L. S. CHADWICK.

LEVER MECHANISM.

APPLICATION FILED JUNE 18, 1903.

920,022.

Patented Apr. 27, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

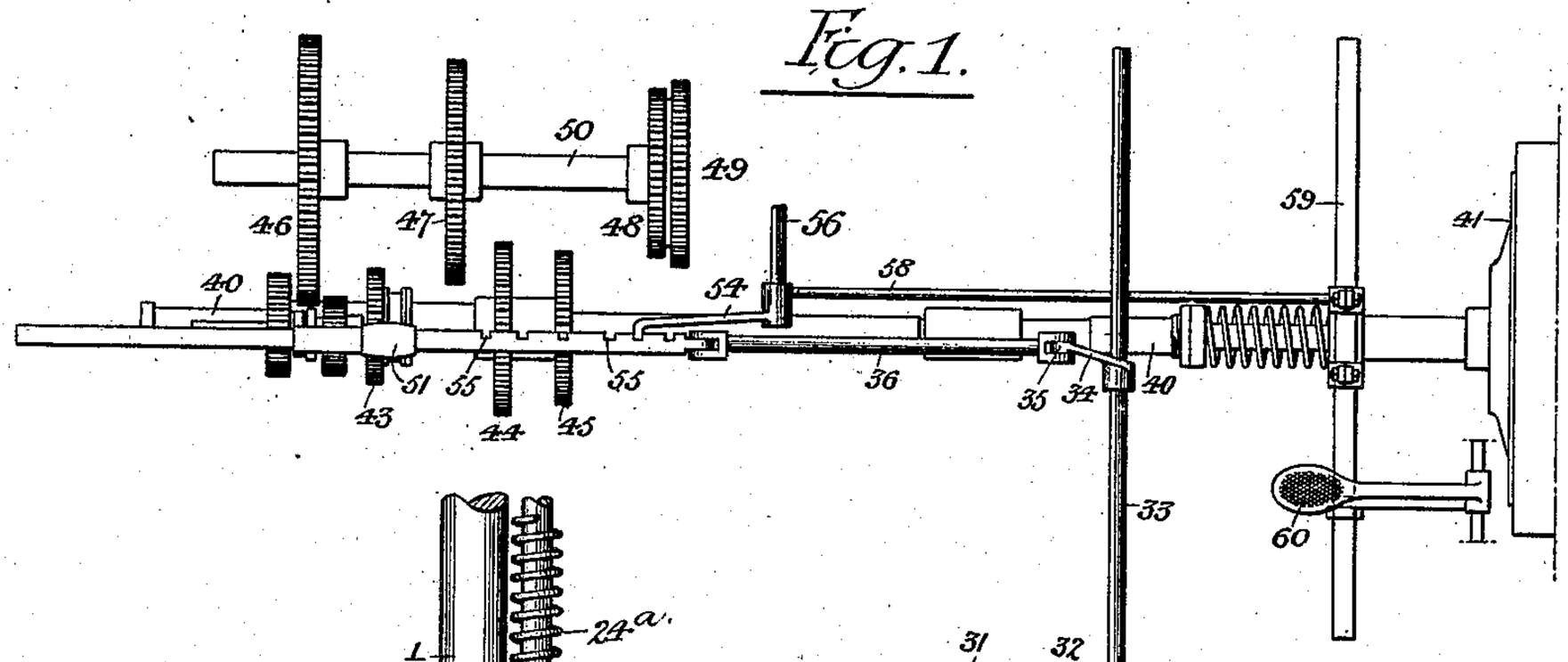

Fig. 3.

