No. 838,820. PATENTED DEC. 18, 1906.

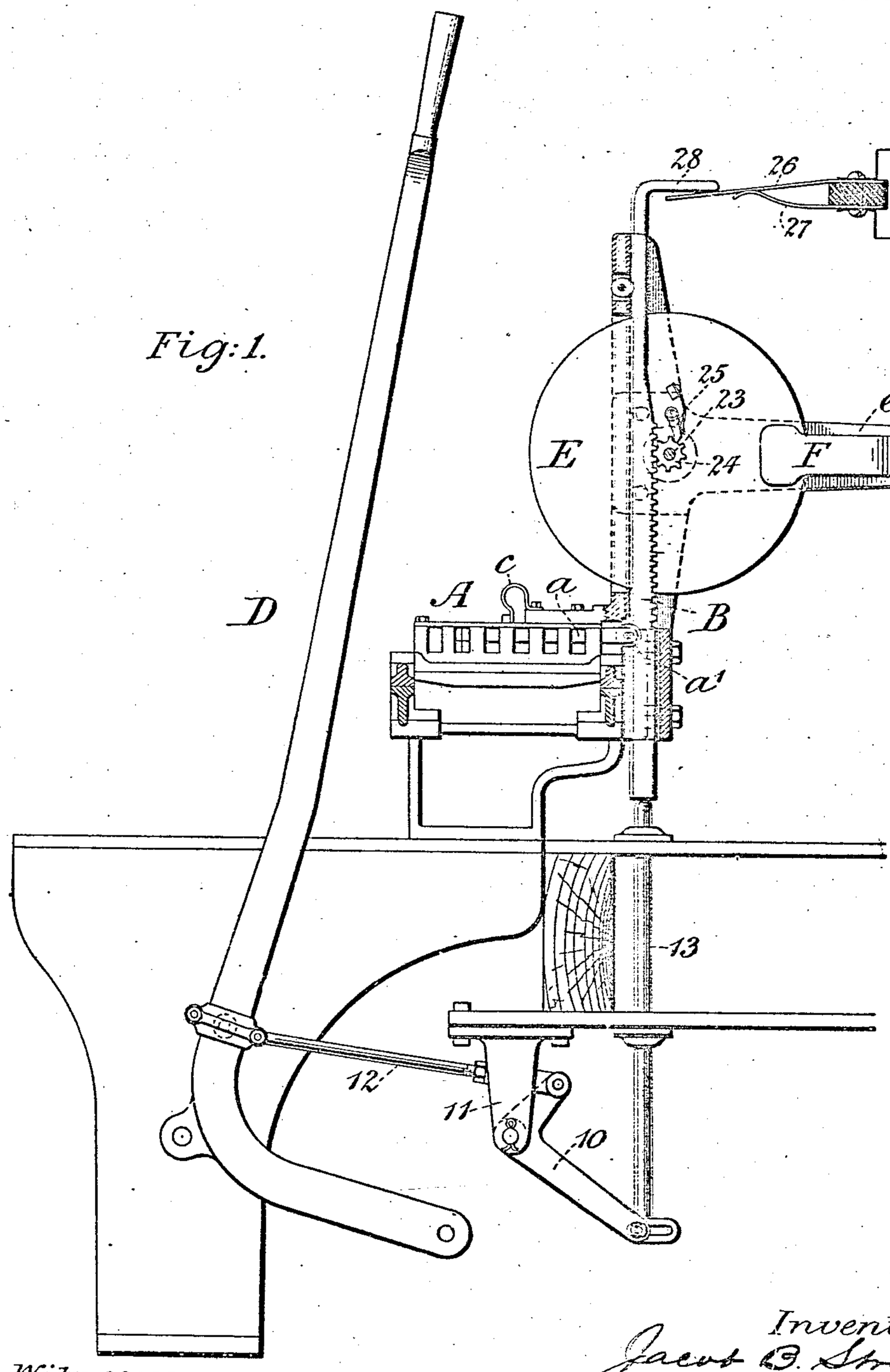
J. B. STRUBLE.

