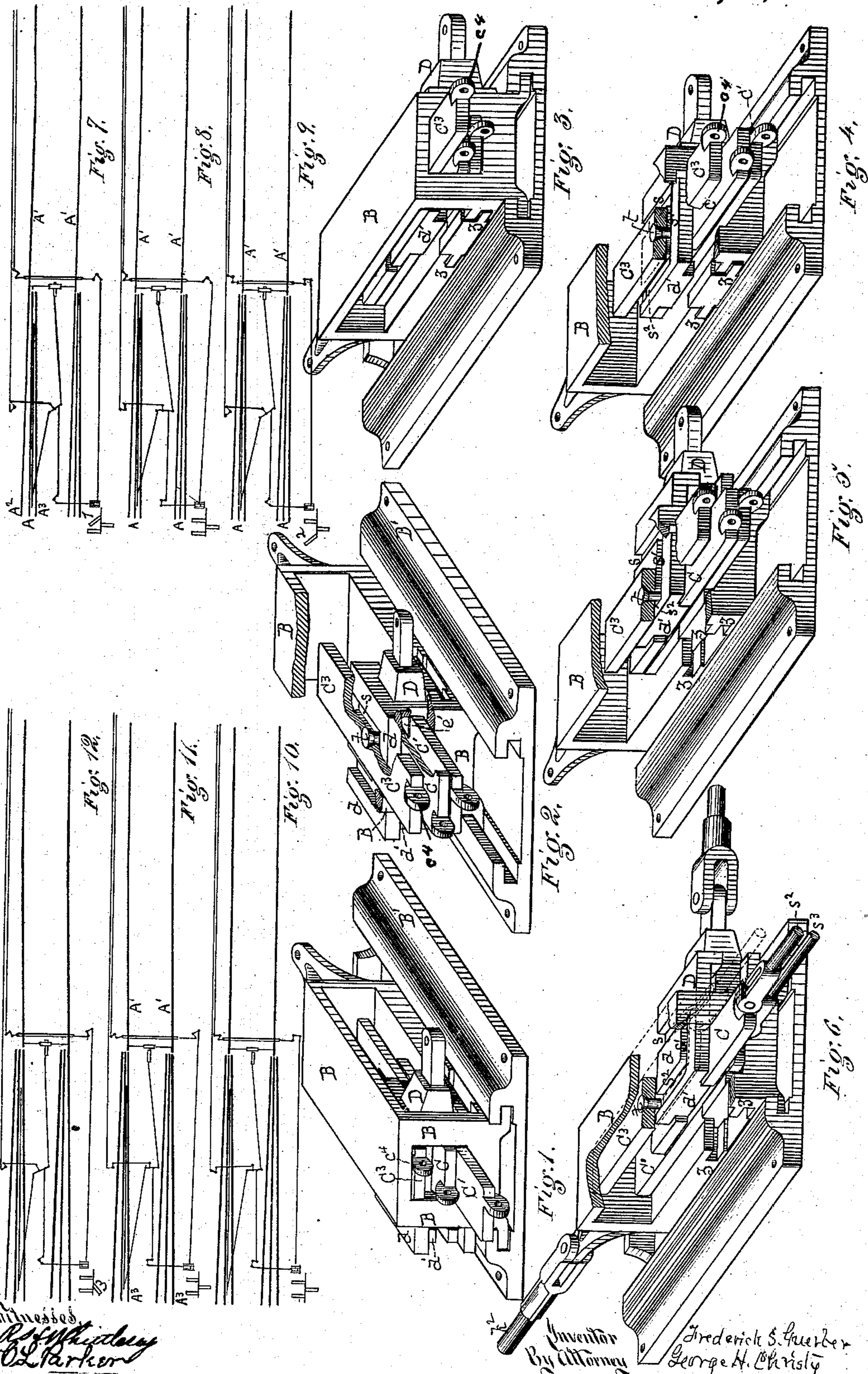


(No Model.)