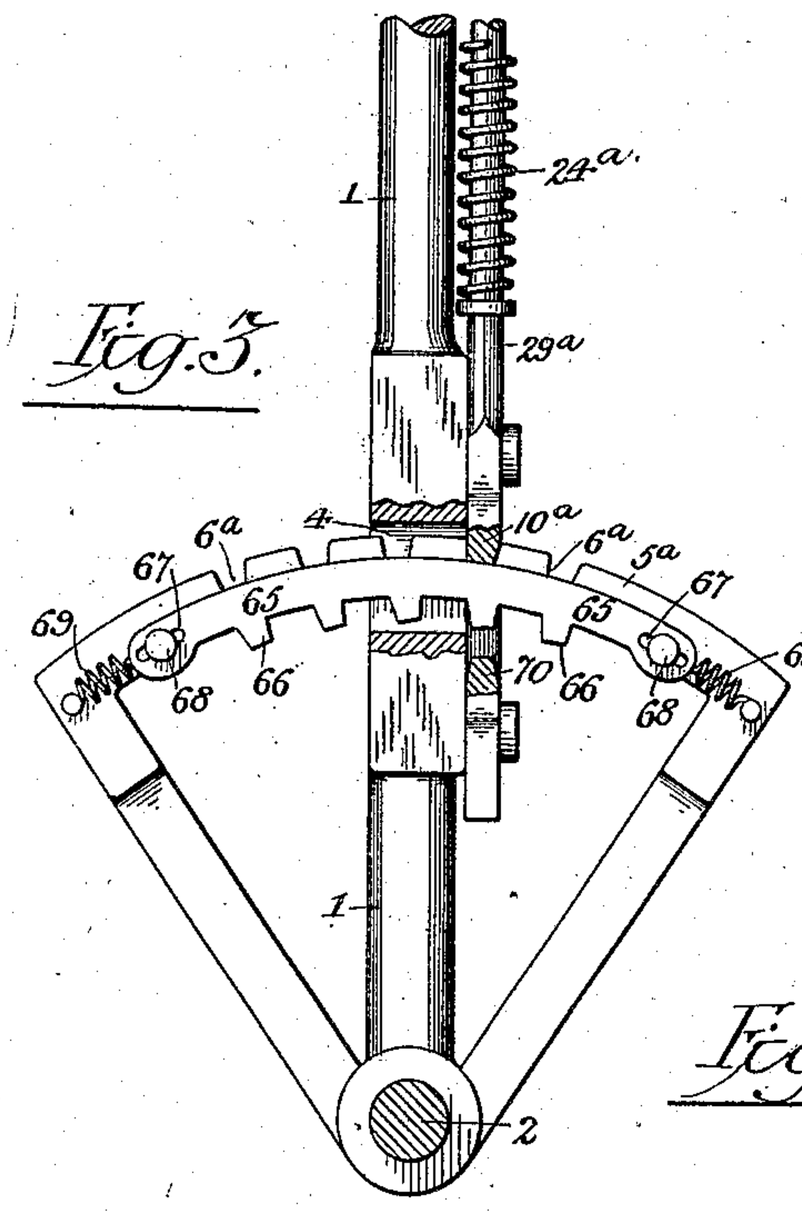

Fig. 2.

Witnesses:-

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3 SHEETS—SHEET 2.

Fig. 3.

