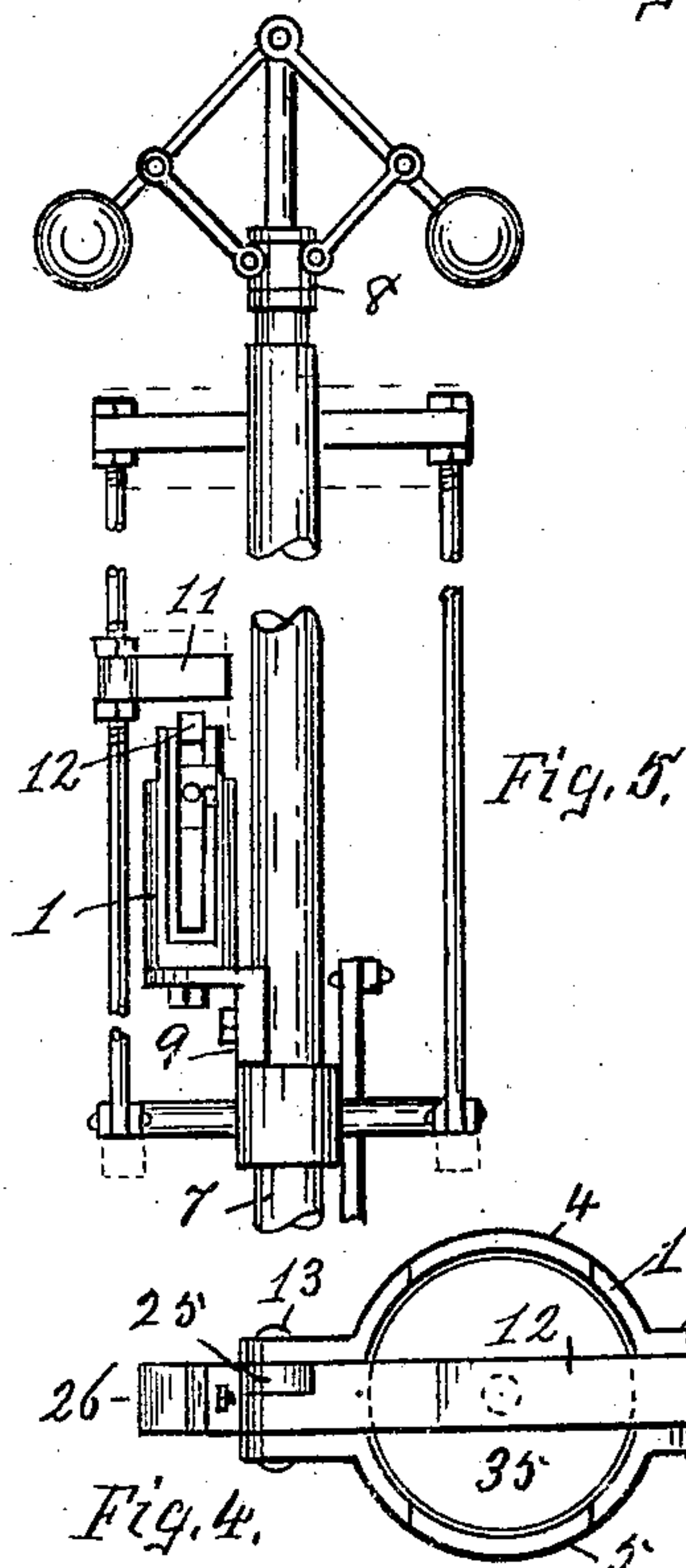