INTERLOCKING MACHINE FOR RAILWAY PURPOSES.

APPLICATION FILED OCT. 6, 1905.

3 SHEETS—SHEET 1.

Fig: 1.



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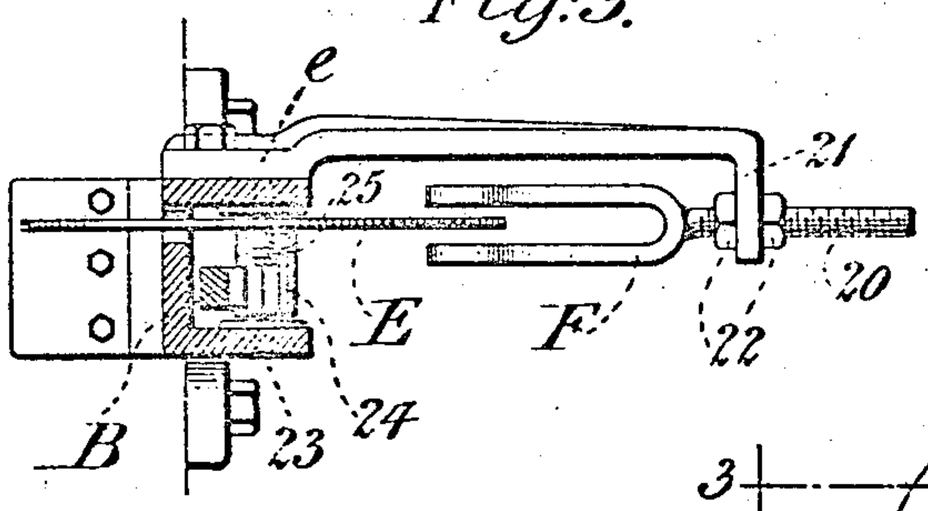
3 SHEETS—SHEET 2.

Fig: 3.