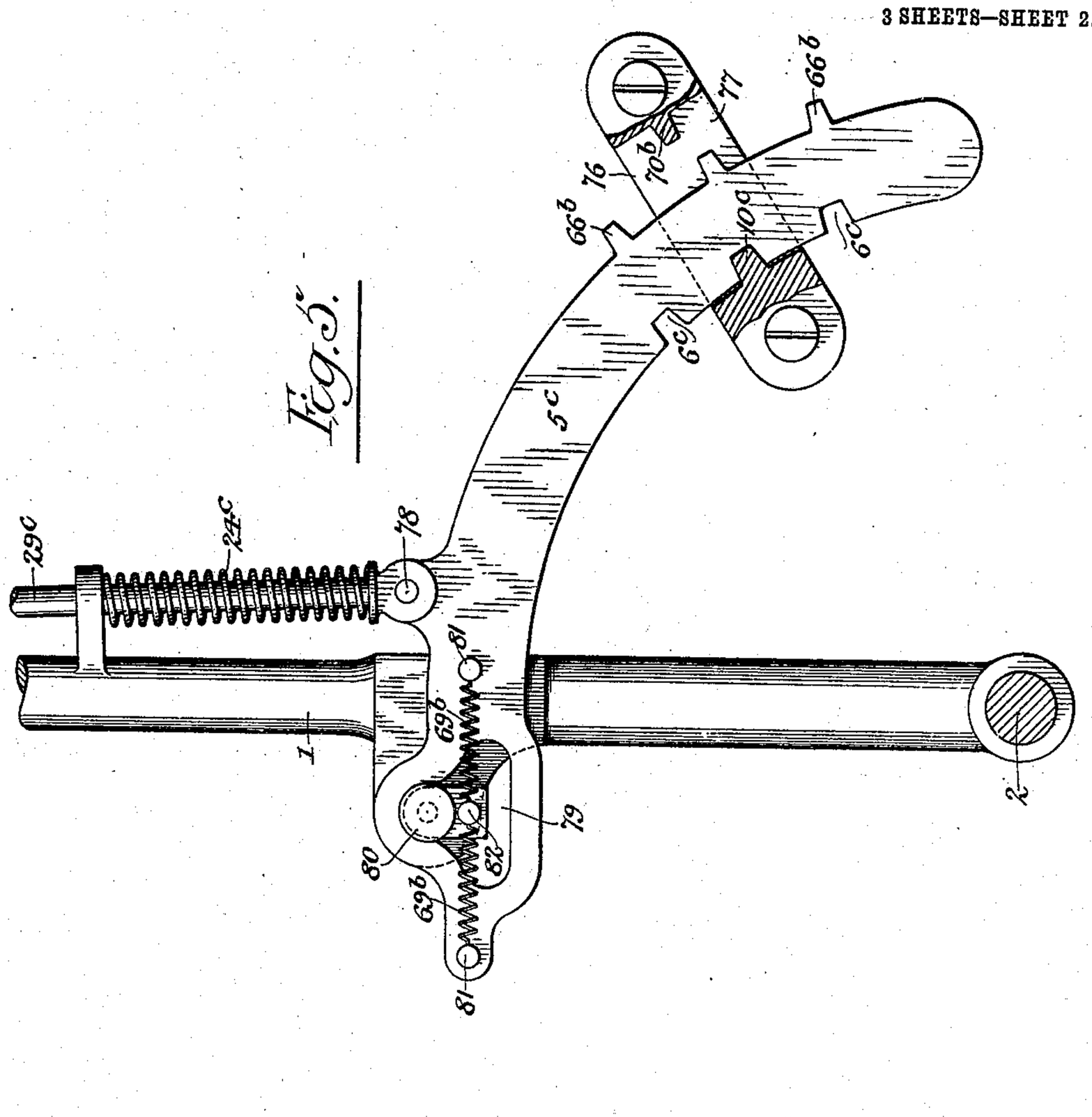
