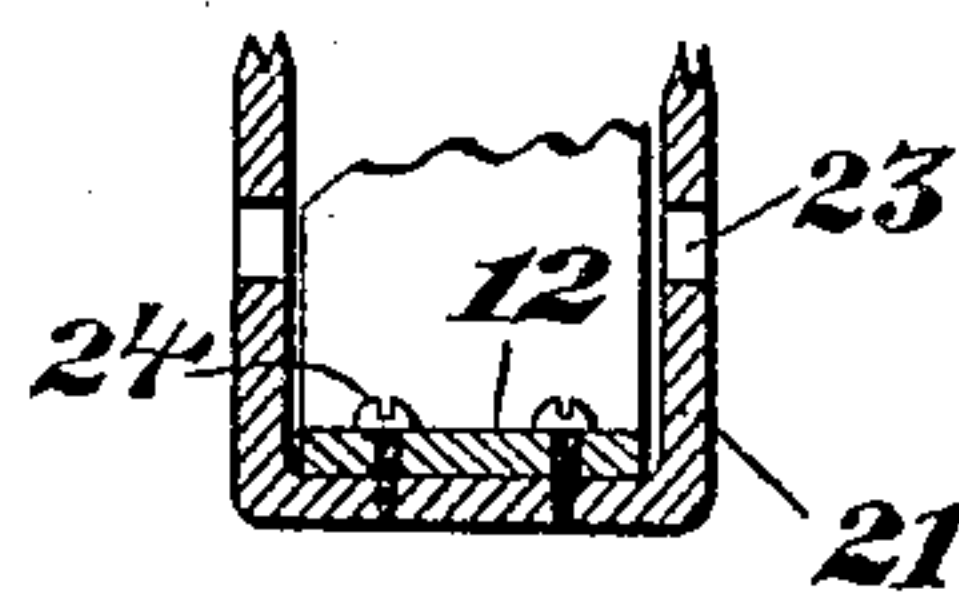


Fig. 6.