2 Sheets—Sheet 1.

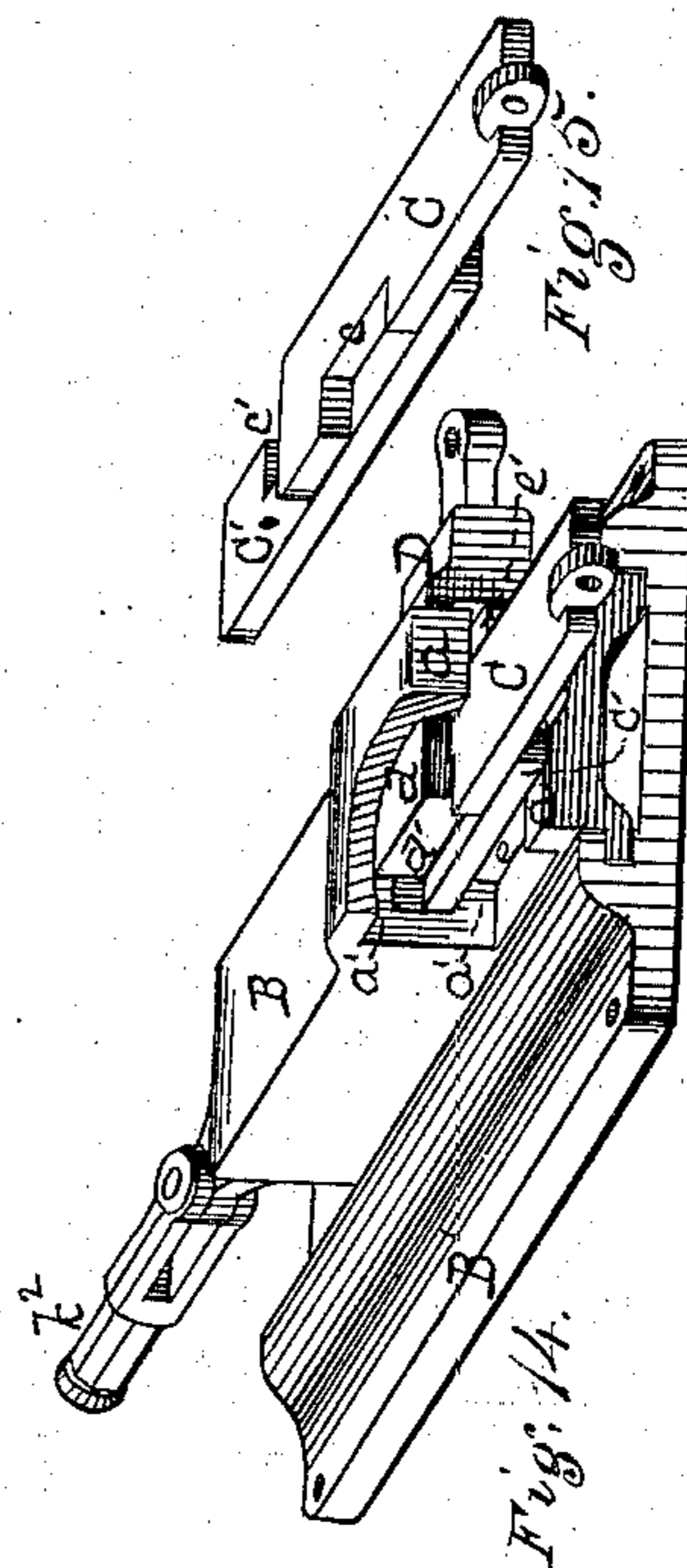
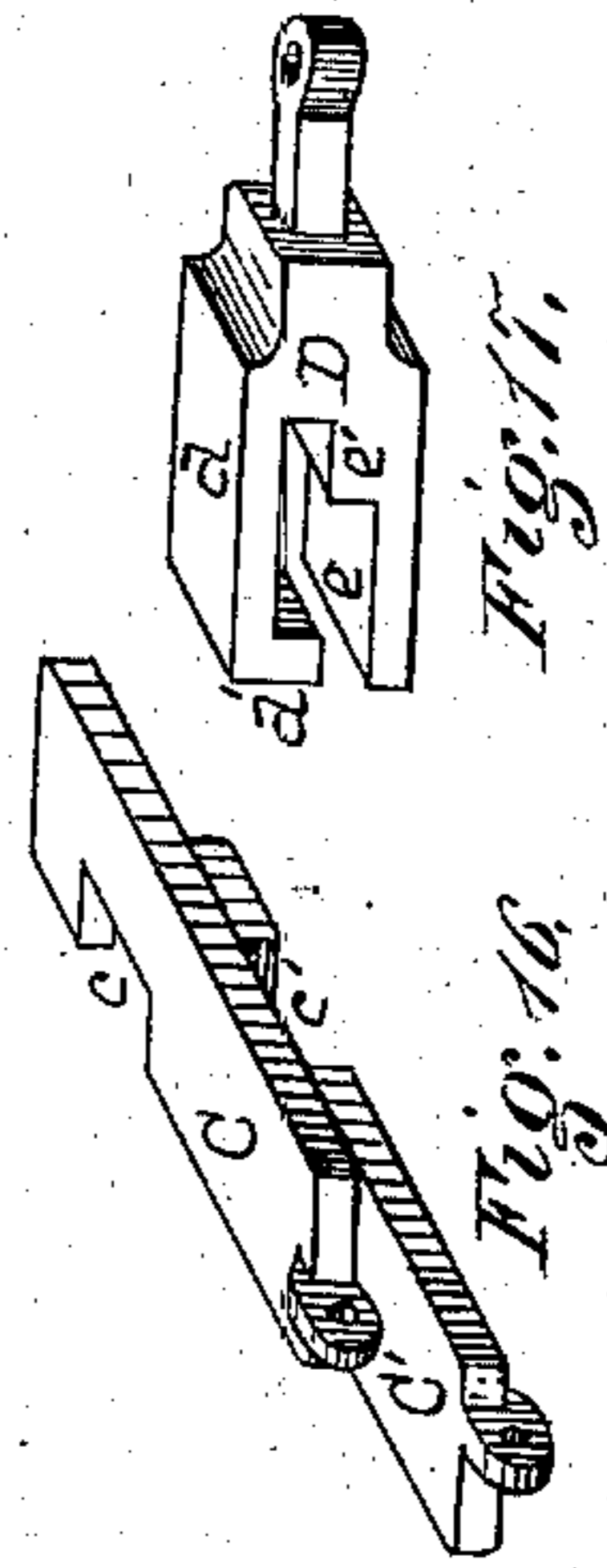