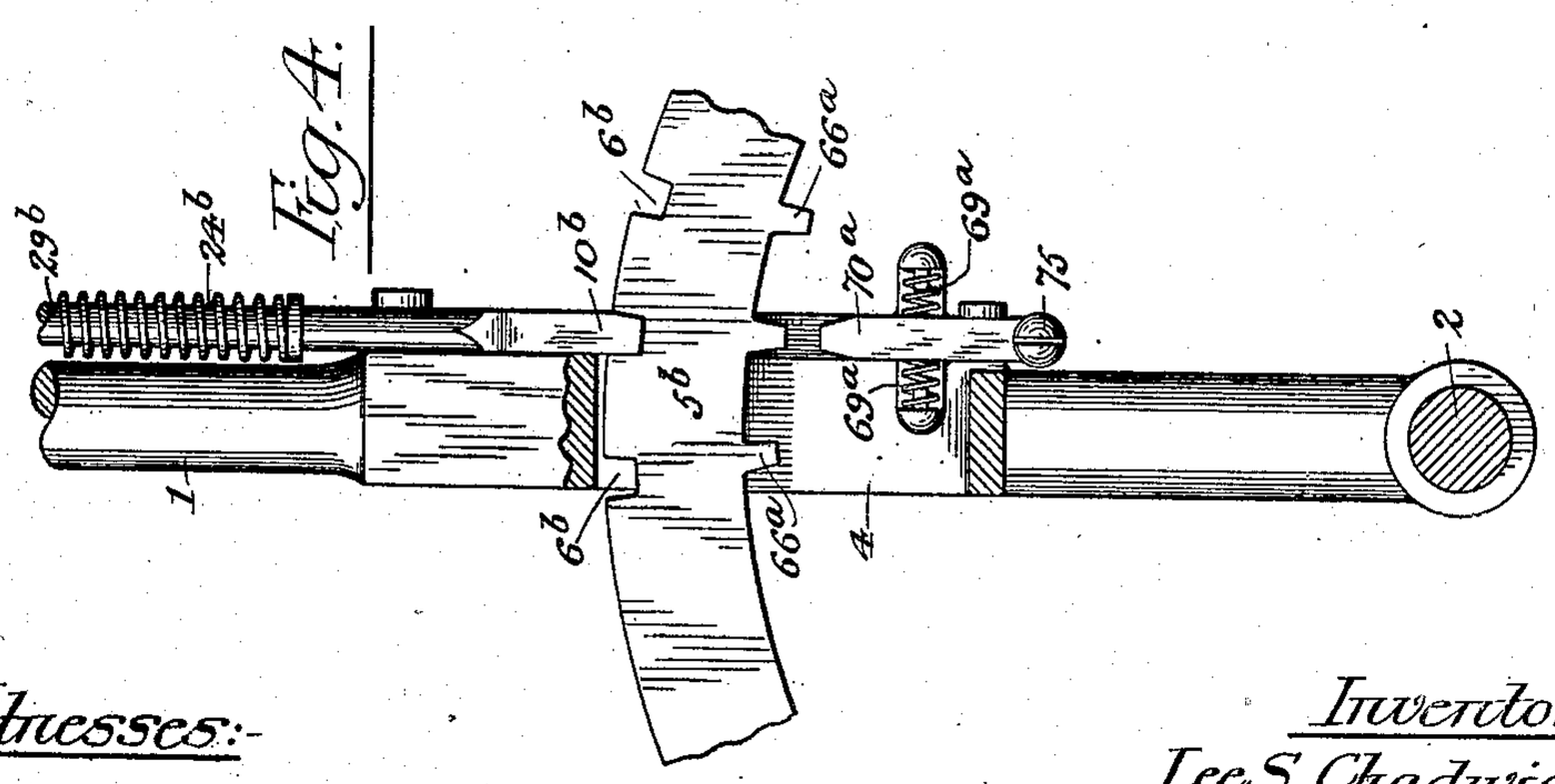