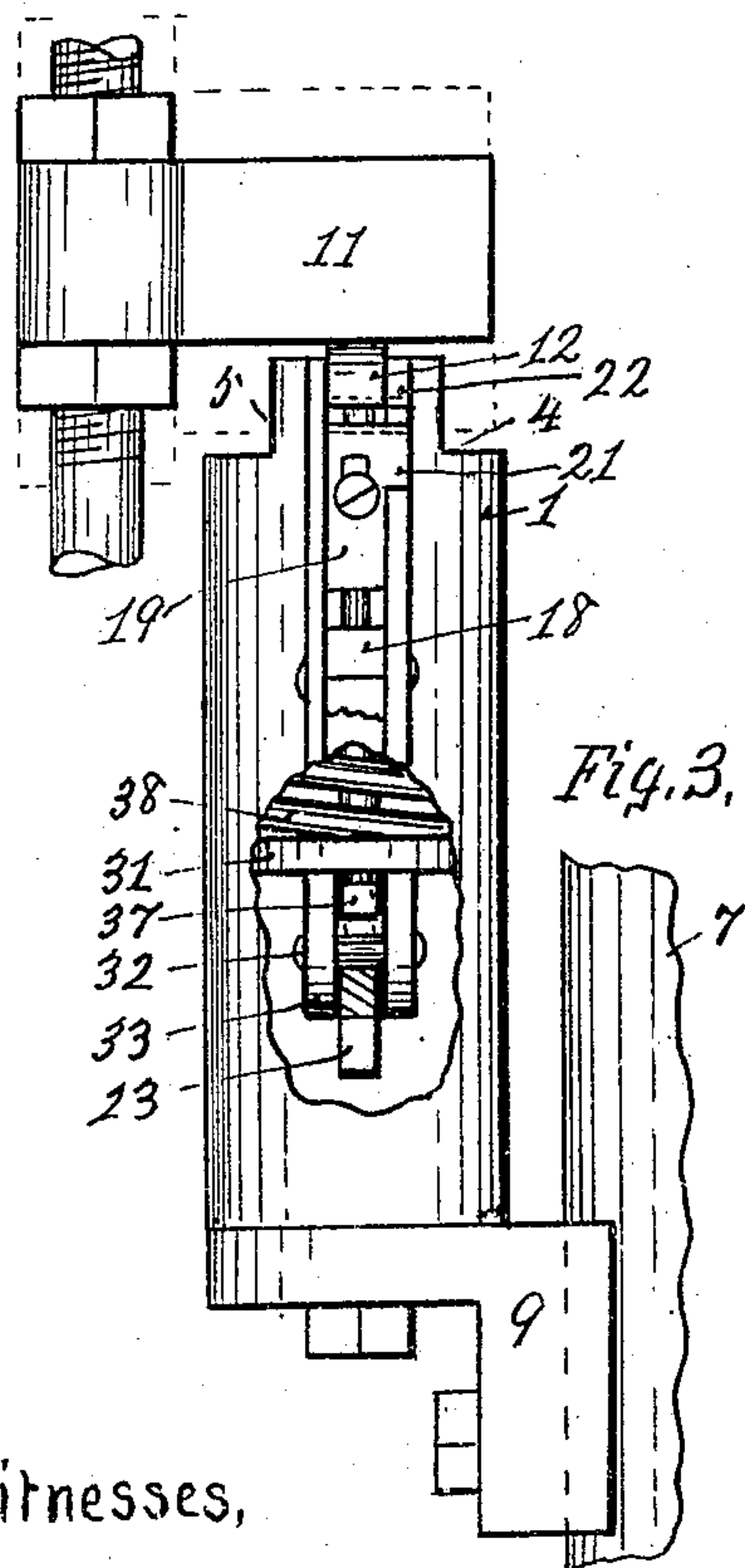
