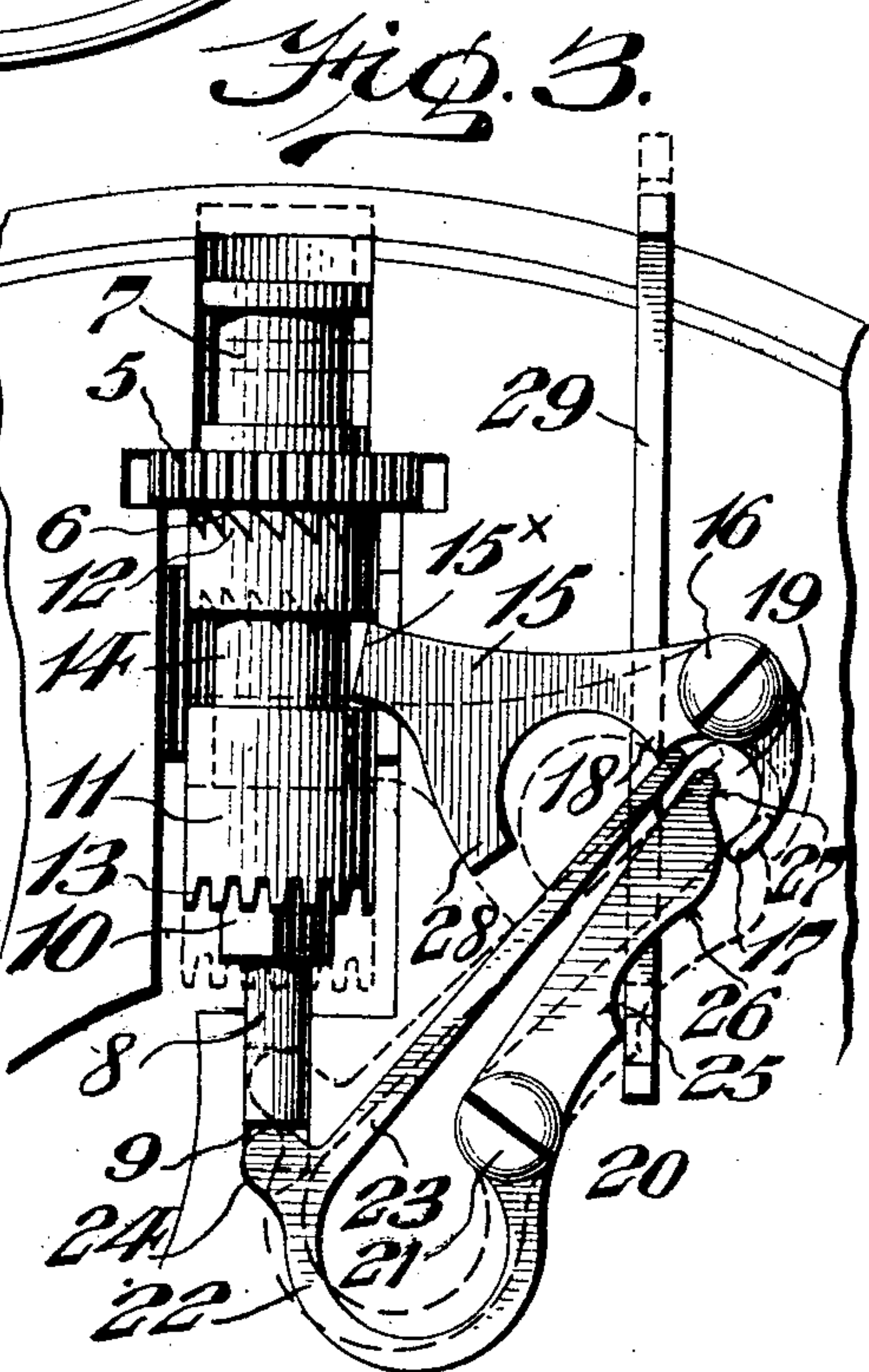
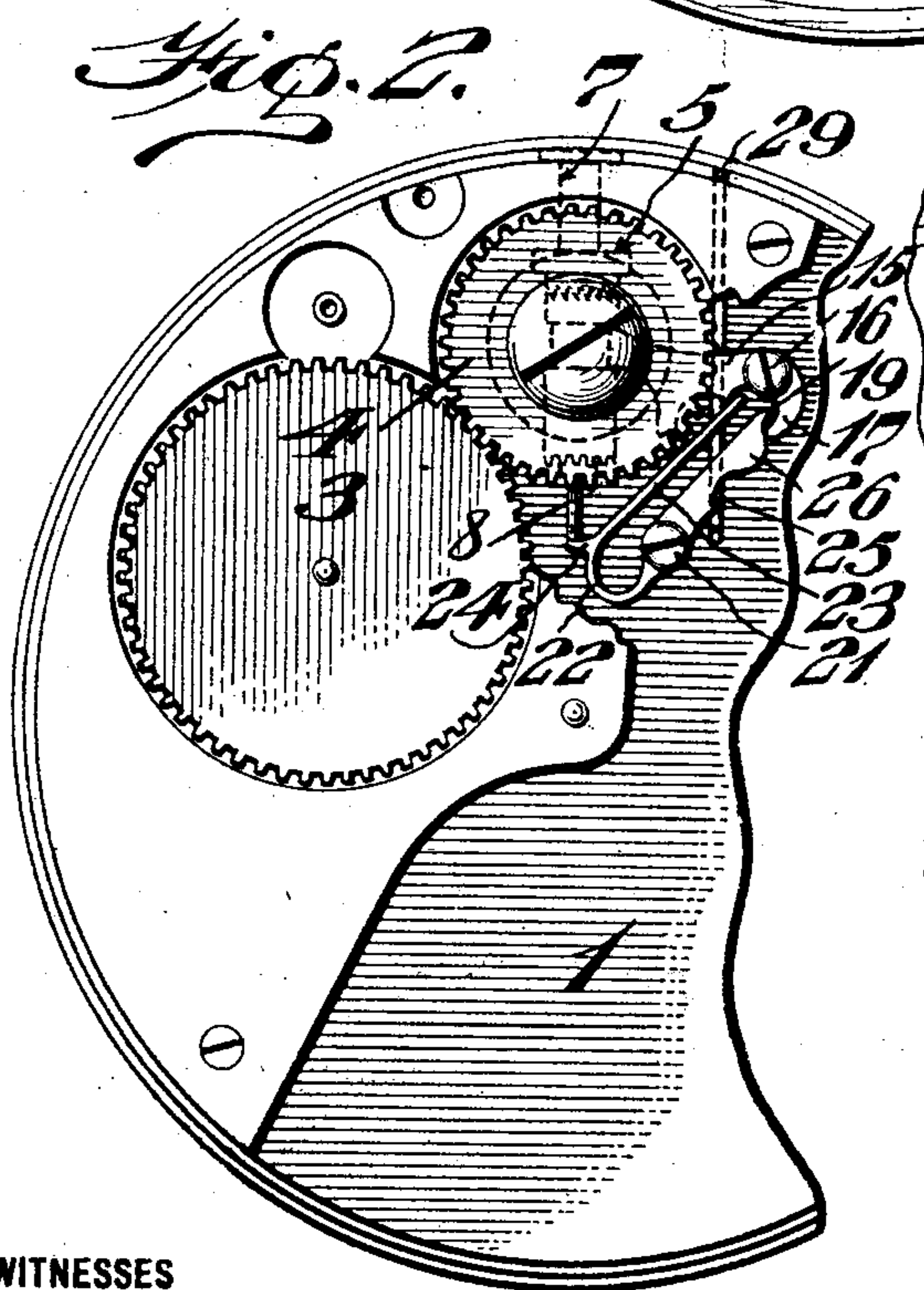