Fig. 4.



Witnesses:-

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3 SHEETS—SHEET 3.

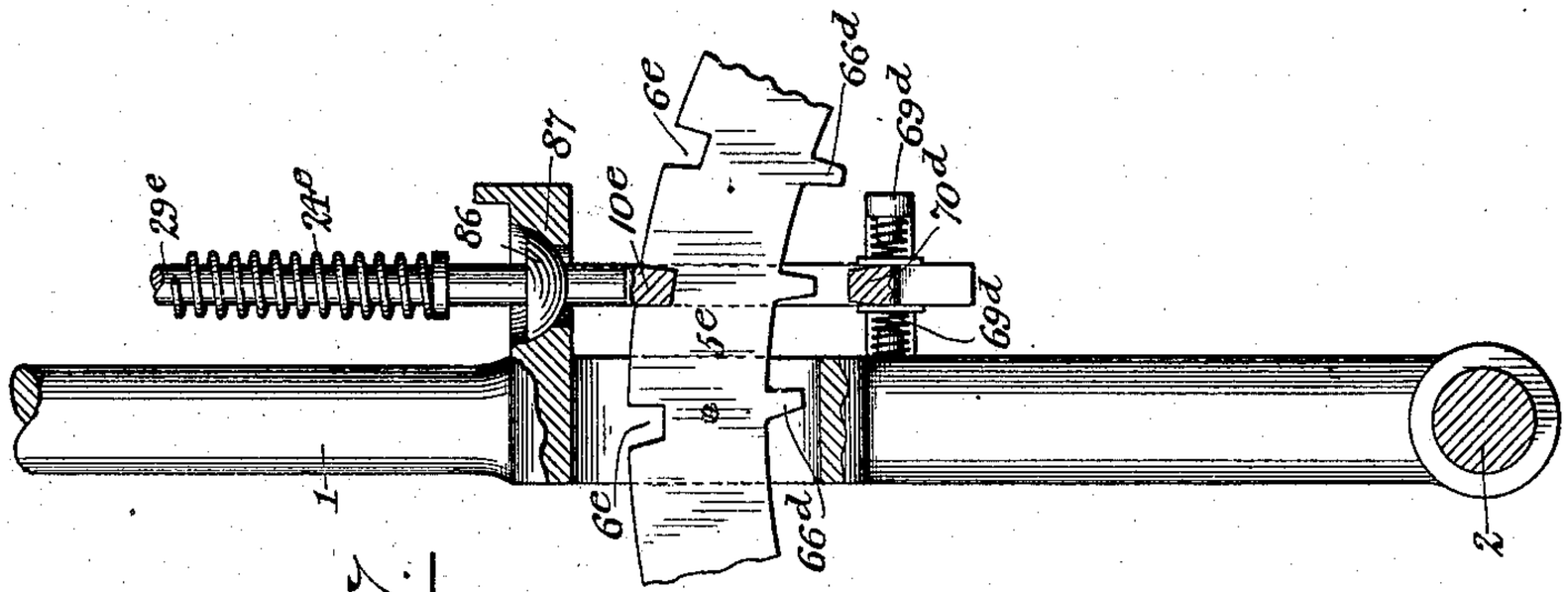

Fig. 7.

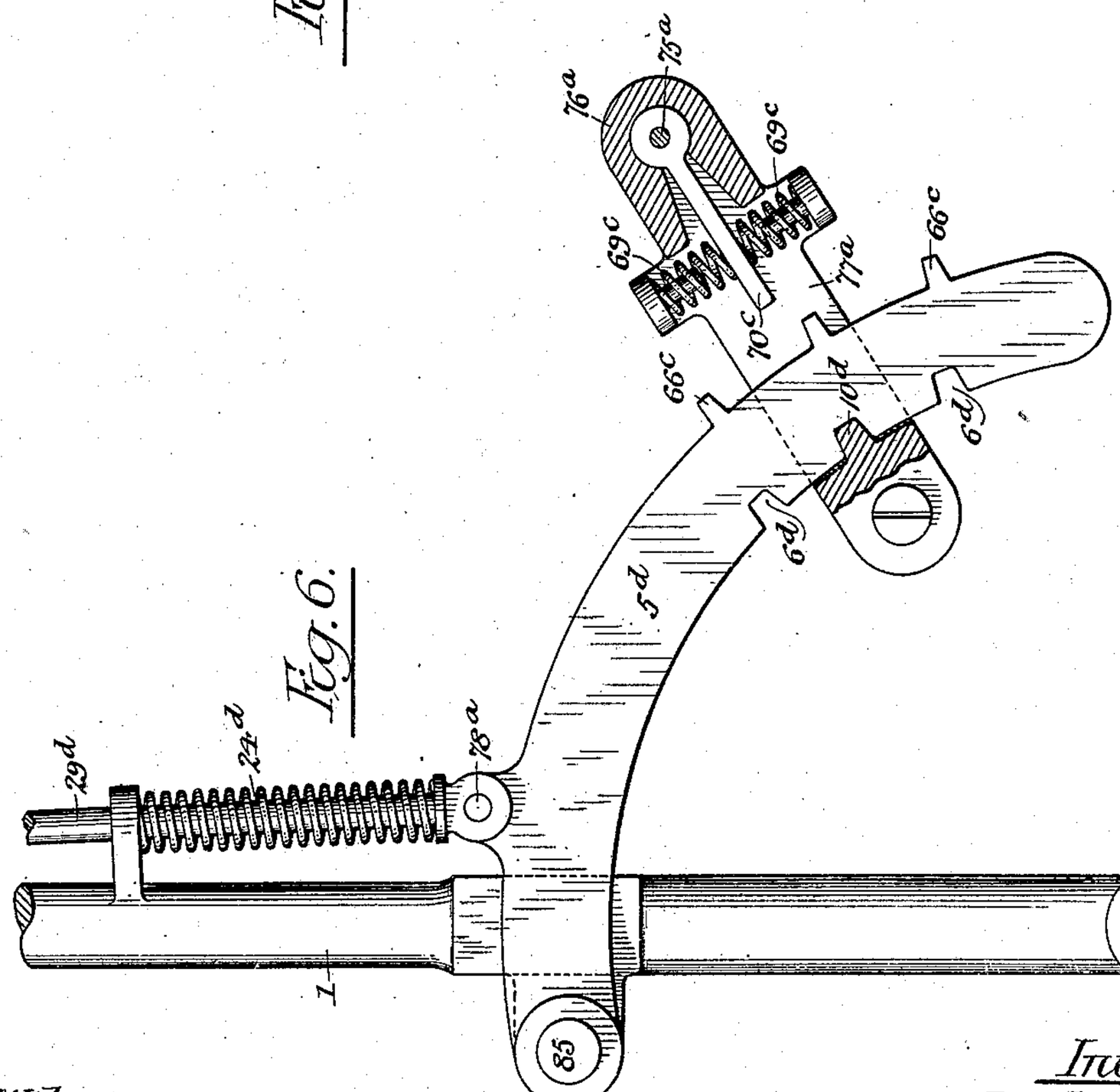

Fig. 6.