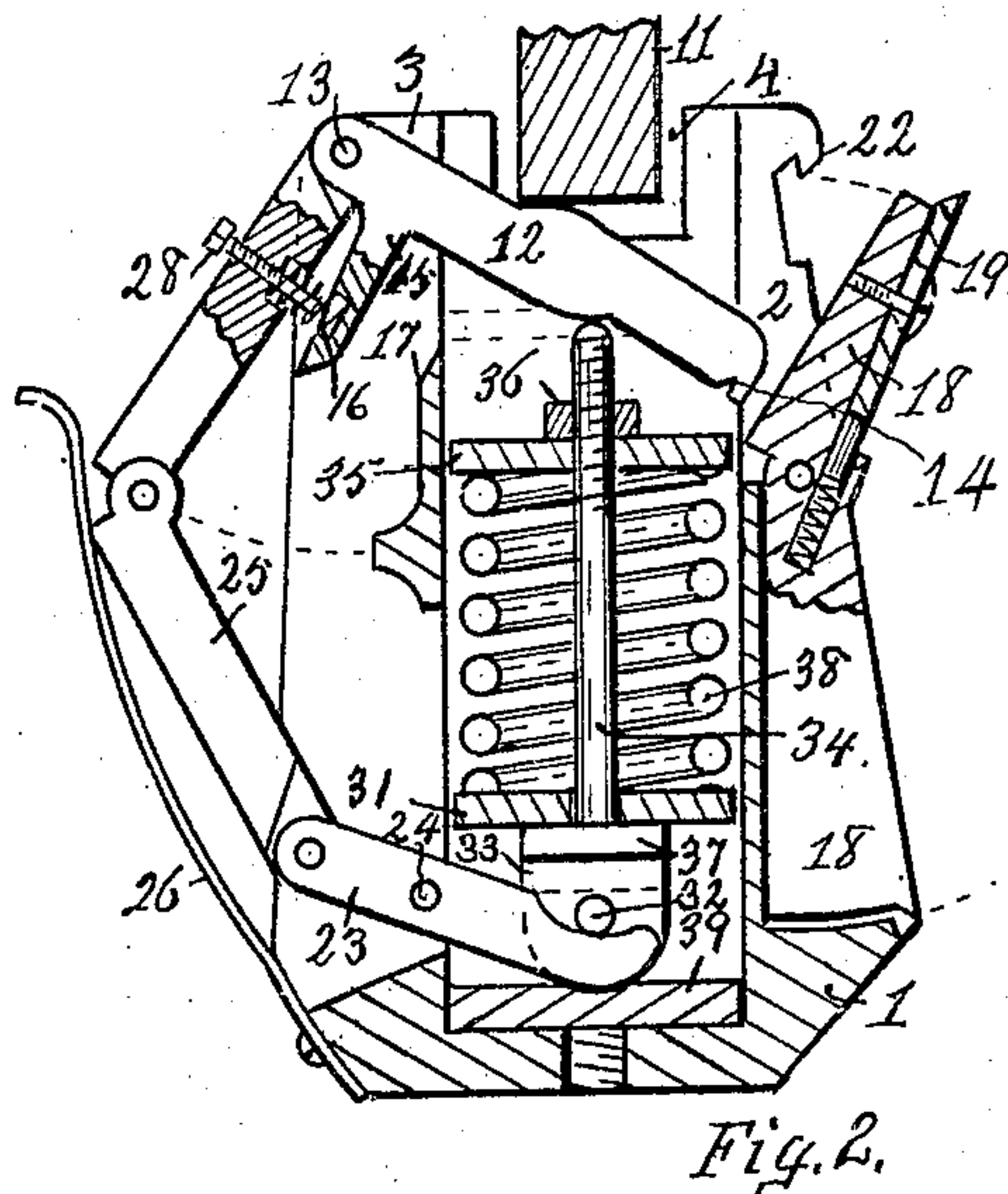
