(No Model.) 2 Sheets—Sheet 1.

J. T. HAMBAY.

SIGNAL APPARATUS.

No. 412,178. Patented Oct. 1, 1889.

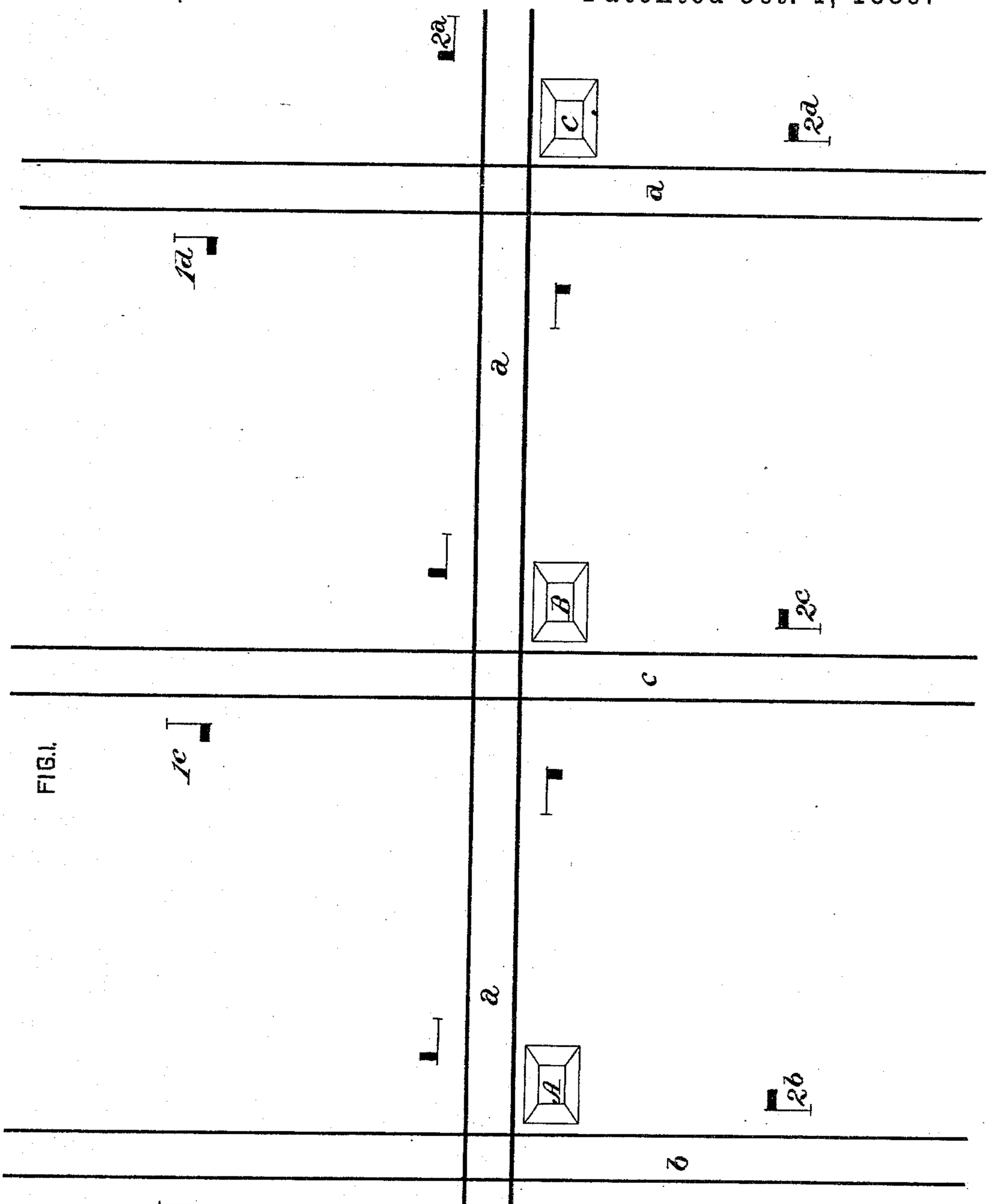

FIG. 1.

WITNESSES:

Darwin S. Wolcott
F. E. Gaither

INVENTOR,

James T. Hambay
by George H. Christy
Att'y.