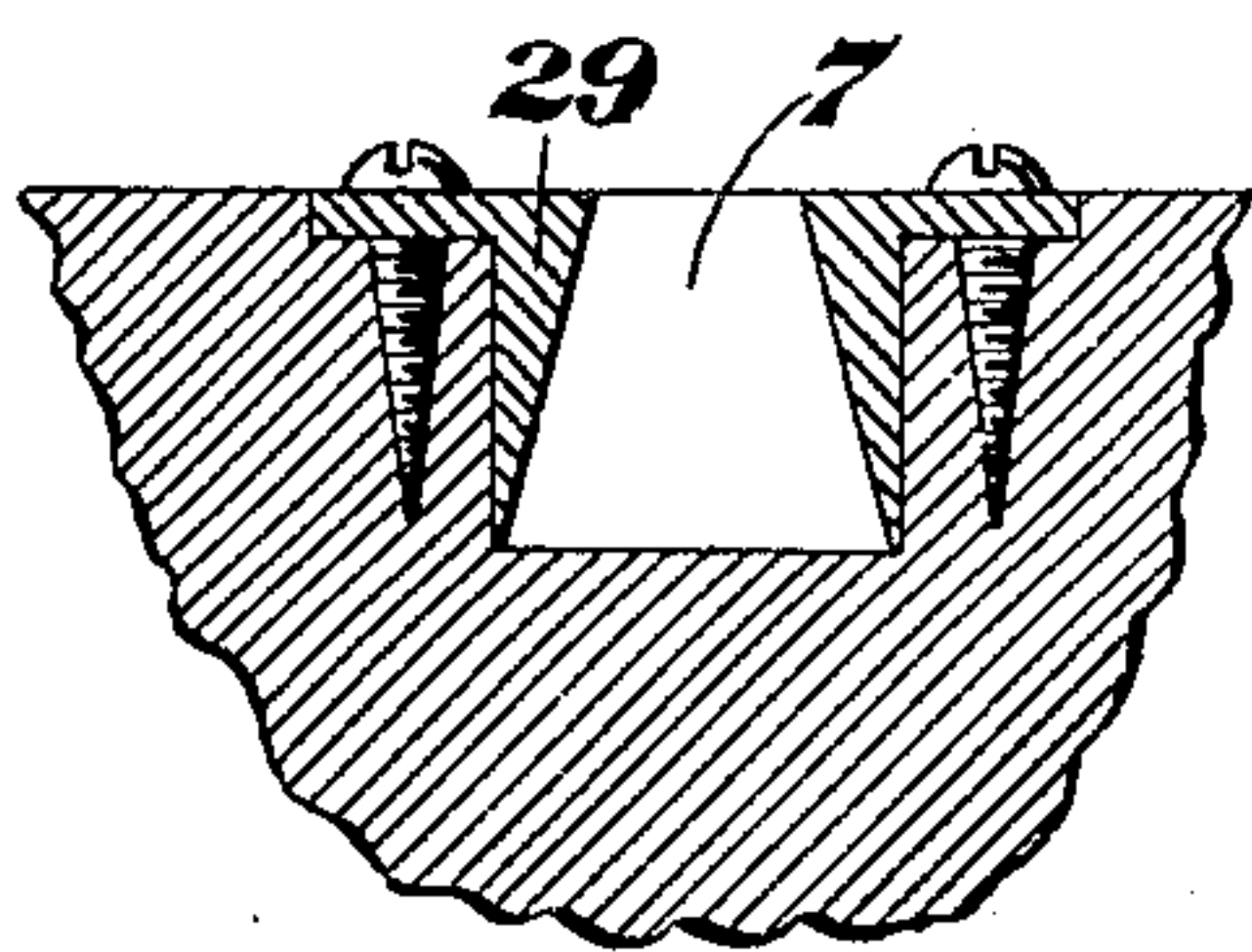


Fig. 7.