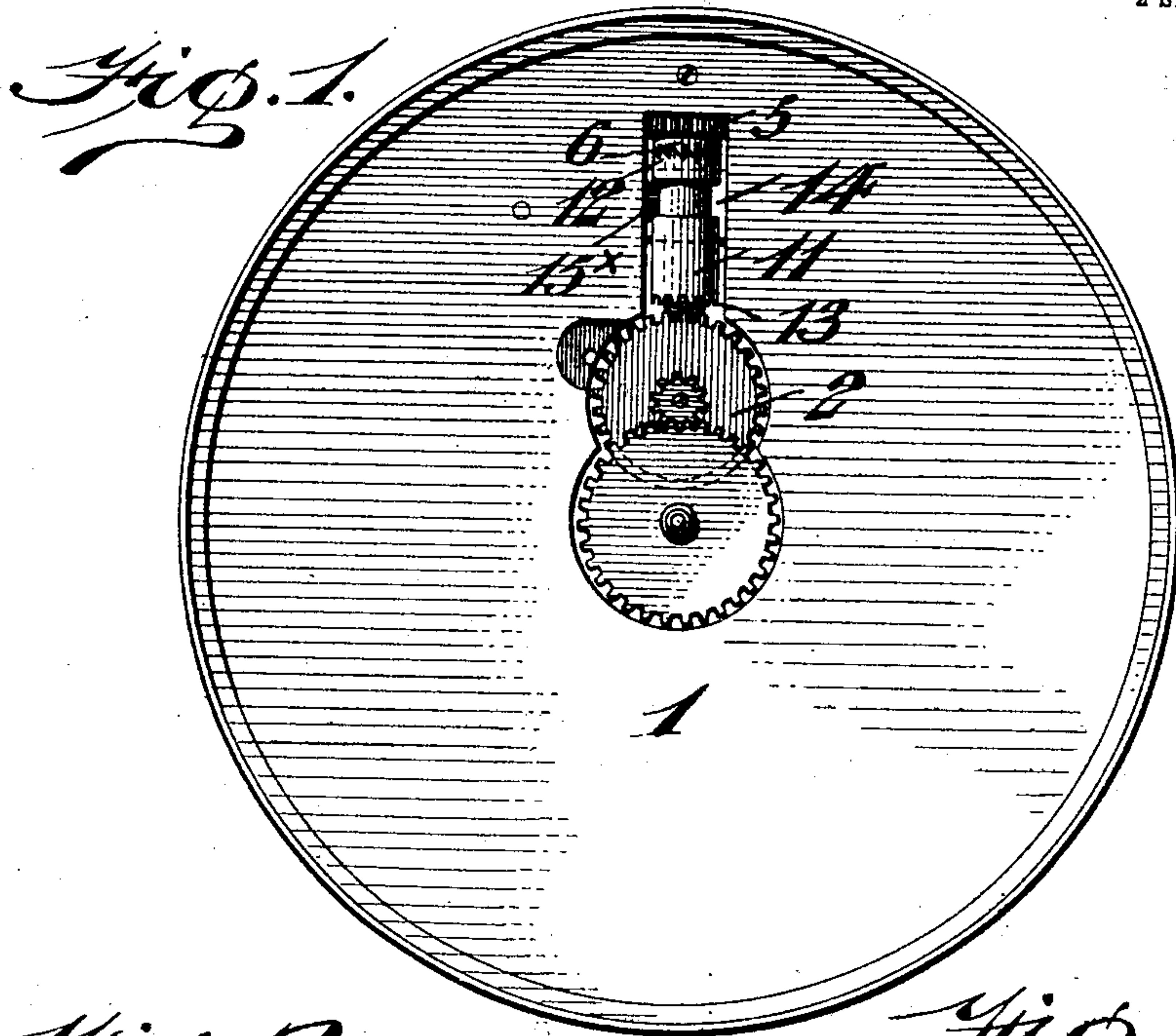