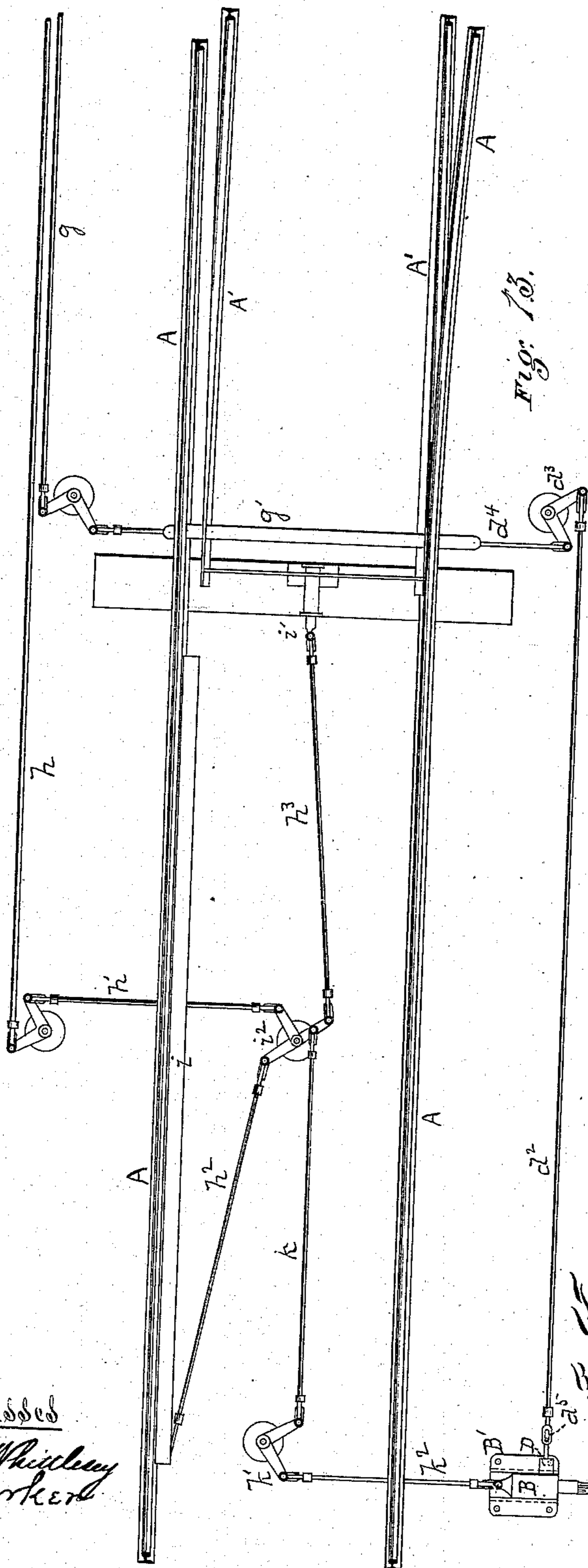
F. S. GUERBER.
Railway Signaling Apparatus.
No. 240,904.
Patented May 3, 1881.