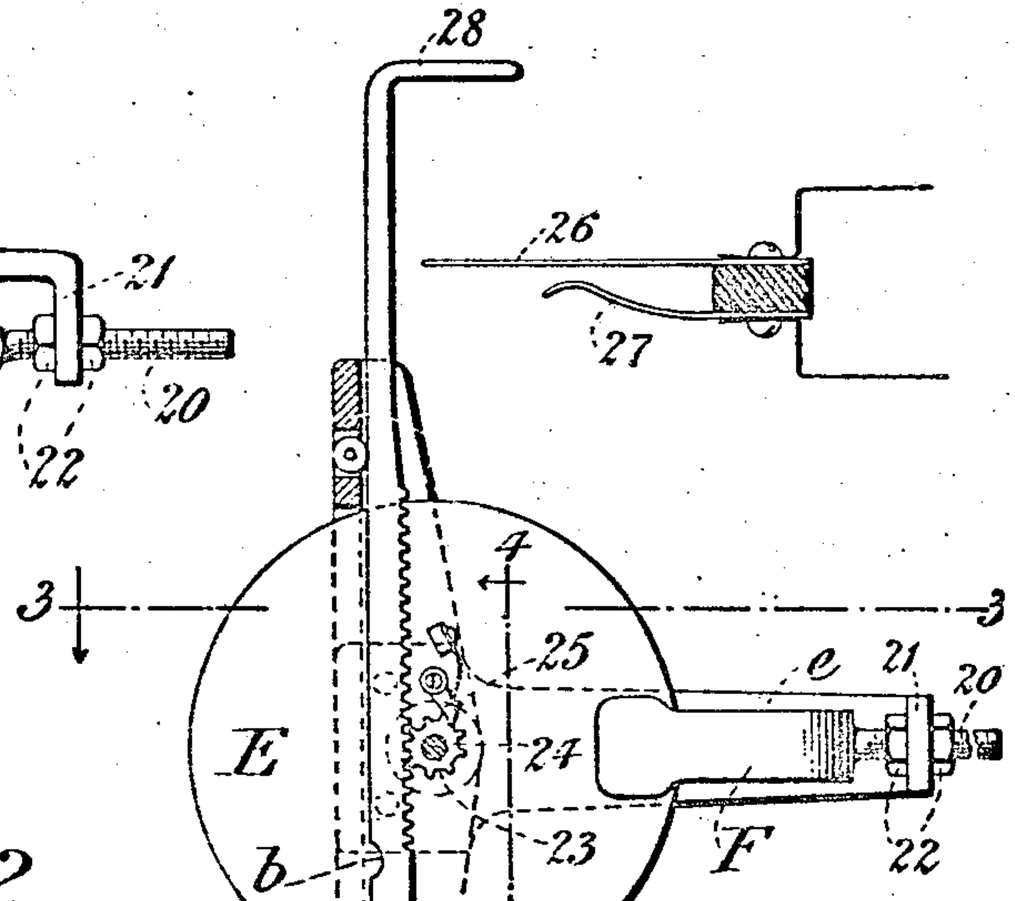


Fig: 2.