G. W. GRISDALE, JR.  
WATCH STEM MOVEMENT.  
APPLICATION FILED JAN. 13, 1910.

960,166.

Patented May 31, 1910.

2 SHEETS—SHEET 1.



WITNESSES

*H. Dieterich*  
*L. Douville.*

INVENTOR

BY

*George W. Grisdale, Jr.*  
*Wiederstein & Fairbank.*

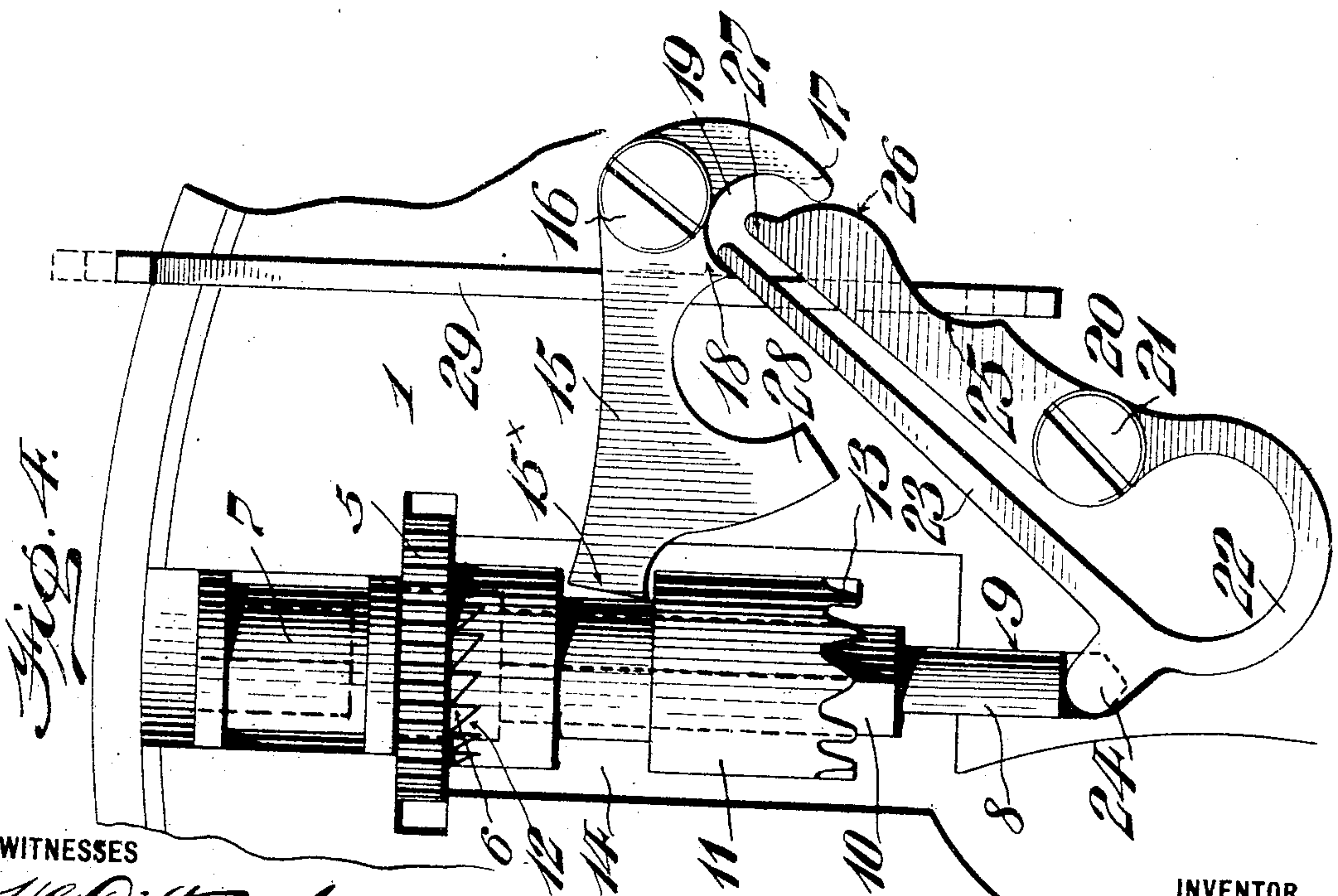
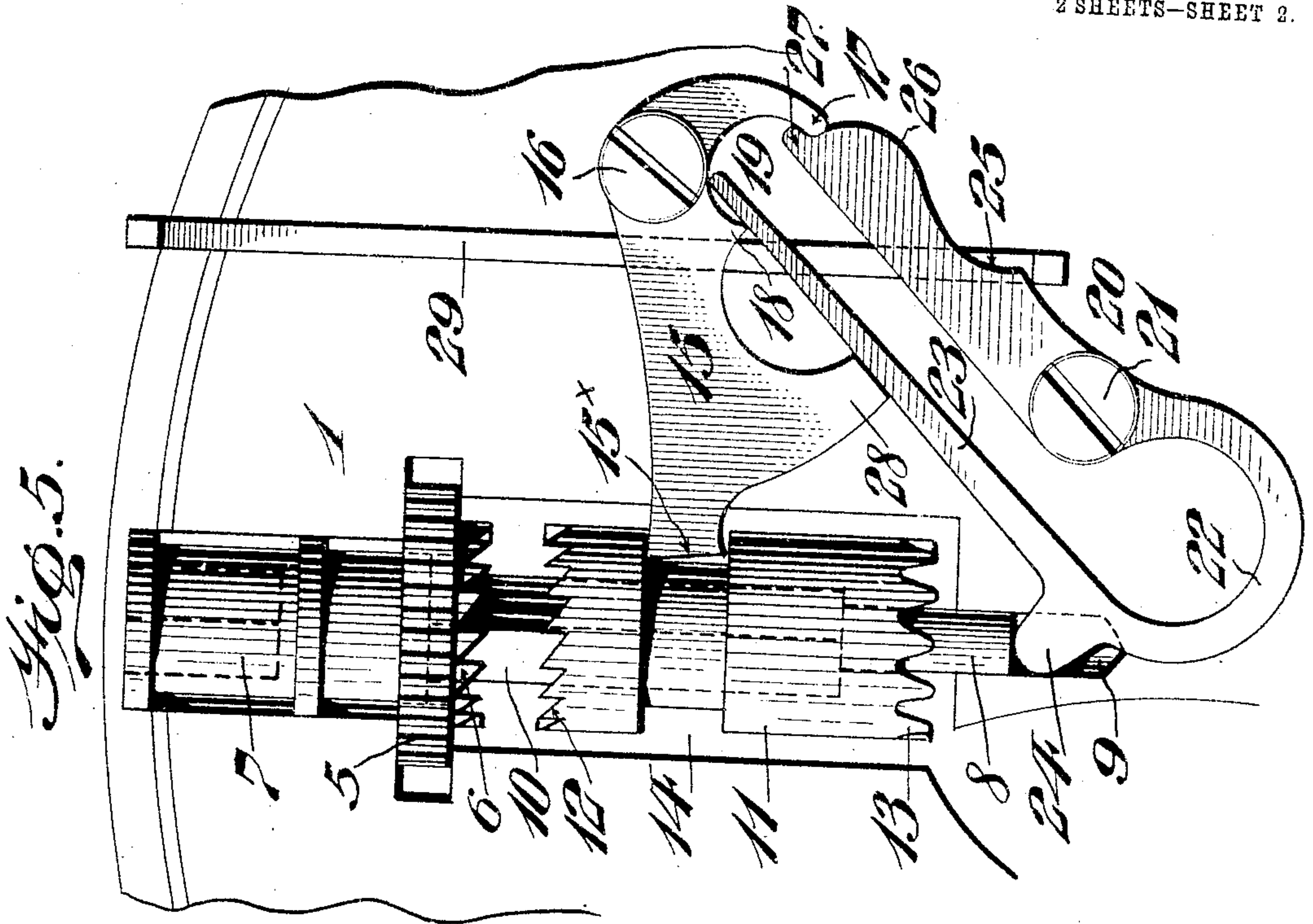
ATTORNEYS