Witnesses:-

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UNITED STATES PATENT OFFICE.

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LEVER MECHANISM.

No. 920,022. Specification of Letters Patent. Patented April 27, 1909.

Application filed June 18, 1903. Serial No. 162,091.

To all whom it may concern:

Be it known that I, LEE S. CHADWICK, a citizen of the United States, and a resident of Ridley Park, Delaware county, Pennsylvania, have invented certain Improvements in Lever Mechanism, of which the following is a specification.

My invention relates to levers for controlling the operation and speed of power driven machinery, more particularly applicable, but not limited to, automobiles and other self-impelled vehicles, and consists of certain means combined with the speed controlling lever whereby the movement of the latter is controlled and the pawl carried by the same may only be moved a notch at a time, thereby compelling a gradual speeding of the vehicle or other power driven mechanism.

The mechanical elements forming the subject of my invention are capable of varied arrangement, and in the accompanying drawings I have illustrated several forms of structure embodying my invention.

In the accompanying drawings: Figure 1, represents a plan view of the speed changing mechanism of an automobile and the connected and attached parts for operating the same, with which my invention may be combined; Fig. 2, is a side elevation of the same and the operating levers and its controlling mechanism; Fig. 3, is an enlarged view illustrating in detail a portion of the structure shown in Fig. 2; Figs. 4 and 5, are views illustrating another embodiment of my invention, and Figs. 6 and 7, are views illustrating still further details.

My present improvements are an extension or further exemplification of the invention embodied in my Patent, No. 773,474, dated October 25, 1904, to which reference is made, which patent contains the broad claims for my invention. The apparatus forming the subject of my present invention is intended to be used for the same purpose and in substantially the same manner as the structure illustrated in my patent. In my former application, the movement of this lever was limited by a special form of pawl which was released from the operating bar of the lever automatically, as soon as said lever was moved for the purpose of engaging the pawl with the next notch of the segment. In my present application, however this pawl is usually fixed, one form of my invention showing it as a part of the operating member carried by the speed lever, while another part shows it as a fixed part, independently mounted, the segment of the pawl being controlled in an entirely different manner.

In the drawings herewith, 1 represents the speed lever suitably mounted at the side of the automobile or other mechanism, and connected at its lower end to a rock shaft 2, from which a crank arm 3 extends, which arm is connected by means of a link 31 with a crank arm 32 mounted on a rock shaft 33, which shaft has another crank arm 34 which is connected at 35 to the rod 36 or other means for throwing into and out of action the gearing for the different speeds of the driving mechanism. The main driving shaft 40 of the mechanism is provided with a clutch member 41, and has splined to its opposite end a series of transmitting and speed changing gears 42, 43, 44 and 45, which are adapted to engage with the driven gears 46, 47, 48 and 49 on the counter shaft 50, from which latter shaft the automobile or other mechanism may be driven by means of the usual bevel gearing. The speed gears 42, 43, 44 and 45, are shifted by means of the rod 36, which has a depending yoke 51 engaging a collar 52 on said shaft, through the medium of the main lever 1, as just described, and this rod is normally locked when the gears are in the operative position. This locking of the bar is accomplished by means of an arm 54 engaging notches 55 in the rod 36, such arm forming part of a bell-crank lever mounted on a stub shaft 56, the other end 57 of which lever is connected by means of a link 58 with a rock shaft 59 which is moved by means of a foot lever 60 through a system of suitable links and levers which also serve to release the clutch member 41 momentarily during the change of speed. It is necessary, therefore, before the speed changing gears can be moved that this foot lever 60 be depressed for the purpose of releasing the locking member 54. After this locking member has been released, the lever 1 may be operated and the speed of the mechanism may be increased or diminished gradually as desired.

In the form of lever mechanism described and claimed in my former application before referred to, the pawl is released from the controlling rod of the main lever after each movement of the latter, and automatically reëngaged as said pawl takes its seat in the notch.