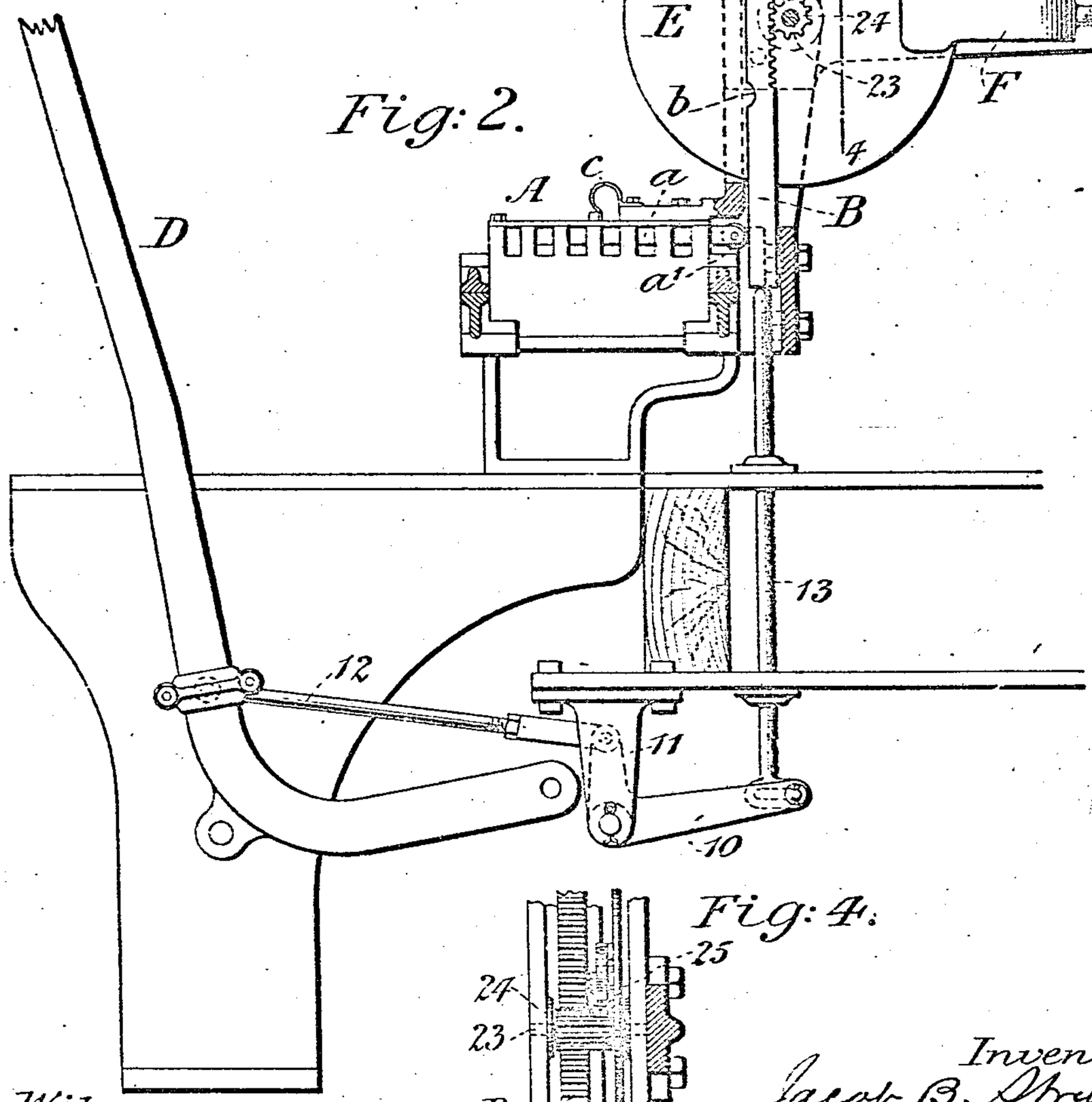


Fig: 4.

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3 SHEETS—SHEET 3.

Fig: 5.

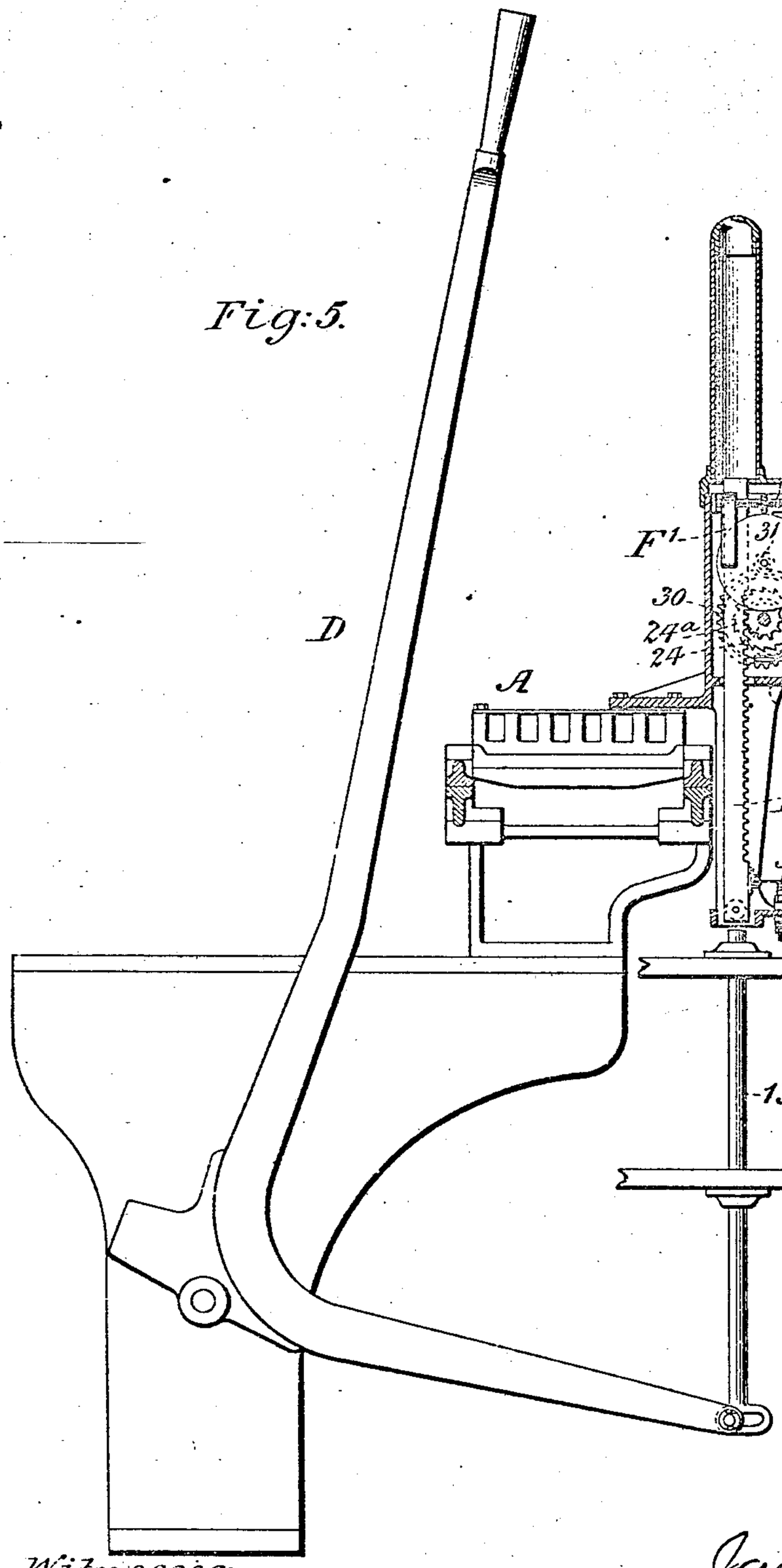
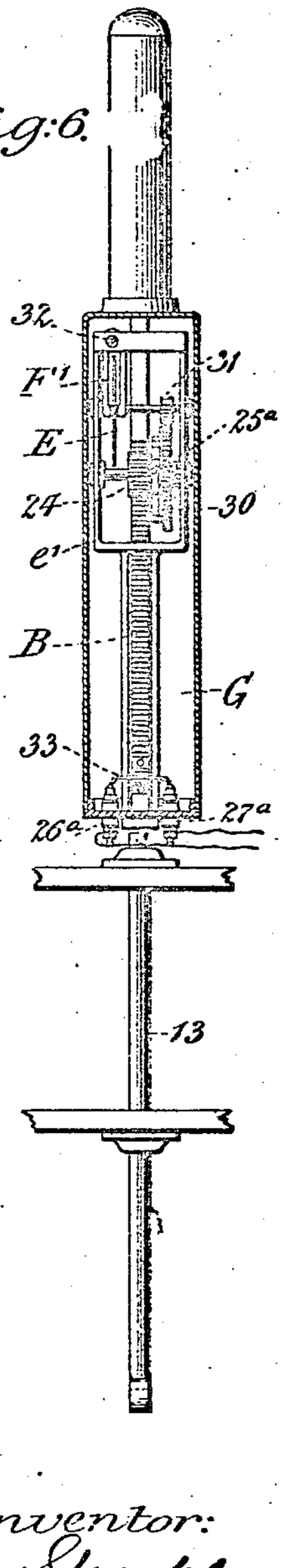