(No Model.)

2 Sheets—Sheet 2.

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Inventor Frederick S. Guerber,
By Attorney George H. Christy

Witnessed
R. S. Whitley
C. L. Parker

UNITED STATES PATENT OFFICE.

FREDERICK S. GUERBER, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO
THE INTERLOCKING SWITCH AND SIGNAL COMPANY, OF SAME PLACE.

RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 240,904, dated May 3, 1881.

Application filed December 30, 1880. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK S. GUERBER, of Harrisburg, county of Dauphin, State of Pennsylvania, have invented or discovered a new and useful Improvement in Railway Signaling Apparatus; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 13, Sheet 2, is a plan view or diagram of a portion of railway track and switch with apparatus connected therewith, illustrative of the manner of applying and working my present invention. Fig. 14 is a detached view, in perspective, to an enlarged scale, and partly broken away, of the devices through the instrumentality of which the objects I have in view are effected. Figs. 15 and 16 are detached views, in perspective, of the slide-plates which I employ, and illustrative of their construction and different relative positions; and Fig. 17 is a like view, in perspective, of the switch-slide.

The figures of Sheet 1 will be subsequently described and explained.

In railway signal and switch apparatus it is sometimes desirable to have at any particular switch two signals, one for the main track and one for the siding, so that the engineer in approaching the station may know not only that the track is clear for him to go ahead, but also may know that the switch is properly set for him to take the main track or siding, as his duty may be.

My present invention relates to the construction of a signal-switch, or a switch in the line of signaling-connections, such that the signal-operating connection will, in the shifting of the railway-switch, (and at the same time and by the same movement,) be shifted from one of two signals to the other, as a consequence of which, when the railway-switch is properly set, such setting will throw the proper signal into engagement with the signal-operating devices. Hence when the main line is open the movement of the signal-operating devices will operate or shift the main-line signal to a "safety" position; and when the railway-switch is prop-

erly set for the siding such setting will bring the siding-signal into an operative connection with the signal-actuating apparatus, so that it may then be shifted to "safety," and whichever signal is in gear the other signal will be at "danger," if it be a semaphore-signal, or will show a danger-light, if it be a light or night signal; and while in the present description I will describe the invention as applied to a semaphore-signal, a light or other suitable signal is hereby expressly included as an equivalent.

In Fig. 13, A represents the fixed rails of a railway-track, and A' the movable switch-rails. From the switchman's cab, or from the usual switch-stand, provision is made, by any suitable connection, $g g'$, for shifting the movable rails A'. A like connection, $h h' h^2 h^3$, is added for the operation of a safety rail or bar, i , and a locking-bolt, i' , these devices having the construction and operation described in United States Patent No. 131,788. From any suitable point in this line of connection—as, for example, from the lever i^2 —a connecting-rod, k , extends to a bell-crank, k' , and the latter, by a rod, k^2 , is connected with the sliding box B; and while in the use of my invention I do not limit myself to its combination with a safety-rail and sliding bolt, I have shown that combination as an advantageous one; but at the same time the rod k^2 may lead directly or by any suitable interposed mechanism to the signal cabin or stand.