(No Model.) 2 Sheets—Sheet 2.

J. T. HAMBAY.

SIGNAL APPARATUS.

No. 412,178. Patented Oct. 1, 1889.

FIG. 2.

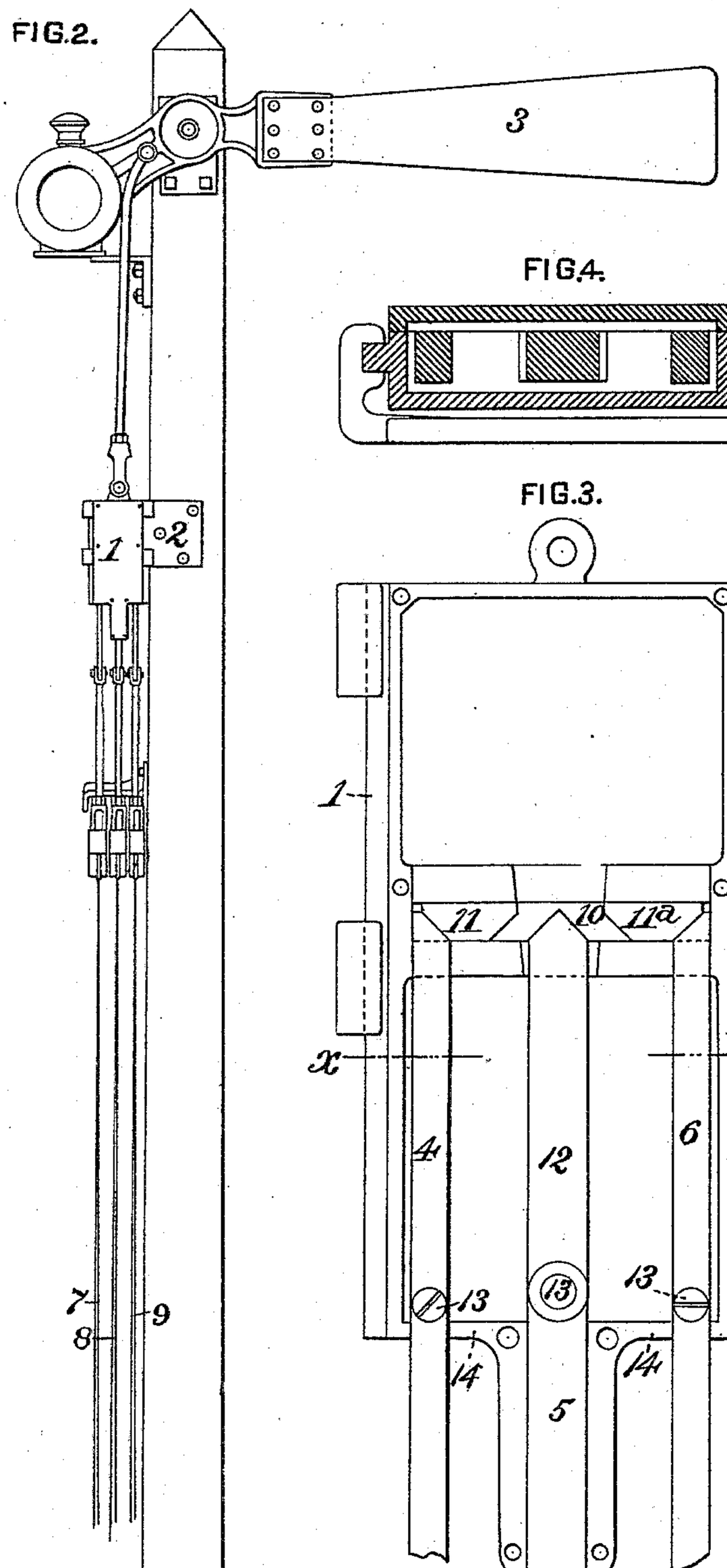

FIG. 4.