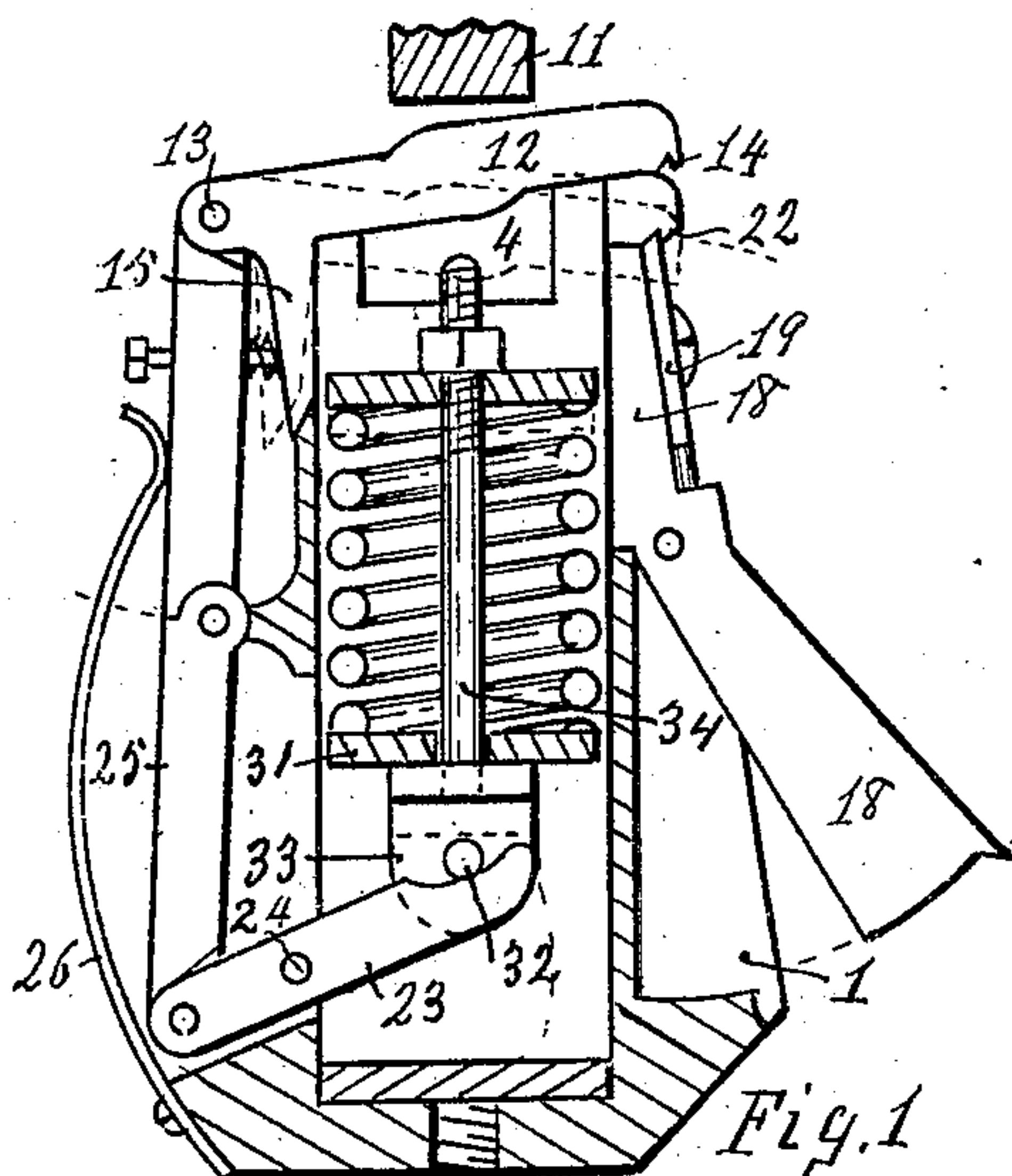