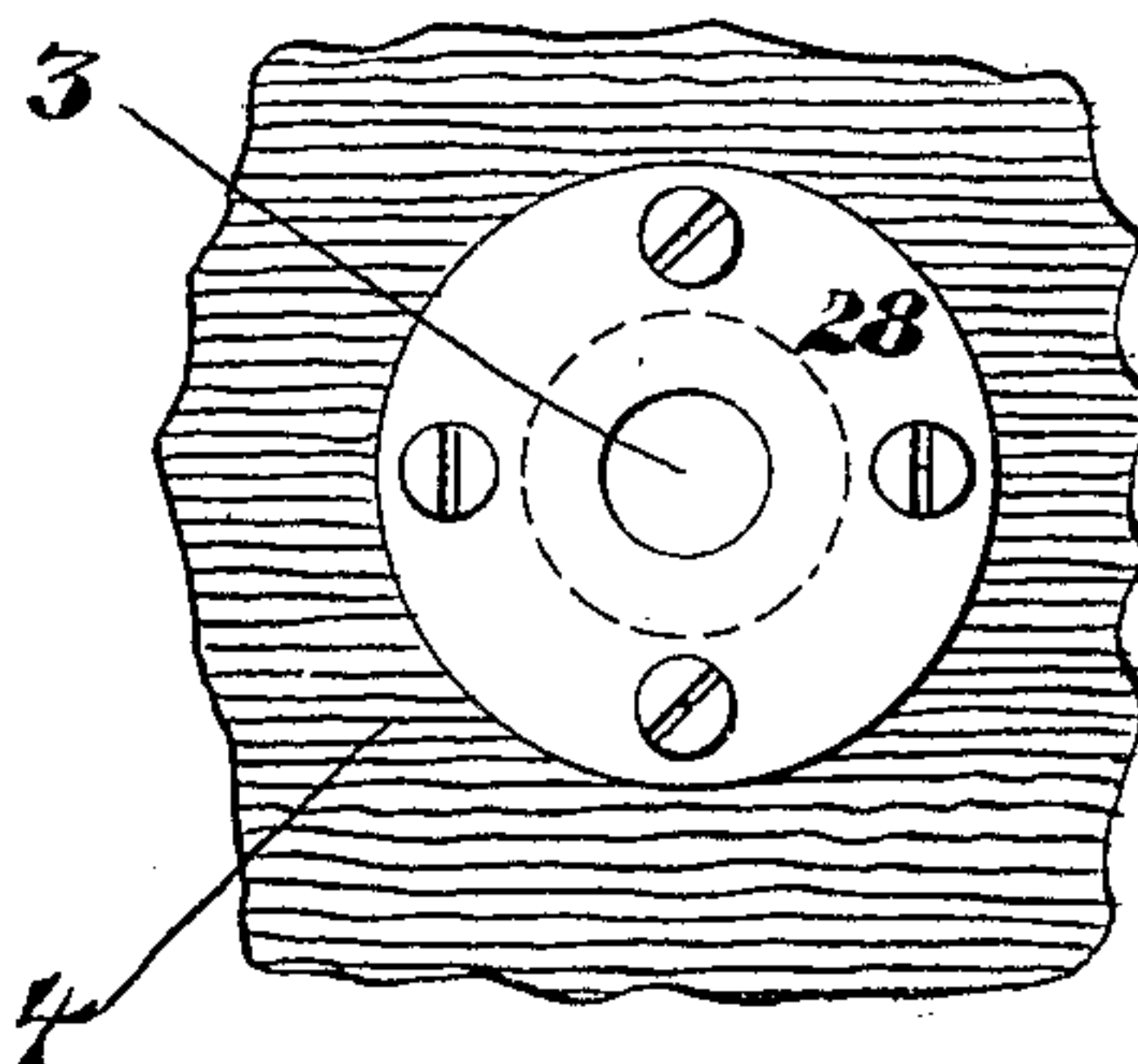
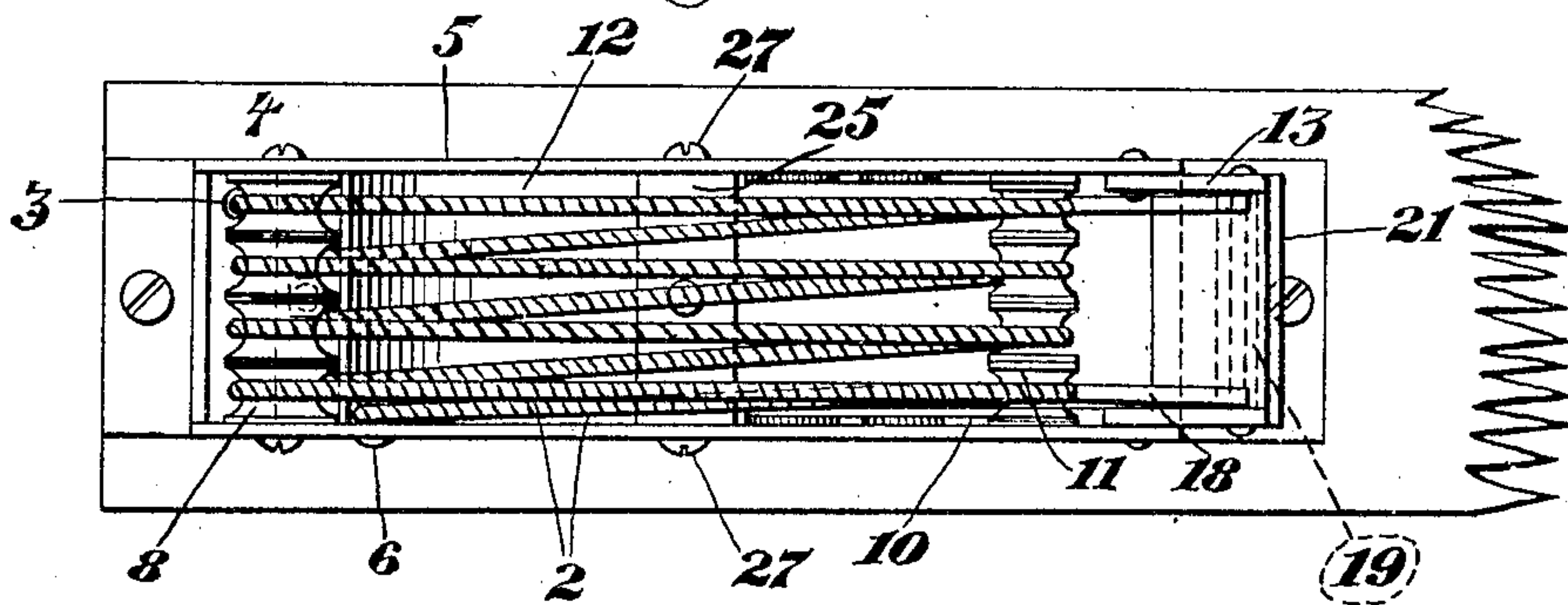


Fig. 8.



Witnesses:

Chas A. Becker,
Elliott R. Goldsmith

Inventor:

William C. Stephen,
By Hugh V. Wagner,
His Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM C. STEPHEN, OF ST. LOUIS, MISSOURI.