Fig: 6.



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UNITED STATES PATENT OFFICE.

JACOB B. STRUBLE, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

INTERLOCKING MACHINE FOR RAILWAY PURPOSES.

No. 838,820. Specification of Letters Patent. Patented Dec. 18, 1906.

Application filed October 6, 1906. Serial No. 337,676.

To all whom it may concern:

Be it known that I, JACOB B. STRUBLE, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Interlocking Machines for Railway Purposes, of which the following is a specification.

My invention relates to interlocking machines for railway purposes. These machines, as is well known in the art, comprise a plurality of levers arranged side by side and mechanical interlocking. When a lever or levers are moved to operate or control the operation of railway parts or appliances—for example, switches and signals—to set up a route for a car or train, the mechanical interlocking is operated to lock other levers which operate or control the operation of other railway parts which would set up a route for a car or train which would conflict with the route first set up. These levers have what is known as a "preliminary" and a "final" movement, and it is only the final movement of a lever which operates the mechanical locking to release certain other levers. In some forms of interlocking machines the latches on the levers operate the mechanical interlocking.

My present invention relates to what I shall term herein a "time releasing means," which acts to prevent the operation of the mechanical interlocking until after an interval of time has elapsed.

I will describe a time releasing means embodying my invention and its application to a lever of an interlocking machine and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a view, partly in side elevation and partly in vertical section, of a lever of an interlocking machine, a form of mechanical interlocking, and a time releasing means applied thereto and embodying my invention. Fig. 2 is a view similar to Fig. 1, but showing the parts in different positions due to a movement of the lever. Fig. 3 and 4 are each detail sectional views taken on the lines 3 3 and 4 4 respectively. Fig. 5 is a view similar to Fig. 1, showing a modified form of my invention; and Fig. 6 is a sectional view of the time releasing devices, taken at a right angle to the view of the same parts in Fig. 5.