No. 845,132.

PATENTED FEB. 26, 1907.

L. SINGLE.  
SAFETY DEVICE FOR SPEED GOVERNORS.  
APPLICATION FILED FEB. 16, 1906.

2 SHEETS—SHEET 1.



Witnesses,

Samuel S. Carr.  
James G. Carr.

Leonard Single, Inventor,  
By Robert S. Carr,  
Att'y.

No. 845,132.

PATENTED FEB. 26, 1907.

L. SINGLE.  
SAFETY DEVICE FOR SPEED GOVERNORS.

APPLICATION FILED FEB. 16, 1906.

2 SHEETS—SHEET 2.

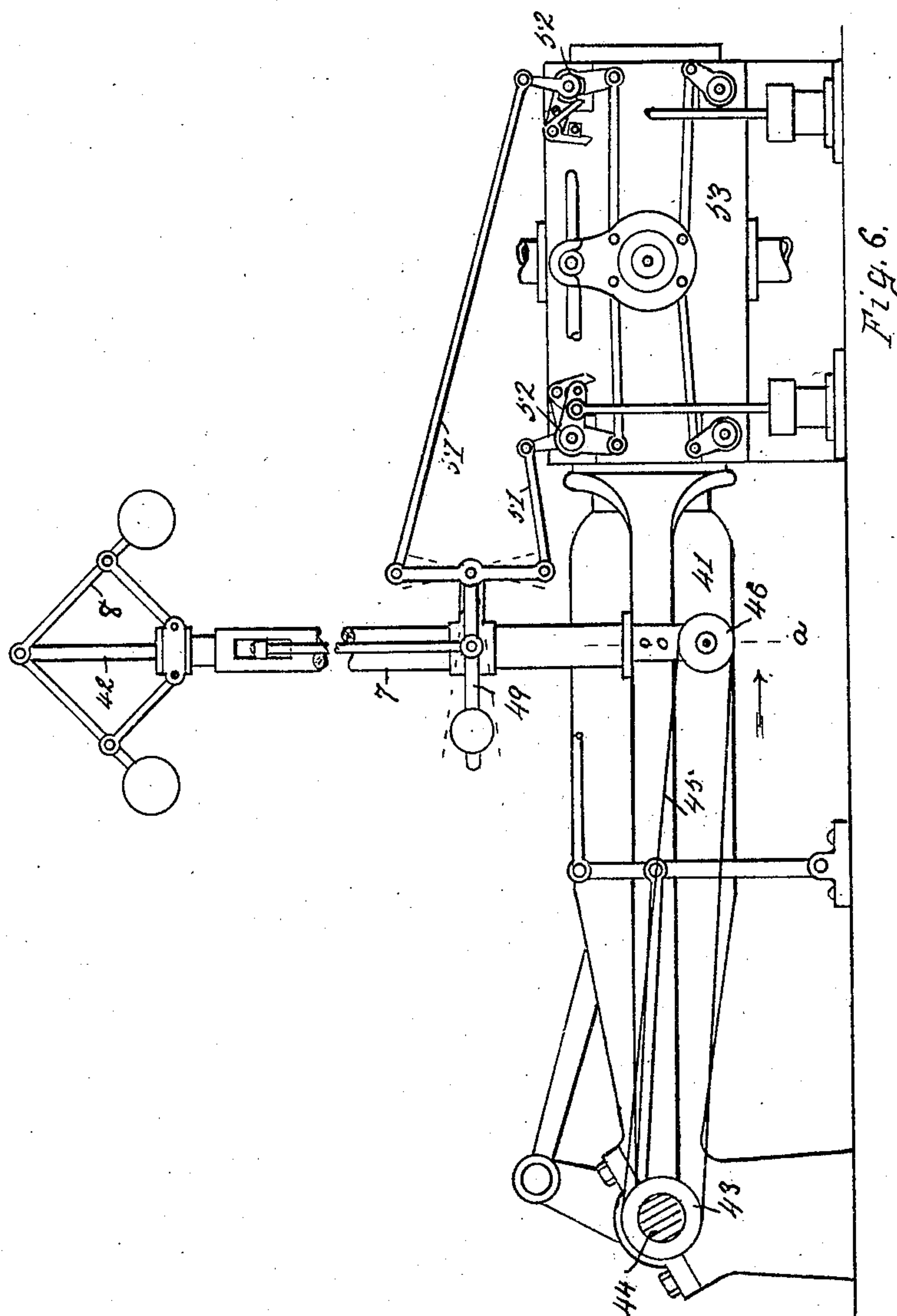


Fig. 6.