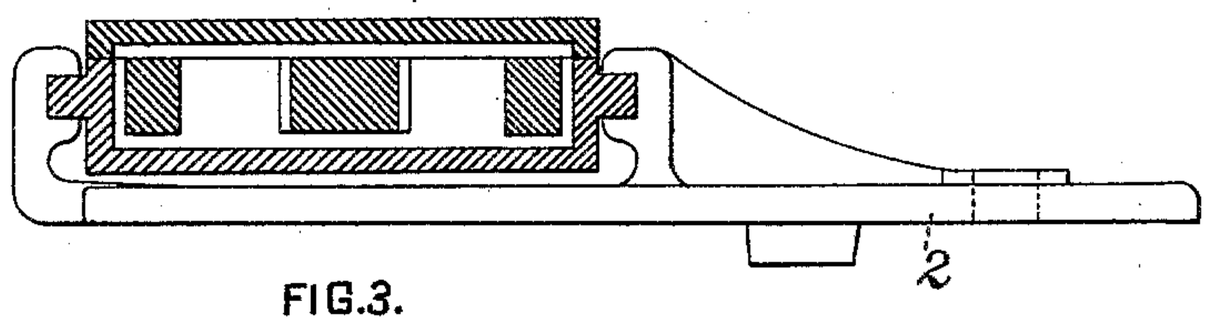

FIG. 3.