WEIGHT-COMPENSATOR.

No. 875,963.

Specification of Letters Patent.

Patented Jan. 7, 1908.

Application filed February 23, 1907. Serial No. 358,828.

To all whom it may concern:

Be it known that I, WILLIAM C. STEPHEN, a citizen of the United States, residing at the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Weight-Compensators, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to weight compensators for use in connection with window-sash, sliding doors, stage-curtains, elevator gates, or any similar contrivance which must be balanced by a weight, and has for its object to provide an economical but efficient substitute for the old-style sash-weights, thereby obviating the necessity of providing in the frames side-pockets in which said weights are carried.

20 In the drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur, Figure 1 is a front elevation, partly broken away, of a window-sash equipped with the herein-described invention; Fig. 2 is a front elevation showing the parts in starting position in full lines and in advanced position in dotted lines; Figs. 3 to 7 inclusive are detailed views of various members; and Fig. 8 is a top plan view of the device.

30 To the stile 1 of the sash a sash-cord or chain 2 is secured, said sash-cord passing through a perforation 3 in the top-rail 4 of the window-frame within which the sash slides, said cord connecting the sash to the weight compensator. While, in ordinary house-construction, it will be found preferable, for the sake of appearances, to have the weight compensator placed out of sight, either above the window-frame or within the space between the frame and the wall, it may, however, be located elsewhere. In many cases where it is necessary to counterbalance rising, swinging, or sliding doors, partitions, or the like, as in factories, freight-houses, and similar places, it is very desirable to have the device in an exposed or accessible position, so that it may easily be oiled, repaired, or adjusted. In such cases, the sash-cord 2 may pass from the door or window over any suitable pulley or pulleys, so that the weight-compensator can be set in any part of the building where it may be conveniently located.

55 The operating parts of the device are mounted between side-plates 5, or, in lieu thereof, other standards or casing may be

provided in which the parts are held. One end of sash-cord 2 is fastened at 6 to a side plate 5, the opposite end of the cord being secured to the sash within a recess 7 counter-sunk in stile 1 thereof. At one end of plates 5 grooved pulleys 8 are journaled, there being shown in the drawings, for example, four such pulleys, and the one on the side opposite to the plate 5 to which the sash-cord 2 is fastened being directly above the perforation 3. Supported by plates 5 is a shaft 9 on which a bifurcated lever 10 rocks, pulleys 11 being journaled in the end of said lever opposite to that at which said lever is pivoted, the number of pulleys 11 being equal to the number of pulleys 8. The sash cord 2 passes from its fastening 6 over the first pulley 11, thence over the first pulley 8, thence over the second pulley 11 and second pulley 8, etc., etc., passing, finally, from the last pulley 8 through perforation 3 to the point where it is fastened to the sash. When the sash is raised to the top of the casing, the lever 10 occupies the position depicted in full lines, Fig. 2, but as the sash is lowered the sash-cord 2 causes said lever to swing toward the position shown in dotted lines, such movement, however, being against the resistance of spring 12, as will presently be set forth, said spring tending, also, to cause the parts to return automatically from the position shown in dotted lines to that indicated by the full lines, or to assist in moving the sash in the opposite direction, or to balance the sash so that it will remain in any position to which it may have been moved. If, as shown by way of example in the drawings, there are four pulleys 8 and a like number of pulleys 11, sash-cord 2 passing over each, it is obvious that a movement of say eight inches by the sash will cause the lever 10 to be swung so that the axis of pulleys 11 moves one inch. If sash-cord 2 should pass over only one pulley 11 and one pulley 8, the sash would move two inches to every one inch of movement given to pulleys 11. By changing the number of pulleys 8 and 11 over which sash-cord 2 passes, more than four pulleys in each series being supplied where necessary, the relative rate of travel of the sash and lever 10 can be regulated in a manner familiar to those skilled in the art.

In the side-plates 5 a bell-crank lever 13 is journaled, said lever being, preferably, constructed as shown in Fig. 4, and having perforations 14 through which pintles 15, 16,

and 17 pass. A link 18, pivoted at one end to lever 10 and at the other to pintle 16, connects lever 10 and bell-crank 13, so that, as lever 10 is rocked about its axis 9, bell-crank 13 will simultaneously be swung about its axis 15. A plate 19, upon the ends of which are formed eyes 20, connects bell-crank 13 to stirrup 21, a pintle 17 being inserted through one of said eyes and through perforations 14 in the bell-crank 12, while a pintle 22 passes through the other eye 20 and perforations 23 in the stirrup, and, as bell-crank 13 is rocked upon its axis, plate 19 will be moved vertically, such motion, of course, being communicated to stirrup 21.