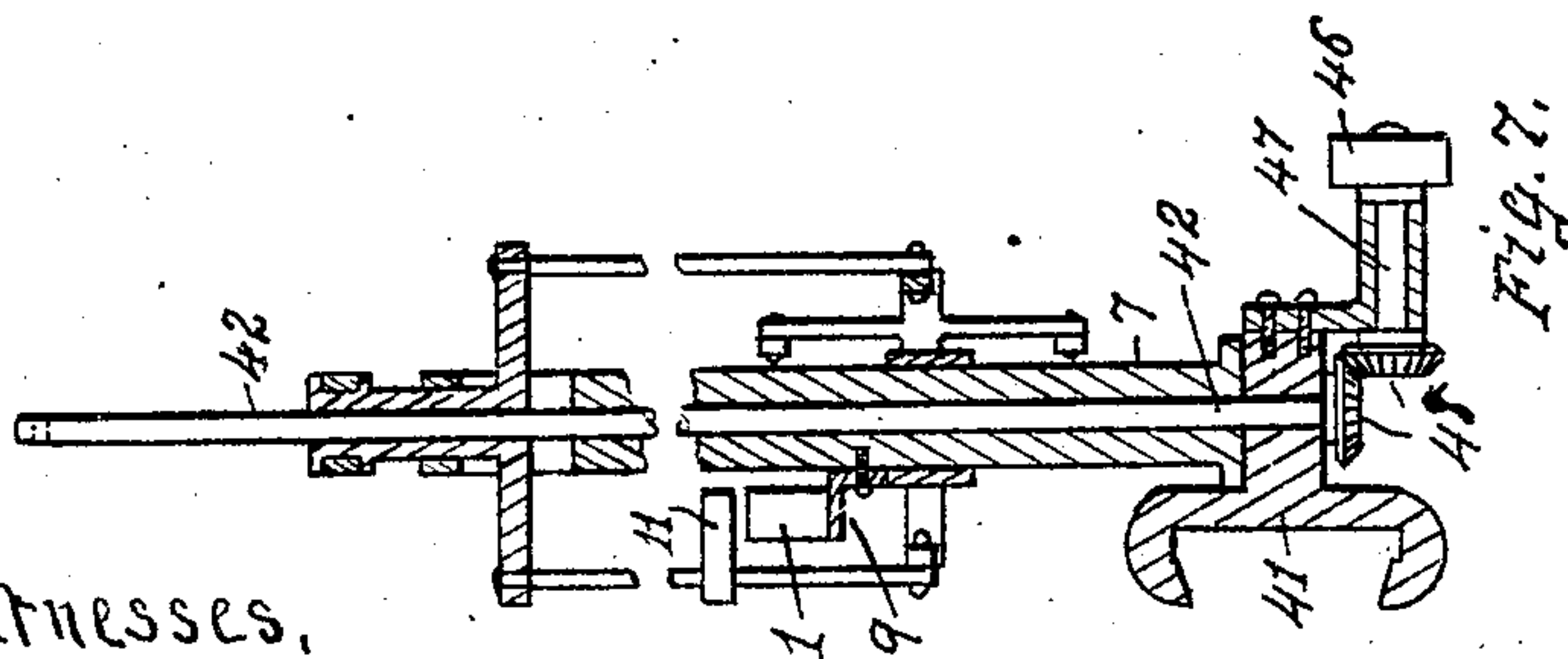


Fig. 7.

Witnesses,

Samuel S. Carr,  
Phoebe Carr.

Leonard Single, Inventor,  
By Robert S. Carr, Atty.



# UNITED STATES PATENT OFFICE.

LEONARD SINGLE, OF HAMILTON, OHIO.

## SAFETY DEVICE FOR SPEED-GOVERNORS.

No. 845,132.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed February 16, 1906. Serial No. 301,373.

*To all whom it may concern:*

Be it known that I, LEONARD SINGLE, a citizen of the United States, residing at Hamilton, Butler county, Ohio, have invented a new and useful Improvement in Safety Devices for Speed-Governors, of which the following is a specification.

My invention relates to safety devices for speed-governors of the class adapted for use on Corliss engines or elsewhere to close the valves at a predetermined point in their decreasing speed; and the objects of my improvement are to provide a stop adapted to prevent the governor from closing the valves when the engine is shut down, to provide means adapted to automatically throw the stop out of action when the speed of the governor is resumed to avoid interference with the action of the governor in shutting down the engine in emergencies, to provide a temporary and yielding resistance to the action of the governor at a predetermined point in its decreasing speed adapted to delay its action in closing the valves for the purpose of obtaining a longer pull of the engine at a slower rate of speed to overcome a heavy load or a temporary decrease in the steam-pressure without interfering with the emergency action of the governor. These objects are attained in the following described manner, as illustrated in the accompanying drawings, in which—

Figures 1 and 2 are longitudinal sections of a safety device embodying my improvements and respectively showing the moving parts in different positions; Fig. 3, a front elevation with parts broken away; Fig. 4, a plan, and Fig. 5 portions of a speed-governor provided with my safety device; Fig. 6, a side elevation of a Corliss engine, and Fig. 7 a transverse section on the line *a* and bisecting the governor-column.

In the drawings, 1 represents a casing, preferably cylindrical in form and provided with front and rear gaps 2 and 3 and side gaps 4 and 5 in the upper portion of its walls. Said casing is adapted to be removably secured on the column 7 of a speed-governor 8 by means of a bracket 9 directly under a lug 11, actuated in a vertical plane by the different speeds of the governor. Arm 12 is pivotally secured at one end within gap 3 to the rear wall of the casing by means of bolt 13 and is vertically movable at the other end within the front gap 2. It is provided with a small catch 14 on the under side of its front

end and with a depending leg 15 near its rear end. Spring 16 is arranged to move said leg into contact with the wall of the casing at 17 and yieldingly support arm 12 in its most elevated position, as shown in Fig. 1.