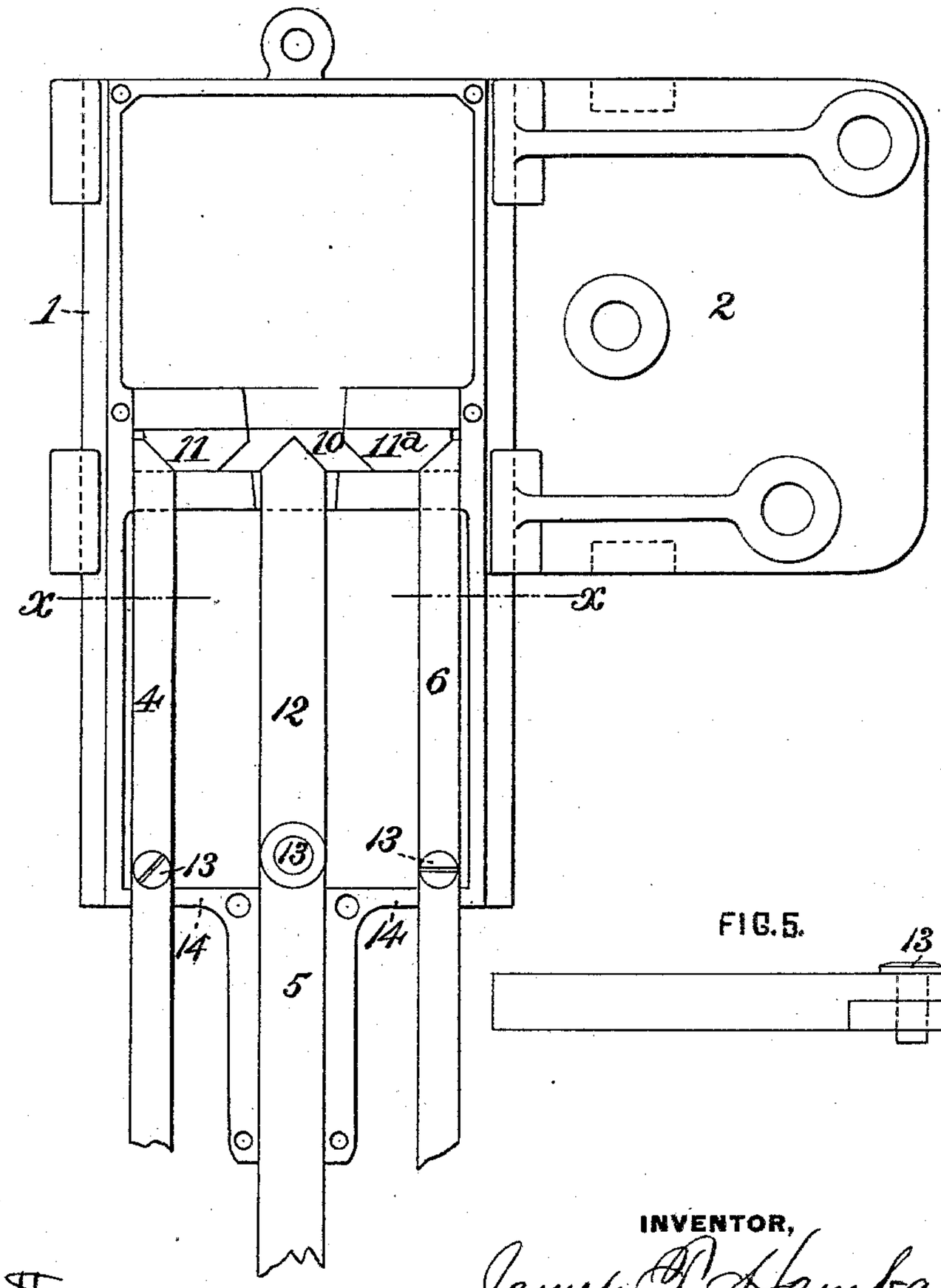

FIG. 5.

WITNESSES:

Darwin S. Wolcott

F. E. Gaither

INVENTOR,

James T. Hambay

by George N. Clinsly Att'y.

UNITED STATES PATENT OFFICE.

JAMES T. HAMBAY, OF WILKINSBURG, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF PITTSBURG, PENNSYLVANIA.

SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 412,178, dated October 1, 1889.

Application filed July 5, 1889. Serial No. 316,592. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. HAMBAY, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Signal Apparatus, of which improvement the following is a specification.

The invention described herein relates to certain improvements in mechanism for operating signals at railroad-crossings; and the invention has for its object a construction of signal-operating mechanism wherein the conjoint action of two or more operators is necessary for the clearing of the signal, although either one of said operators may effect a return of the signal to "danger."

In general terms, the invention consists in the construction and combination of mechanical devices or elements, all as more fully hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a diagrammatic view showing three lines of railway intersected by a fourth line and the several signals controlling the train movements along such lines. Fig. 2 is a view in elevation of the signal-post having my improved signal-operating mechanism attached thereto. Fig. 3 is a view in elevation of the operating mechanism on an enlarged scale, the cover of the case inclosing such mechanism being removed. Fig. 4 is a sectional view, the plane of section being indicated by the line $x\,x$, Fig. 3; and Fig. 5 is a detail view, on an enlarged scale, of the pivotal signal-bar.

For purposes of convenient description and illustration I have selected a case where three lines of railway are intersected by a fourth line, in which case it is necessary that each of the operators in the towers A, B, and C should join together in order to effect the movement of a train along either of the lines of track *a*, *b*, *c*, and *d*. If, for instance, a train should be passing in the direction of the arrow along the line *a*, it is necessary that the signals 1^b, 1^c, and 1^d, 2^a, 2^b, 2^c, and 2^d should be set to "danger" before the signal 1^a is cleared. It may happen that at the time the operator in the tower A pulls his lever for clearing the signal 1^a a train is passing along the track *d*, and hence such trains on the tracks *a* and *d* would interfere. In order to avoid such interference, it is necessary that the signals governing train movements over the several crossings should be interlocked or else dependent upon the conjoint action of each of the operators in the towers. The interlocking of the machines in the several separate and independent towers is impracticable, as such towers may be separated a considerable distance; hence upon each of the signal-posts I secure a sliding frame 1, mounted in suitable bearings formed on the bracket 2, bolted, as shown in Fig. 2, to the signal-post. This frame 1 is connected at its upper end by a rod to the semaphore-blade 3 or other suitable signal. The bars 4, 5, and 6, operated by rods 7, 8, and 9, leading to the towers A, B, and C, pass up into the frame 1, and are guided in their movements therein by suitable grooves or notches. At a suitable point, preferably about midway of the frame 1, is formed a groove 10, in which the sliding blocks 11 and 11^a are arranged. These blocks are made of a width relative to the width of the frame and of the bars 4 and 6 and dog 12 so as to permit of the passage of two of the bars or one bar and the dog up beyond them, but to prevent the movement of the third bar independent of the frame. The bars 4 and 6 are beveled on one edge at their upper ends, and the dog 12, pivotally attached to the end of the bar 5, has its upper end oppositely beveled, so as to enable said bars and dog to shift the blocks 11 and 11^a, which are oppositely beveled on their lower sides laterally of the frame 1, except when locked, as hereinafter described. Each of the bars 4, 5, and 6 are provided with pins 13, adapted in their downward movements to engage a ledge 14 of the frame and pull said frame down, moving the blade to a horizontal or "danger" position.