The sliding box B is mounted on any suitable base or foundation plate, B', the two being united by suitable guides, as shown in Fig. 14, so that the box B may have a limited range of longitudinal motion as actuated from or through the rod k^2 . This box is made hollow and open at its forward end; but its top and bottom plates are bent inwardly, as at $a a$, so as to overlap or engage the edges of the switch-slide D, and the opposite edges of the latter rest against the shoulders $a' a'$ made for that purpose in the box. The box B has also open sides at its forward end, or at any other desired point of its length, so as to provide for the operation crosswise of the box of the switch-slide D. The latter has substantially the shape shown in Fig. 17. Its top plate, d , has a down-

wardly-projecting flange, d' , and the bottom plate, e , has a shoulder, e' . This switch-slide is connected, as shown in Fig. 13, by a rod, d^2 , bell-crank d^3 , and rod d^4 , with the switch-bar g' , so that both the switch-slide D and the movable rails of the switch shall receive motion simultaneously.

Passing through between the jaws or plates of the switch-slide D, and longitudinally into the cavity of the box B, are two slide-plates, C C', one of which is connected by a rod, c^2 , with the main-track signal, and the other by a like rod, c^3 , with the siding-signal, both signals being arranged on a signal-post, P, but preferably in such manner that a forward thrust or motion of the box B shall result in raising the signal in gear to a "safety" position, and a backward movement will let it come down to "danger," or, if lights are employed, will display them accordingly. The slide-plates C C' are notched or recessed on their opposite edges, as indicated at c and c' . The length of these recesses is such as that they may be readily engaged, the upper one by the flange d' and the lower one by the shoulder e' of the switch-slide D; but the parts are so proportioned that but one of the slide-plates C or C' shall be interlocked at once with the switch-slide D, and through it with the box B. When both plates C C' are back, which will be the case when the switch is unlocked and is free to be shifted, both the notches c and c' will lie in the path of the switch-slide D, so that such slide may be shifted to release one of the slides and interlock with the other.

With the devices in the position shown in Figs. 13 and 14 the main line is open, and in opening it the switch-slide D has been shifted into a locking engagement with the slide-plate C, (the flange d' entering the recess c), and in the operation of locking the switch the box B, and with it the slide-plate C, have been thrust forward so as to shift the main-line signal to "safety." Also, by the same motion, in shifting the switch-rails, the shoulder e' has been caused to clear the recess c' of the lower slide-plate, C', as a result of which the siding-signal (previously brought to a "danger" position) remains so. The slide-plates then have the positions shown in Figs. 14 and 15. If, now, it be desired to run a train onto or off the siding, the operator first reverses the lever, which withdraws the locking-bolt i' and shifts the safety-rail i . The same motion communicated through $k k' k^2$ draws the box B back, and with it the slide-plate C and switch-slide D, and shifts the main-line signal to "danger." Both recesses $c c'$ are then in the path or line of motion of the switch-slide D. The operator then, having his switch unlocked and all signals at "danger," so as to stop all trains, shifts his switch so as to make a siding-connection. This motion, transmitted through $d^4 d^3 d^2$, throws the switch-slide D to the left, Fig. 13, causes the flange d' to clear the recess c , and causes the shoulder e' to enter the recess

c' of the lower slide-plate and make a locking engagement therewith. Then the operator reverses the lever connected with h , so as to give the locking-bolt i' a forward thrust and lock the switch and restore the safety-rail to its working position. The same motion transmitted through $k k' k^2$ gives to the box B and to the slide-plate C', which, by the switch-slide D, is now interlocked therewith, a forward thrust, which, leaving the main-line signal at "danger," shifts the siding-signal to "safety." A reversal of the operation described restores the main-track connection, locks it, and shifts the main-line signal to "safety," leaving the other at "danger."

As the length of endwise motion of the switch-slide D does not need to be as great as the ordinary length of the sidewise movement of the switch-rails, provision may be made at any suitable point, as at d^5 , by means of a slot and pin, for such excess of movement, though the same result may be attained by varying the length of the bell-crank arms at d^3 , or in other suitable way.