A gravity-stop 18, pivotally supported on the front wall of the casing, is provided with a spring-actuated latch 19, which projects a short distance above the top of said stop and carries a lateral projection 21. Said projection is adapted to automatically engage with catch 22, which is formed on the casing and in a plane just inside of the path of catch 14 on arm 12 and serves to lock the stop in the position within gap 2 and directly under the front end of arm 12, as shown in Fig. 1. In the descent of arm 12 under the action of lug 11 it moves latch 19, with the projection thereon, out of engagement with catch 22. The outward movement of the stop thus unlocked is quickly arrested by the engagement of the latch with catch 14 on arm 12, whereby the stop is maintained in a position to support the end of said arm. When lug 11 is lifted by the speed of the governor, the exertion of spring 16 raises arm 12 from the stop, thereby disengaging catch 14 from the latch, and the stop automatically falls in a forward direction and from the path of arm 12, as shown in Fig. 2.

Lever 23, fulcrumed on pivot 24, secured in the rear wall of the casing, terminates at one end within the casing. Knee-lever 25 is pivotally secured at its respective ends on the other end of lever 23 and on pivot or bolt 13, whereon arm 12 is hinged. Spring 26, secured on the casing, is adapted to move and yieldingly maintain the knee-lever in the locked position, as shown in Fig. 1. The upper member of said lever carries spring 16 and is provided with screw 28, which serves as an adjustable stop for leg 15.

A circular plate 31 is movably supported within the casing on lever 23 by means of pin 32 being inserted through jaws 33, which depend from said plate adjacent to the sides of said lever. A bolt 34 serves as a temporary and yielding stop under arm 12 and is movable through a central opening in plate 31. It is provided with a washer 35 and with an adjusting-nut 36 and is formed with a T-head 37, which is movable between jaws 33 to the extent permitted by pin 32 and plate 31. A coiled spring 38, mounted on plate 31, is adjustably clamped thereon under washer 35 by means of nut 36 on stop 34, and



an elastic stop 39 for the end of lever 33 is seated on the bottom of the casing.

Column 7 is supported on the bed 41 of a Corliss engine and provided with a shaft 42, whereon the governor 8 is attached. Said shaft is rotated from pulley 43 on the crank-shaft 44 by means of a belt 45 engaging with pulley 46 on intermediate shaft 47, which engages with shaft 42 by means of bevel-gears 48.

When the speed of the engine is increased, the centrifugal action of the governor raises lug 11 and the bell-crank lever 49. This movement of the lever causes valve-rods 51 to actuate the tripping cut-off valves 52 on the cylinder 53 to decrease the admission of steam to the cylinder and effect a corresponding decrease in speed. Said valves are arranged to increase the admission of steam with the decreasing speed of the governor to a predetermined point, when they shut off the steam completely. My device is intended to delay the action of the governor in causing the valves to shut off the steam until its speed has decreased below said predetermined point.

In operation the descent of lug 11 is intended to correspond with the decreasing speed of the governor and with the increasing admission of steam thereby until at a predetermined point in the descent of lug 11 the steam is suddenly and entirely shut off by the governor. To prevent the governor from closing the valves when the engine is otherwise shut down that steam may be admitted for starting, the gravity-stop should be locked under arm 12. The decreasing speed of the governor causes stop 11 in its descent to move arm 12 in contact with the point of latch 19 and transfer its engagement from catch 22 to catch 14 on said arm, where it will remain during the time the arm remains supported on the stop. After the engine is started and the speed of the governor has raised lug 11 the exertion of spring 16 lifts arm 12 and disengages catch 14 thereon from the latch and permits the gravity-stop to automatically fall in a forward direction from the path of arm 12, as shown in Fig. 2. In this position the descent of lug 11 is not prevented, nor is the closing of the valves by the governor in emergencies. Stop 34 is arranged to intercept and yieldingly resist the descent of arm 12 and lug 11 thereon just above the predetermined point of closing the valves that the engine may continue to run even, slowly, and under a full head of steam to recover from a heavy load or from low steam-pressure. The resistance of stop 34 may be regulated as desired by the adjustment of the coiled spring; but it must always be less than the pressure of lug 11 on arm 12 when the speed of the governor is very slow or entirely discontinued that its emergency action may not be prevented.