In the modifications forming the subject of my present invention, the pawls are either fixed directly to the controlling rod, or else they bear a fixed relation to the rock shaft upon which the main lever 1 is mounted. In the structures shown in Figs. 2, 3, 4 and 7, the lever 1 is provided with a through opening 4 for the passage of the segmental notched rack.

The details of the lever mechanism forming the subject of the present invention, are as follows: In Figs. 2 and 3, for instance, the engaging pawl is shown at 10^a carried by a rod 29^a which is movable vertically, being raised by means of the lever 26 pivoted to the main lever 1 and adjacent to the handle 27 of the latter, and depressed by the spring 24^a. The segmental rack 5^a is provided with the usual notches 6^a with which this pawl is adapted to engage, and carried by this segment and movable in the arc of a circle in respect to the same, is a supplemental curved rack 65 having a series of projections or teeth 66 co-acting with and in operative alinement with the notches 6^a. This member 65 is slotted at 67 whereby it may be supported on the pins 68 in a position free to move in either direction and it is normally held in the central position by means of springs 69. Directly beneath the pawl 10^a and in operative alinement therewith is a projecting member 70 adapted to contact with one of the projections or teeth 66 on the supplemental rack 65 and thereby prevent further upward movement of the pawl until the main lever 1 is turned in one direction or the other. This projecting member 70 is arranged to slide on a pin secured to the main lever. If now, for instance, the rod 29^a be raised, the pawl 10^a will be disengaged from one of the notches 6^a, but the projecting member 70 directly opposite the pawl will come in contact with one of the teeth 66 of the rack member 65. As soon as the main lever 1 is moved, however, said projection 70 passes from its engagement with the tooth 66, and the tendency of the operator being to grasp the lever 26 and close it against the handle 27, the movement of said lever 26 serves to raise the rod 29^a the full height and the projection 70 is brought into one of the spaces between the teeth or projections 66 and contacting with one of the latter, prevents further movement of the main lever. The pawl 10^a cannot be seated until said lever 26 and rod 29^a are released. Immediately said lever is released, the projection 70 is disengaged from one of the teeth 66, and on the forward movement of the handle, the spring 24^a carried by the rod 29^a will thrust the pawl 10^a into the next notch. The movement, however, of the projection 70 is not entirely limited to the space between the projections or teeth 66 as the springs 69 connected to the member 65 provide for movement of the latter, which in some instances may be sufficient to seat the pawl 10^a in the next notch without the necessity of releasing the lever 26 until the full movement of the main lever has been made. The engagement of the projection 70, however, between the teeth or projections 66 of said member 65, prevents greater movement than one notch at a time, and this engagement always takes place no matter whether the main lever 1 is moved in one direction or the other.

In the device shown in Fig. 4, the main lever 1 carries a pawl 10^b and a projecting member 70^a pivoted at 75 to the lower end of the rod 29^b. In this instance, the rack 5^b is not only provided with the notches 6^b but also with projections or teeth 66^a in operative alinement therewith. When it is desired to move the main lever in this form of structure, the rod 29^b will be lifted as in the usual manner, and this will cause the projection 70^a which is pivoted at 75, to rise in engagement with one of the projections or teeth 66^a. The movement of the rod 29^b is thereby stopped and the pawl 10^b being clear of its rack, the main lever 1 is free to move in either direction. This further movement, as in the structure just described, raises the projection 70^a into one of the spaces between the teeth 66^a, and on the further movement of the lever 1, such projection 70^a will be stopped by contact with one of the teeth 66^a, and the still further movement of the main lever 1 will compress one of the springs 69^a until the pawl 10^b may be slipped into one of the notches 6^b of the rack segment 5^b.