G. W. GRISDALE, JR.  
WATCH STEM MOVEMENT.  
APPLICATION FILED JAN. 13, 1910.

960,166.

Patented May 31, 1910.

2 SHEETS—SHEET 2.



WITNESSES

*H. Dieterich*  
*L. Dowville.*

BY

*George W. Grisdale, Jr.*  
*Wiedersheim & Furbank.*

INVENTOR

ATTORNEYS



# UNITED STATES PATENT OFFICE.

GEORGE WM. GRISDALE, JR., OF TRENTON, NEW JERSEY.

## WATCH-STEM MOVEMENT.

960,166.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed January 13, 1910. Serial No. 537,926.

*To all whom it may concern:*

Be it known that I, GEORGE WILLIAM GRISDALE, JR., a citizen of the United States, residing at Trenton, in the county of Mercer, State of New Jersey, have invented a new and useful Watch-Stem Movement, of which the following is a specification.

My invention consists of a new and useful device for the purpose of controlling the clutch for the adjustment of the hands of a watch and for winding the main spring.

It further consists of a clutch lever and a stem lever suitably connected, whereby the stem lever is contracted by the action of the stem and when released throws the clutch lever to move the clutch into engagement with the minute wheel.

It further consists in forming a cam on the stem lever which is in engagement with a suitable portion of the clutch lever in order to properly actuate the same.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

Figure 1 represents a plan view of a dial plate showing the adjusting wheels and winding pinion. Fig. 2 represents a view taken from the opposite side showing the clutch operating mechanism. Fig. 3 represents a similar view to that shown in Fig. 2 on an enlarged scale with certain of the parts removed. Figs. 4 and 5 represent elevations on an enlarged scale showing the operative parts in different positions.

This invention relates to an improved watch stem movement such as is employed in watches for the purpose of operating the clutch in connection with the winding or the adjusting of the hands to the correct time, and the object of this invention is to provide for a cheap and simple device that will insure a perfect action combined with a long and faithful service such as is desired in high class watches.

In the drawings I have shown a construction as one embodiment of my invention which I have found operates successfully in practice, but it will be evident that changes may be made in the construction, the arrangement of the parts may be varied and other instrumentalities may be employed

which will come within the scope of my invention, and I do not therefore desire to be limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

My invention is so designed and adjusted as to give a silent and harmonious action when in operation, thereby eliminating all undesirable effects found in watch stem movements now in use (*i. e.*) excessive tension, chattering, scraping, &c. caused by faulty design or by their process of manufacture, which sooner or later terminates the life of the spring or wearing away of the essential parts of the stem movement concerned.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates a pillow plate or dial plate of a watch or clock which is adapted to support the proper mechanism for actuating a watch, and which is suitably formed to accommodate the same.

2 designates the minute wheel which is adapted to be suitably actuated as will be hereinafter described, to set the hands of the watch.

3 designates the gear wheel connected with the main spring, which is in suitable connection with the wheel 4 which is actuated by the winding pinion 5, the latter being suitably supported in the watch plate 1, and being provided with clutch teeth 6.