Should the pressure of lug 11 on arm 12 exceed the resistance of stop 34, the engine will be automatically shut down, and the descent of lug 11 will move arm 12, with leg 15 thereon, to contact with stop 28 and throw the knee-lever in an outward direction against the resistance of spring 26, thus permitting lug 11 to move the yielding stop mechanism within the casing in a downward direction until the end of lever 23 rests on elastic stop 39, as shown in Fig. 2. From the position shown in Fig. 2 lug 11 may be raised and supported with arm 12 on the gravity-stop, as before described, and the exertion of spring 26 will automatically move the knee-lever to its former locked position and cause lever 23 to move and maintain the yielding stop mechanism in its former operative position, as shown in Fig. 1.

Having fully described my improvement, what I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combination, of an arm pivotally secured at a fixed point, a stop adapted to limit the movement of the arm, and means adapted to automatically remove the stop upon the movement of the arm in a direction therefrom.

2. The combination of an arm pivotally secured at a fixed point, a movable stop, means adapted to lock the stop in a position to intercept the movement of the arm in one direction, and means actuated by the movement of the arm in the opposite direction to unlock the stop.

3. The combination of a stop automatically movable from a fixed position, means to lock it in said position, a lever automatically movable from contact with said stop and means simultaneously actuated thereby to unlock the stop.

4. The combination of a fixed catch, a movable stop, a latch thereon adapted to engage with the catch, a movable lever, a catch thereon, said lever being arranged to automatically transfer the engagement of the latch from the former to the latter catch.

5. The combination of a lever, a stop mechanism adapted to yieldingly resist the movement thereof, and means actuated by the lever at a predetermined point in its movement adapted to discontinue the resistance of said stop.

6. The combination of a lever, a stop adapted to intercept and yieldingly resist the movement thereof, lever mechanism adapted to remove the stop; and adjustable means adapted to engage with the lever, and arranged to actuate said mechanism.

7. The combination of a lever, a stop adapted to yieldingly resist the movement thereof, means actuated by the lever adapted to move the stop out of operative position, and means adapted to automatically move



and maintain said stop into operative position.

5 8. The combination of a casing, a lever hinged thereon, a stop mechanism movably supported within the casing and adapted to intercept and yieldingly resist the movement of the lever, and adjustable lever mechanism actuated by said lever, and adapted to throw the stop out of action at a predetermined point in the movement of said lever.

10 9. The combination of a movable member, a stop secured at a fixed point and automatically movable out of the path of the said member, means adapted to automatically retain the stop in the path of said member, and means adapted to automatically release said stop simultaneously with the removal of said member from contact therewith.

20 10. The combination of a member movable in a predetermined path, a catch secured at a fixed point, a stop automatically movable out of the path of said member, a latch thereon adapted to engage with the catch and maintain the stop in the path of said member, said latch being arranged to be disengaged from the catch by contact of said member therewith, and means carried by said member adapted to prevent the movement of the stop after the latch is disengaged from the catch.

30 11. The combination of a movable member, a stop arranged to intercept and yieldingly resist the movement thereof, and lever mechanism actuated by said member, and adapted to terminate the resistance of the stop.

12. The combination of a movable member, a stop adapted to intercept and yieldingly resist the movement thereof, means adapted to move and maintain the stop in operative position, and means actuated by said member at a predetermined point in its movement adapted to throw the stop out of action.

13. The combination with a casing, a lever hinged thereon, a gravity-stop movable in the path of the lever, means adapted to retain the stop in said position and adapted to be actuated to release the stop by the departure of the lever from contact with the stop.

14. The combination of a casing mounted at a fixed point, a member movable in relation thereto, a movable stop on the casing adapted to intercept the movement of said member in one direction, said stop being automatically movable out of the path of said member simultaneously with the movement of said member in the opposite direction after contact therewith.

15. The combination of a casing mounted at a fixed point, a member movable in relation thereto, a yielding stop, and an unyielding stop, both movably secured in the casing, said stops being adapted to independently intercept said member at different respective predetermined points in its movement.

LEONARD SINGLE.

Witnesses:

DAVID PIERCE,  
R. S. CARR.