One end of spring 12 seats in stirrup 21, being held therein by screws 24, and, as stirrup 21 is moved vertically, said end of spring 12 is, likewise, raised or lowered. A yoke 25, through perforations 26 in which pintle 27 passes, said pintle being inserted, likewise, through perforations in the side-plates 5, passes over said spring 12 and limits the upward movement thereof, so that, as stirrup 21 is raised, the right-hand end of spring 12 (Fig. 2) will be bent into the position shown in dotted lines, the left-hand end remaining practically unaffected.

The perforation 3 should be protected by a suitable guard-plate 28, and recess 7 by plates 29. A screw 30 regulates the tension of spring 12.

The operation of the device may be summarized as follows: When the sash is lowered, sash-cord 2 rocks lever 10 toward the left, Fig. 2. By means of link 18, bell-crank 13, and plate 19, such motion of lever 10 is communicated to stirrup 21, which moves upward against the pressure of spring 12. The tension of this spring is so regulatable as exactly to counterbalance the weight of the sash, so that, as the sash is moved to any position, it will there be held by the spring 12. The sash may, accordingly, be raised and lowered at will, and will stay fixed in any desired position, since the spring 12 performs the same function as a counterweight.

Having thus described my said invention, what I claim and desire to secure by Letters-Patent is:

1. In a weight-compensator, the combination of a cord, one end of said cord being movable and the other end fixed, a lever having a fixed fulcrum, and pulleys journaled in axial alinement on said lever, said cord passing over said pulleys and causing movement of said lever.

2. In a weight-compensator, the combination of a member to be counterweighted, a lever having a fixed fulcrum having axially alining pulleys thereupon, and means connecting said member to said lever, whereby the movement of said member causes a rocking of said lever.

3. In a weight-compensator, the combina-

tion of a member to be counterweighted, a lever having a fixed fulcrum having axially alining pulleys thereupon, a cord connecting said member and said lever thereby to actuate the lever on movement of said member, and means to resist the movement of said lever.

4. In a weight-compensator, the combination of a member to be counterweighted, a lever having a fixed fulcrum having axially alining pulleys thereupon, a cord connecting said member and said lever thereby to actuate the lever on movement of said member, and a spring subject to the tension of which said lever moves.

5. In a weight-compensator, the combination of a member to be counterweighted, a lever having a fixed fulcrum having axially alining pulleys thereupon, means connecting said member and said lever thereby to actuate the lever on movement of said member, a spring subject to the tension of which said lever moves, and means intermediate said lever and said spring through which the movement of the lever is communicated to the spring.

6. In a weight-compensator, the combination of a member to be counterweighted, a lever, means whereby the movement of said member causes movement of said lever, a spring subject to the tension of which said lever moves, a bell-crank, means connecting said bell-crank to said lever, and means connecting said bell-crank to said spring.

7. In a weight compensator, the combination of a member to be counterweighted, a lever, means whereby the movement of said member causes movement of said lever, a bell-crank, a link connecting said bell-crank to said lever, a spring and means connecting said bell crank to said spring.

8. In a weight-compensator, the combination of a member to be counter-weighted, a bell-crank, a leaf spring, means moved by said bell-crank and connecting said bell-crank to said spring, a cord pulled by the counter-weighted member, and means intermediate said cord and said bell-crank whereby movement of said counterweighted member causes movement of said bell-crank.

9. In a weight-compensator, the combination of a member to be counterweighted, a bell-crank, a spring, a stirrup in which said spring seats, means connecting said bell-crank to said stirrup, and means intermediate said member and said bell-crank, whereby movement of said member causes movement of said bell-crank.

10. In a weight-compensator, the combination of a member to be counterweighted, a leaf-spring, means adjacent one end of the spring for adjusting the tension thereof, means adjacent the middle of the spring for limiting the upward movement thereof, and means intermediate said member and said

spring whereby said member is caused to move subject to the tension of said spring.