Similar reference characters designate corresponding parts in all of the figures.

In the drawings the mechanical interlocking is of a form which is operated positively in one direction by the movement of the lever and automatically through a spring or equivalent device in a reverse direction.

The mechanical interlocking device is indicated by A and is operated by a sliding bar *a*, having a roller *a'* at its outer end adapted to lie in a recess *b* in a vertically-movable rack-bar B. These parts are in their normal position in Fig. 1. When the bar B is moved upwardly by the operation of lever D, the sliding bar *a* will be moved to the left against the force of a spring *c*, and this will result in locking other levers against being operated, and such other levers will not be released until the rack-bar B has moved down from the position shown in Fig. 2 to that shown in Fig. 1, when the spring *c* will move bar *a* to the right, and thereby release the other levers.

Any suitable means may be employed to move the bar B upwardly. Thus in Figs. 1 and 2 there is an angle-lever 10, pivoted to a fixed bracket 11 and having its short arm connected to the lever D by a link 12, while its long arm has a slot-and-pin connection with a rod 13, adapted to move vertically in suitable fixed guides. In normal position the lower end of bar B rests loosely on the upper end of the rod 13, as seen in Fig. 1. When the lever D is moved to the left, the rod 13 will be lifted and carry the bar B with it, as shown in Fig. 2, and when the lever D is moved in the opposite direction the rod 13 will move away from the bar B and permit the latter to fall by gravity to its normal position. In Figs. 5 and 6 the angle-lever 10 and link 12 are dispensed with, and the lever D is connected directly with the rod 13 by a slot-and-pin connection. The particular means employed to lift the bar B do not, however, form any part of my invention, and any other means may be employed for that purpose.

My invention relates to the means for retarding or regulating the speed of the downward movement of the bar B, and it is based on the principle that if a closed conductor is moved in a magnetic field induced currents in the closed conductor set up a field opposing the primary field, and thus retard the

movement of the closed conductor. In the preferred form illustrated the closed conductor is a disk E, mounted on a shaft 23, supported by a bracket *e*. This disk is preferably of non-magnetic material, such as brass or aluminium, and it is supported to rotate between the poles of a magnet F, preferably a permanent magnet. This magnet is adjustably supported on the bracket *e* in such manner that its poles may be moved toward or away from the center of the disk. Any suitable means may be employed to effect this adjustment, and, as shown in Figs. 1, 2, and 3, the magnet is provided with a threaded stem 20, which extends through an arm 21 on the bracket, and nuts 22 on said stem are adapted to engage opposite sides of the arm.

On the shaft 23, which carries the disk E, a pinion 24 is mounted and meshes with the teeth on the bar B. Either the pinion 24 or the disk E may be loose on the shaft if the latter is rotatable, and both will be loose thereon if it is fixed against rotation. A spring-pressed pawl 25 is pivoted to the disk E and engages the teeth of the pinion in such manner that the pinion may be rotated in one direction without moving the disk; but when rotated in the other direction the pawl will carry the disk with the pinion. As shown, the pinion rotates without the disk when the bar B is moved upwardly.

In addition to controlling the mechanical interlocking the bar B may also be employed to open and close an electric lock-circuit. As shown in Figs. 1 and 2, the wires of the lock-circuit terminate in two contacts 26 27, one of which is movable and projects into the path of an arm 28 on the bar B. When the bar B is in normal position, the movable contact 26 will be held in engagement with the fixed contact 27, and the lock-circuit will be closed; but when the bar B is moved upwardly the contact 26 will move out of engagement with contact 27 and open the lock-circuit. In the particular form illustrated in Figs. 1 and 2 the contact 26 moves away from contact 27 by spring action; but any other force may be utilized to move it.