By increasing the number of the slide-plates and adding to the number of engaging shoulders or flanges of the switch-slide D, provision may be made for operating the three signals of a three-throw switch—that is, of a switch which in one adjustment gives a main-line connection and in its two other adjustments connects with one or the other of two sidings. A construction of devices for this purpose is illustrated in the drawings of Sheet 1, where Figs. 1 to 6 show, in perspective views, the sliding box, slide-plates, and switch-slide in different positions of adjustment, and Figs. 2, 4, 5, and 6 having a portion of the devices broken away or sectioned the better to illustrate the operations involved; and Figs. 7 to 12 are diagrams of switches or switch-movements. In these figures, except as hereinafter explained, letters already used indicate like parts and of like operation as already set forth; but this use of the invention is particularly applicable to a three-throw stub-switch, and such switches are shown in Figs. 7 to 12, where I have indicated the movable rails by A', and which may be set to connect to the main track A, so as to form a part thereof, or to either of the sidings A² or A³, as may be desired.

In addition to the slide-plates C C', I add a third slide-plate, C³, which, by its eye c^4 , has a stem-connection with the added signal, which in this case is the main-line signal. A pin, t , is inserted in this slide, so that its lower projecting end shall enter a groove, $s s' s^2$, made of a U shape, in the upper face of the top plate, d , of the switch-slide D. Assuming, now, that the track is set as in Fig. 7, the switch-slide D is then thrown to the left to the extent of its fullest possible motion, and the shoulder e' thereon is in engagement with the slide-plate C', as illustrated in Fig. 2, and the flange d' is clear of the slide-plate C, and, also, the pin t is in the groove s , which extends in a direction

lengthwise of the slide-plate C^3 , so that the box B may be thrust forward, as shown in Fig. 1, so as to shift signal 1 to "safety," leaving the other two at "danger," as in Fig. 7. Reversing the motion last described, as shown in Fig. 2, brings all signals to "danger," as shown in Fig. 8. Setting A' to A brings the devices to the position shown in Fig. 4, where the pin t occupies the cross-groove s' , but in which adjustment d' and e' are both clear of their slides C C' . The switch-slide D is now interlocked with the slide-plate C^3 , so that the signal-shifting motion will give C^3 a forward thrust, as in Fig. 3, and bring signal 2 to "safety," as in Fig. 9, leaving the other signals at "danger." Reversing the motion last described, as in Fig. 4, will bring all signals to "danger," as in Fig. 10. Setting A' to A^3 , as in Fig. 11, brings the devices to the position shown in Fig. 5, where the pin t occupies the groove s^2 , which is lengthwise of the slide-plate C^3 , and the flange d' enters the recess of the slide-plate C, so as to be interlocked therewith, and the shoulder e' is clear of its slide-plate C' . Then, with the switch-locking and signal-shifting motion, the slide-plate C will be thrust forward, as illustrated in Fig. 6, so as to shift the signal 3 to "safety," as illustrated in Fig. 12, leaving the other signals at "danger." On a reversal of this motion the devices will come back to the positions shown in Figs. 5 and 11; but in this construction, instead of guiding the switch-slide D between a flange, a , and shoulder a' , as in Fig. 14, I operate it by guides or ways z , as shown in Figs. 3 to 6, or by other equivalent means.

I claim herein as my invention—

1. A slide-box, B, connected with a mechanism

for operating the same, and capable of being brought into an operative engagement or lock with one of two or more slide-plates having each a separate signal-connection, in combination with a switch-slide, D, operated by the switch movement in making and breaking the locking engagement between the box and its several slide-plates, substantially as set forth.

2. The box B, in combination with recessed slide-plates C C' , and with switch-slide D, having flange d' and shoulder e' , substantially as and for the purposes set forth.

3. The combination of locking-bolt i' , safety-rail i , and box B, actuated by a common motion, switch-slide D, actuated by the switch-motion, and signal slide-plates C C' , substantially as set forth.

4. A signal-operating mechanism for shifting any one of two or more signals, a corresponding number of signal-connections, and an interlocking mechanism operated by the switch movement, and by its motion thrown out of a locking engagement with one line of signal-connection and into a locking engagement with another line, and without the necessary movement of either line for the purpose of such locking and unlocking, substantially as set forth.

5. In combination with the mechanisms of Figs. 14 to 17, the groove s s' s^2 of the switch-slide D, the slide-plate C^3 , and its pin t , substantially as set forth.

In testimony whereof I have hereunto set my hand.

FREDERICK S. GUERBER.

Witnesses:

JAMES JENKINS,
D. W. DICKEY.