11. In a weight-compensator, the combination of a member to be counterweighted, a leaf spring, a tension-regulator at one end thereof, means connecting the end opposite said first-mentioned end to said member, whereby said member is caused to move subject to the tension of said spring, and means intermediate the ends of said spring and limiting the movement thereof.

12. In a weight-compensator, the combination of a member to be counterweighted, a leaf spring, means for adjusting the tension thereof, means connecting said spring to said member, whereby said member is caused to move subject to the tension of said spring, and a yoke engaging said spring and limiting the movement thereof.

13. In combination with a member to be counterweighted and a frame within which said member moves a plurality of axially alining pulleys supported on said frame, a rocking lever supported by said frame, axially alining pulleys carried by said lever, and a cord attached at one end to the frame and at the other to the member to be counterweighted, said cord passing over said first-mentioned and said second-mentioned pulleys, said cord, upon motion of said member, communicating motion to said lever.

14. In combination with a member to be counterweighted and a frame within which said member moves, a plurality of standards, axially alining pulleys journaled in said standards, a rocking lever journaled in said standards, axially alining pulleys journaled in said lever, and a cord attached at one end to a standard and at the opposite end to the member to be counterweighted, said cord passing over said first-mentioned and said second mentioned pulleys, said cord, upon motion of said member, communicating motion to said lever.

15. In combination with a member to be counterweighted and a frame within which said member moves, a plurality of standards, pulleys journaled in said standards, a rocking lever journaled in said standards, pulleys journaled in said lever, a spring carried in the standards, means intermediate the lever and the spring, and a cord attached at one end to the member to be counterweighted and passing over said first-mentioned and said second-mentioned pulleys, said cord, upon motion of said member, communicating motion to said lever, said lever being subject to the tension of said spring.

16. In combination with a member to be counterweighted a plurality of standards, pulleys journaled in said standards, a rocking lever journaled in said standards, pulleys journaled in said lever, a spring supported by the standards, a bell-crank, means connecting the lever to the bell-crank, means

connected to the bell-crank and the spring, and a cord attached at one end to the member to be counterweighted and passing over said first-mentioned and said second-mentioned pulleys, said cord, upon motion of said member, communicating motion to said lever, said lever being subject to the tension of said spring.

17. A weight-compensator having a member to be counterweighted, a yielding means, and a pair of rocking elements, said member being connected to said yielding means through said rocking elements.

18. A weight-compensator having a member to be counterweighted, a yielding means, a pair of rocking elements, means connecting said elements to each other, means intermediate said elements and said member connecting said member to said rocking elements, and means intermediate said elements and said yielding means whereby the rocking of said rocking elements is communicated to said yielding means.

19. A weight-compensator having a member to be counterweighted, a pair of rocking elements, means connecting said elements to each other, a cord connecting said member to one of said elements, a spring, and means intermediate said spring and said other rocking element connecting said element to said spring.

20. A weight-compensator having a member to be counterweighted, a plurality of suitably-journaled pulleys, a pair of rocking elements, a cord passing over said pulleys and connecting said member to one of said rocking elements, means connecting said rocking elements to each other, a spring, and means intermediate said spring and said other rocking element.

21. In a device of the character described, the combination of a member to be counterweighted, a flexible means, rocking means actuated by said flexible means, a yielding means, and a pair of longitudinally-moving members connecting said rocking means to said yielding means.

22. In a device of the character described, the combination of a member to be counterweighted, a flexible means, rocking means actuated by said flexible means, a yielding means, and a pair of longitudinally-moving members connecting said rocking means to said yielding means, said members being normally disposed approximately at right angles to each other.

23. In a device of the character described, the combination of a member to be counterweighted, a flexible means, rocking means actuated by said member, a yielding means, and a moving member intermediate said yielding means and said rocking means, each end of said last-mentioned member having an arcuate course of travel.

24. In a device of the character described,

the combination of a member to be counter-weighted, a flexible means, rocking means actuated by said member, a yielding means, and a longitudinally-moving member intermediate said yielding means and said rocking means, said last-mentioned member being in pivotal connection with said rocking means.

25. In a device of the character described,
10 the combination of a member to be counter-weighted, a flexible means, rocking means

actuated by said member, a yielding means, and a member intermediate said yielding means and said rocking means, and being in pivotal relation with said yielding means 15 and with said rocking means.

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

WILLIAM C. STEPHEN.

Witnesses:

ELLIOTT R. GOLDSMITH,
CHAS. A. BECKER.