7 designates the pendent end of the stem which has the end portion 8 thereof movable in a suitable recess 9 in the watch plate 1, and which is provided with the squared portion 10, on which is movably mounted the clutch 11 in a suitable clearance therefor in the watch plate 1. The clutch 11 is provided with teeth 12 adapted for engagement at the proper time with the teeth 6 of the winding pinion 5 and is also provided at its opposite end with the teeth 13 which are adapted at the proper time for engagement with the teeth on the minute wheel 2 for setting the hands of the watch. At a suitable point in the clutch is provided a groove 14.

15 designates a clutch lever pivoted at 16



to the dial plate 1, and having an end portion 15\* thereof seated in the groove 14 of the clutch 11.

17 designates an extension on said clutch lever upon the opposite side of the pivotal point 16 from the end 15\*, which engages with the clutch 11. 18 designates a bearing on said clutch lever which is nearer the pivotal point 16 than is the end of the extension 17, a suitable recess 19 being formed in the clutch lever between the bearing 18 and the extension 17.

20 designates a stem lever pivoted at 21 to the dial plate 1, the pivotal point separating the lever 20 into two sections, one a spring section and the other a cam section.

The spring section consists of the loop 22 having the arm 23 extending therefrom, a portion of said arm engaging with the bearing 18 of the clutch lever and said arm 23 being provided with a projection 24 suitably located in order to be engaged by the end 8 of the stem in order that the stem lever 20 will be properly rotated or actuated around its pivotal point 21 as will be hereinafter described. The cam section on the stem lever 20 is provided with a recess 25 and with a cam 26, which is adapted when the stem lever 20 is suitably situated to engage with the extension 17 on the clutch lever and to ride thereon.

It will be noted that when the stem 8 is bearing upon the projection 24 that the spring section of the stem lever is rotated around its pivotal point 21 and the arm 23 and the cam member are compressed or brought together, see Fig. 4, the arm 23 pressing against the bearing 18 elevates the end 15\* and the clutch 11, it being noted that the cam section of the stem lever is also moved so that the end of the extension 17 rides up in the cam, and permits the elevation of the end of the lever 15 whereby the clutch 11 is caused to be held in elevated position in order that the teeth 12 thereof will engage with the teeth 6 on the winding pinion 5, the parts, when in this position, being properly located to wind the watch. As soon as the stem 8 is pulled out and so removed from its engagement with the projection 24, the compressed stem lever expands and the cam member forces over the projection 17, rotating the clutch lever 15 on its pivotal point 16 and lowering the clutch, the parts assuming the position seen in dotted lines in Fig. 3, and as seen in Fig. 5. As the cam 26 rides on the end of the projection 17, the point of contact thereof is at a greater distance from the pivotal point 16 than is the bearing 18 upon which the arm 23 bears so that the parts will be easily moved. By this means, the stem lever always returns the clutch lever to its proper position to remove the clutch from engage-

ment with the winding pinion and places the other teeth on the clutch in position to engage with the wheel, which engages with the hands of the watch, to set the same. It will be noted that the point of engagement of the spring section of the stem lever with the point of engagement of the arm 23 and the bearing 18 of the clutch lever is substantially in a straight line between the points of pivot of the two levers, which will result in a much smoother and easier movement than otherwise.

27 designates a lug which is adapted to engage with the end of the extension 17 when the parts are in the position seen in Fig. 5, in order to prevent the improper movement of the cam lever of the stem lever. On the clutch lever 15 I provide on arm or stop 28 which is adapted to abut with the spring arm 23 when the clutch is lowered and which serves as a stop limiting the proper meshing of the teeth of the clutch member with the teeth of the minute wheel, the effect of which is evident.

Special attention is called to the points of bearing of lug 27 and cam 26, as shown in Fig. 5, providing for a positive position of the clutch 11, referring to the line of motion of the said bearing point of the lug 27 connecting with a radial line drawn from the pivotal point 21 to the said point of bearing on the cam 26, the above points of bearing when in the position shown being equivalent to bearings constructed perpendicular to the radial line and line of motion in the respective levers above mentioned, this arrangement removing all possibility of disengagement of the clutch teeth 13 with the teeth of the minute wheel 2 due to the pressure required to keep said teeth engaged when setting the watch. This arrangement in combination with extension 28 on clutch lever 15 embodies a very important feature in controlling the position of the clutch in its relation with the minute wheel and in other words produces a double locked effect in the clutch when in the setting position.

It will be well to call attention to the advantage a contracting loop spring has over an expanding one when the loop springs are to be utilized in transmission of power, since in the former, the inner or shorter sides of the loop contract and the outer or longer sides expand, there being more material for expansion and less for contraction, proves the advantage over the latter which has more material for contraction and less for expansion.