In Figs. 5 and 6 the disk E and pinion 24 are mounted on different shafts. In this form the shaft which carries the pinion 24 also carries a toothed disk 30, one or the other being loose on the shaft, and a spring-pressed pawl 25ª is pivoted on the disk 30 and engages the teeth of a disk 24ª, rotatable with the pinion 24, so as to permit the pinion to be rotated when the bar B is moved upwardly without rotating the disk 30, but causing both to rotate on the downward movement of the bar B. In this form the disk will be fixed on its shaft, and a pinion 31 will also be fixed on the said shaft and mesh with the toothed disk 30. In this form of the invention two permanent magnets F′ F′ are employed and straddle the disk E at opposite points. The magnets are hung on a shaft 32, provided with right and left hand threads, said shaft being supported to turn in bearings on a bracket *e′*, and by rotating this shaft the magnets F′ F′ will be moved simultaneously toward or away from the center of the disk E.

In Figs 5 and 6 the terminals 26ª and 27ª of the electric lock-circuit are supported in a casing G, which incloses the bar B and the speed-regulating devices, and the bar B carries a bridge 33, which engages the terminals 26ª and 27ª when the bar B is in its lowest or normal position.

The operation is as follows: When the lever D is operated to set a signal—for example, to clear position—the bar B will be moved upwardly, and thereby operate the mechanical interlocking and at the same time open the circuit of the electric lock, which may control some other railway part, as a switch. When the lever D is returned to its normal position to put the signal to "danger," the bar B will be left in its elevated position and will return by gravity to its normal position, thereby causing the disk E to rotate between the poles of the magnet, which, as before described, will cause a magnetic field opposing the primary magnetic field to be set up, and the movement of the disk will thus be retarded. This retarding movement may be varied by adjusting the magnets to bring their poles nearer to or farther away from the center of the disk, the retardation being increased as the poles of the magnet approach the periphery of the disk. The speed of the downward movement of the bar B can thus be regulated as desired, and thereby secure the necessary time interval after a lever D has been returned to normal position before another lever can be operated or the part controlled by the electric lock be moved.

Without limiting myself to the precise details of construction illustrated and described, I claim—

1. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking and in the opposite direction to effect its release, and magnetic means permitting of a slow movement of the bar in said opposite direction.

2. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking, and in the opposite direction to effect its release, a closed conductor movable with said bar in said last-named movement, and a magnet between the poles of which said conductor is caused to move by said bar.

3. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking, and in the opposite direction to effect its release, a rotary disk, means for transmitting movement from the

bar in its last-named movement to said disk, and a magnet between the poles of which said disk is caused to rotate by the movement of the bar.

4. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking and in the opposite direction to effect its release, a rotary disk of non-magnetic material, means for transmitting movement from the bar in its last-named movement to said disk, and a permanent magnet between the poles of which the said disk is caused to rotate by the movement of the bar.

5. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking and in the opposite direction to effect its release, a rotary disk, means for transmitting movement from said bar in its last-named movement to said disk, a magnet between the poles of which said disk is caused to rotate by the movement of the bar, and means for adjusting the poles of the magnet relatively to the surface of the disk.

6. In interlocking mechanism for railway purposes, a rack-bar movable in one direction to effect the interlocking, and in the opposite direction to effect its release, a pinion meshing with the teeth of said bar, a rotary disk, means for connecting the disk to the pinion to rotate therewith when the bar makes its releasing movement, and a magnet between the poles of which said disk is caused to rotate.

7. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking, and movable by gravity in the opposite direction to effect its release, means for positively moving the lever in the first-named direction, a rotary disk, a magnet between the poles of which said disk is supported to rotate, and means for transmitting movement from the bar on its releasing movement to the disk.

8. In interlocking mechanism for railway purposes, a bar movable in one direction to effect the interlocking and in the opposite direction to effect its release, an electric lock-circuit, means carried by said bar to close the said circuit when the bar has completed its releasing movement, and inductive means for permitting a slow releasing movement of said bar.

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

JACOB B. STRUBLE.

Witnesses:
JAMES CHALMERS, Jr.,
W. L. MCDANIEL.