In the structure shown in Fig. 5, the rack segment 5^c is pivotally connected at 78 to the rod 29^c, and the pawl 10^c for engagement therewith is carried by a fixed structure 76 independent of the main lever, such structure having a suitable slot 77 for the passage of said rack segment. This rack segment is slotted at 79 for engagement with a stud 80, carried by the main lever 1, and is provided with the usual recesses 6^c and the projections or teeth 66^b in operative alinement therewith: the fixed structure 76 carrying a projecting member 70^b for engagement with said teeth or projections 66^b. The segment 5^c is held down in position with one of its notches in engagement with the pawl 10^c by means of the spring 24^c carried by the rod 29^c, and the said segment is provided with a pair of springs 69^b, each connected at one end to pins 81 at the ends of the slot 79 and at the opposite end to a central pin 82 carried by the main lever 1; such springs tending to hold the segment in engagement with the pin 80. Upon lifting the rod 29^c, the segment 5^c will be drawn out of engagement with the pawl 10^c and one of its teeth 66^b will come in contact with the projecting member 70^b preventing further movement of said segment until the main lever is

moved, when the further movement of the segment will be stopped by the engagement of the side of the teeth 66^b with the projection 70^b. The continued movement of the main lever 1 and the rod 29^c will cause the segment 5^c to rise from its engagement with the stud 80 and one of the springs 69^b will be compressed, while the other is expanded in the further movement of said segment for the purpose of seating the next notch 6^c of the same on the pawl 10^c in its changed position.

In Fig. 6, is shown a structure which may be said to combine parts of the structures shown in Figs. 4 and 5. The pivoted rack segment 5^d connected to the rod 29^d at 78^a is also pivoted at 85 to the main lever 1 and as shown has a series of notches 6^d on one side and a series of teeth 66^c on the opposite side, such teeth being arranged to contact with a projecting member 70^c pivoted at 75^a to a fixed structure 76^a having a slot 77^a for the passage of the rack segment. When the segment is raised for the purpose of moving the lever to engage a new notch, the springs 69^c disposed on either side of the projecting member 70^c provide sufficient lost motion to insure that such segment may be moved a sufficient distance to engage the next notch.

In Fig. 7, the rod 29^e is provided with a semi-spherical member or shoulder 86 adapted to engage a suitable socket 87 carried by the main lever 1. Directly below the member 86 is the pawl 10^e adapted to engage notches 6^e in the segment 5^e and in operative alinement with these notches are projections or teeth 66^d which are engaged, when the rod 29^e is lifted, by a projecting member 70^d. This projection 70^d is provided with springs 69^d which support it in proper position with relation to the main lever 1 and provide for the lost motion of this member, as in all the other forms.

The operation of the devices embodied in my present invention is substantially the same as the operation of the device forming the subject of my former application, the pawl being released when the lever of the controlling rod is grasped, and the main lever prevented from moving more than the distance of one notch by means of the projection in operative alinement with the pawl coacting with the toothed rack, which latter is combined with or disposed adjacent to the usual segmental notched rack.

From the foregoing, it will be readily understood that numerous modifications may be made to the subject of my invention, without departing from the scope of the same, and while I have shown certain means of performing the object sought to be attained, I do not wish to be limited to the precise construction shown and described.

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

1. The combination in lever controlling mechanism, of a pivoted lever, a racked member, a sliding pawl for engagement therewith, a supplementary toothed rack in operative alinement with the racked member, a member for engagement with the teeth in line with said pawl, and means for operating said mechanism, the operation of such mechanism preventing the movement of the lever more than the distance between the notches of the racked member.

2. The combination in lever controlling mechanism, of a pivoted lever, a racked member, a sliding pawl for engagement therewith, a supplemental toothed rack in operative alinement with the racked member, a projecting member in line with said pawl for engagement with the teeth of the supplemental rack, and means for operating said mechanism, the latter serving to prevent the movement of the lever more than the distance of one tooth or notch of the racked member.

3. The combination in lever controlling mechanism, of a pivoted lever, a racked member having notches on one side and teeth in operative alinement on the other side, a pawl for engagement with the notches, and a projecting member in line therewith for engagement with the teeth, said latter member serving to prevent the movement of the lever more than one tooth or notch of the racked member at a time.

4. The combination in lever controlling mechanism, of a pivoted lever, locking mechanism comprising a racked member and means for engaging the same, one of said elements of the locking mechanism being carried by the lever and movable with relation to the other, and auxiliary mechanism comprising a second racked member and engaging means therefor, one of which elements is carried by the lever and movable with relation to the other for controlling the coaction of the first racked member and its engaging means, said auxiliary mechanism being operated by the lever and serving to limit its movement to the extent of one notch or tooth of the racked member.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

LEE S. CHADWICK.

Witnesses:
P. B. CAUCHMAN,
GEO. B. HARVEY.