In the cam section I provide a recess the walls of which are engaged by a drawbar 29 should I desire to use this construction, the end of said drawbar serving to hold the stem lever contracted, when the drawbar is moved to the position seen in dotted lines,



Fig. 4. From the above it will be seen that beneath the fulcrum of the clutch lever is a space or recess designed for the reception of the ends of the cam member and the spring section of the stem lever, the ends, points or sides of this space forming bearings for the spring and cam sections of the stem lever, and that the spring bearing is approximately on the line between the two lever fulcrums, the cam bearing being at a distance farther from the center or pivot than spring bearing, and so constructed as to provide for a proper contraction of stem lever in the space above mentioned when so desired, and the spring bearing and cam bearing being of unequal distances from the center causes a downward movement of the end of the clutch lever when equal pressure is placed upon both bearings, the said pressure being obtained from the stem lever.

The operation of the device will be readily apparent.

Referring to Fig. 4, it will be noted that when the stem 8 is moved to its depressed or inner position, it bears upon the projection 24 and rotates the stem lever 20 on its fulcrum or pivot 21, causing the arm 23 to impart a pressure to the bearing 18 on the clutch lever 15 in order to elevate the end of said clutch lever which is in engagement with the clutch 11. At the same time the cam section and cam 26 on the stem lever is moved toward the arm 23, that is, these two parts are compressed with the cam bearing upon the end of the extension 17 of the clutch lever. When in this position the teeth 12 of the clutch are in engagement with the teeth 6 of the winding pinion 5, so that the watch can be wound, it being understood that the clutch lever and stem lever form a resilient support for the clutch in order that the stem may be rotated in a reverse direction.

When the stem is withdrawn, in the position seen in Fig. 5, in order that the watch may be set, there is no longer any pressure upon the stem lever 20 whereupon the same will turn upon its pivot 21 and the cam 26 bearing upon the extension 17 of the clutch lever will move, forcing out the extension, rotating the clutch lever 15 upon its pivot and lowering the end thereof, which is in engagement with the clutch which will thus also be lowered so that the teeth 13 thereof will engage with the minute wheel of the watch, it being understood that the stop 30 will contact with the arm 23 and limit the downward movement of the clutch to prevent improper engagement of the teeth.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, a stem, a winding pinion, a minute wheel, a

clutch, a clutch lever having one end engaging with said clutch, and having bearings and a stem lever actuated by said stem and having members exteriorly engaged by said bearings whereby when the stem is depressed said members are compressed.

2. In a device of the character stated, a stem, a winding pinion, a minute wheel, a clutch adapted to engage either said pinion or said wheel, a clutch lever engaging said clutch and having bearings, and a pivotally mounted stem lever adapted to be engaged by said stem and having an arm exteriorly engaged by one bearing, and a cam member, the cam of which engages the other bearing whereby when said stem is depressed the arm and cam member are contracted.

3. In a device of the character stated, a stem, a clutch, a clutch lever pivotally supported and engaging said clutch and having a bearing and an extension, a pivoted stem lever having an arm on one side of the pivot engaging said bearing, and a cam on the other side of said pivot adapted to bear in said extension, whereby when the stem is depressed said arm and cam are moved toward each other, and the clutch is elevated and when said stem is raised the arm and cam member force out said extension to lower said clutch.

4. In a device of the character stated, a stem, a clutch, a pivoted clutch lever having an end engaging said clutch, and having a bearing and an extension, a pivoted stem lever engaged by said stem to rotate the same on its pivot, said stem lever having an arm engaging said bearing, normally in line with the two pivots, a cam on said stem lever adapted to engage the said extension at a greater distance from said clutch lever pivot than is the bearing from said pivot.

5. In a device of the character stated, a stem, a clutch, a pivoted clutch lever having an end engaging said clutch and having a bearing and an extension, a pivoted stem lever engaged by said stem to rotate the same on its pivot, said stem lever having an arm engaging said bearing normally in line with the two pivots, a cam on said stem lever adapted to engage said extension at a greater distance from said clutch lever pivot than is the bearing from said pivot, and an arm on said clutch lever adapted to abut the arm of said stem lever to limit the movement of said clutch.

6. In a device of the character stated, a stem, a clutch, a clutch lever pivotally mounted having an end engaging said clutch and having a recess, the wall of which forms bearings on opposite sides of the pivot, and a stem lever pivotally supported and having a cam section and a spring section, one of which engages one bearing and one the other of said clutch



lever, whereby when the stem is depressed the two sections are contracted and said sections actuating said clutch lever when released from said stem.

5 7. In a device of the character stated, a stem, a clutch, a clutch lever pivotally mounted having an end engaging said clutch and having a recess, the wall of which forms bearings on opposite sides of the  
10 pivot, and a stem lever pivotally supported and having a cam section and a spring section, one of which engages one bearing and one the other of said clutch lever, whereby when the stem is depressed the two sections  
15 are contracted and said sections actuating said clutch lever when released from said stem, and a stop on said cam section engaging with one of the bearings to prevent improper movement of the cam section.

20 8. In a device of the character stated, a stem, a clutch, a clutch lever pivotally mounted having an end engaging said clutch and having a bearing and an extension, and a stem lever engaged by said stem  
25 pivotally mounted and having an arm on the side of the pivot engaging said bearing and a cam member on the other side of the pivot engaging said projection, so that when the stem is depressed, the clutch lever is  
30 actuated to elevate the clutch and the arm and cam member are compressed with the cam bearing on the extension, whereby when the stem lever is released the arm and cam member rotate the clutch lever on its pivot  
35 to lower said clutch.

9. In a device of the character stated, a stem, a clutch, a clutch lever pivotally mounted and having an end engaging said clutch, a bearing on said lever, an extension  
40 on said lever the end of which is a greater distance from the pivot than is said bearing, a stem lever pivotally supported and adapted to be actuated in one direction by said stem, an arm on one side of said stem lever  
45 pivot engaging said bearing, and a cam member on the other side of said stem lever pivot, the cam of said member being adapted to engage said extension, whereby when the stem engages the stem lever said arm  
50 and cam member are contracted and actuate said clutch lever to elevate the clutch and when said stem lever is released said arm and cam move said clutch lever to depress said clutch.

55 10. In a device of the character stated, a stem, a clutch, a clutch lever pivotally mounted and having an end engaging said clutch, a bearing on said lever, an extension on said lever, the end of which is a greater  
60 distance from the pivot than is said bearing, a stem lever pivotally supported and adapted to be actuated in one direction by said stem, an arm on one side of said stem lever pivot engaging said bearing, and a

cam member on the other side of said stem 65 lever pivot, the cam of said member being adapted to engage said extension, whereby when the stem engages the stem lever, said arm and cam member are contracted and actuate said clutch lever to elevate the 70 clutch, and when said stem lever is released said arm and cam move said clutch lever to depress said clutch, and a stop on said cam member to prevent improper movement thereof. 75

11. In a device of the character stated, a stem, a clutch, a clutch lever pivotally mounted and having an end engaging said clutch, a bearing on said lever, an extension on said lever, the end of which is a greater 80 distance from the pivot than is said bearing, a stem lever pivotally supported and adapted to be actuated in one direction by said stem, an arm on the side of said stem lever pivot engaging said bearing, and a 85 cam member on the other side of said stem lever pivot, the cam of said member being adapted to engage said extension, whereby when the stem engages the stem lever, said arm and cam member are contracted and 90 actuated by said clutch lever to elevate the clutch, and when said stem lever is released said arm and cam move said clutch lever to depress said clutch, and a stop on said cam member to prevent improper movement 95 thereof, and an arm on said clutch lever adapted to abut the arm on said stem lever when the clutch is lowered to limit the movement thereof.

12. In a device of the character stated, a 100 stem, a clutch, a clutch lever pivotally supported, having an end engaging said clutch, and having a recess forming bearings on opposite sides of the pivot, and a stem lever pivotally supported and adapted 105 to be engaged by the stem and having two members on opposite sides of the stem lever pivot and the ends of said members seated in said recess and one engaging one bearing and one the other, and a cam on one member 110 adapted to ride on its bearing whereby the two members are contracted when the stem is depressed.

13. In a device of the character stated, a stem, a clutch, a pivoted clutch lever having 115 an end engaging said clutch and having a bearing and an extension, a pivoted stem lever engaged by said stem to rotate the same on its pivot, said stem lever having an arm engaging said bearing, a cam on said stem 120 lever adapted to engage said extension and a stop on said cam section adapted to engage with said extension when the sections of the stem lever are properly expanded, the engagement of the parts being such that the 125 clutch lever is retained in lowered position until the parts are properly actuated to release the same.

14. In a device of the character stated, a clutch lever pivotally mounted and having an end engaging said clutch, a bearing on said lever, an extension on said lever, the  
5 end of which is at a greater distance from the pivot than is said bearing, a lever pivotally supported having an arm on one side of its pivot, engaging said bearing, and a cam member, on the other side of its pivot, the cam of which is adapted to engage said  
10 extension, a recess in said cam member and a drawbar adapted when elevated to be seated in said recess in order to contract said arm and said cam member.

GEORGE WM. GRISDALE, JR.

Witnesses:

LEWIS W. LONG,

FRED LONG.