Referring now to the diagrammatic view, Fig. 1, it will be seen that the operator in the tower A may pull the lever connected to the signal 1^a, thereby shifting the bar 4 upwardly; but this movement of the bar will have no effect upon the semaphore 3, but will simply shift the block 11 to the right in Fig. 2. Each of the towers A, B, and C will be connected

by a suitable electric signal; so that the operator in the tower A may notify the operators in the towers B and C that he wishes to clear the signal 1^a, so as to permit of the passage of the train along the line *a*. It will be understood, of course, that the operator in the tower A controls the train movements not only along the line *a*, but also along the line *b*, and that the interlocking mechanism in the tower A is so arranged that he cannot pull the lever for operating the signal 1^a until the levers operating the signal 1^b and 2^b have been so shifted as to set said signals to "danger." Under the circumstances heretofore supposed the operator in the tower B has his machine set at normal and the signals 1^c and 2^c governing the train movements on the line *c* set to "danger;" hence, as soon as he receives notice from the operator in tower A, he shifts the proper lever, thereby raising the bar 5 and dog 12 on signal-post 1^a. This movement of the bar and dog will not affect the frame 1, but will merely shift the block 11^a to the right and hold it in such shifted position. As a train is (under the supposed case) passing along the line *d*, the operator in the tower C cannot immediately respond to the call from the tower A, but must wait until the train on the line *d* has passed the crossing. The operator in the tower C then returns the signals 1^d and 2^d to "danger," the signal 2^a being of necessity at "danger" before the signals 1^a and 2^d were cleared, and then shifts the lever connected to the signal 1^a, thereby raising the bar 6. As hereinbefore stated, the blocks 11 and 11^a have been shifted to the right, the latter into the line of movement of the bar 6 by the upward movement of the bar 4 and the dog 12; hence the bar 6 must in its movement raise the frame 1 in its guides, thereby shifting the blade 3 to "safety."

From the foregoing it will be readily understood that the conjoint action of the operators in the three towers is necessary for the setting of any one of the signals to "safety," each of the signals 1^a and 1^b, 1^c and 1^d, 2^a, 2^b, 2^c, and 2^d being provided with the signal-operating mechanism hereinbefore described.

If after the passage of a train over the line *a*, as hereinbefore described, the operator in the tower B should desire to clear the signals 1^c and 2^c, he must first return the lever leading to the signal 1^a to normal, so as to unlock the levers leading to the signal 1^c or 2^c. The return of the lever connected to signal 1^a will lower the dog 12, and thereby pull down the frame 1, the pin 13 engaging the projecting ledge 14 of the frame, the block 11^a previously in engagement with the upper end of bar 6, as hereinbefore described, being slid to the left by the bar 6. From the foregoing it will be seen that although the conjoint action of the three operators is necessary in the case supposed to shift any one of the signals to "safety" either one of the operators can return the signal to normal.

While I have shown and described the apparatus as adapted for control and operation by three operators, it will be readily understood by those skilled in the art that by the addition of one or more bars or dogs and blocks the system can be indefinitely expanded. It will also be understood that either one of the bars or the dog may be shifted first, the others following in due sequence, and that it is only the last operator that can set a signal to "safety."

Where the conjoint action of three or more operators is necessary for the shifting of a signal, as hereinbefore described, the pivotally-mounted dog is connected to one of the intermediate bars, as shown, and a considerable amount of lateral movement of the dog is permitted. Otherwise the shifting of either of the blocks 11 or 11^a by the upward movements of the bars 4 or 6 would prevent the upward movement of the bar 5 independent of the frame; but by providing the intermediate bar with a pivotal dog said bar can when only one block has been shifted inwardly be raised independent of the frame, the dog swinging to one side, unless both blocks have been moved inwardly by the upward movement of both bars 4 and 6.

When designed for operation by two operators, the pivotal dog is omitted and only one block 11 employed, said block being made of a length equal to the inside width of the frame less the width of one of the signal-bars, so that by the upward movement of one of the bars the block is moved and held in the path of the other bar, thereby preventing any upward movement of said bar independent of the frame.

I claim herein as my invention—

1. In a signal apparatus, the combination of a movable signal, a movable frame connected to the signal, two or more signal-operating bars, and one or more blocks constructed, when shifted by one or more of the signal-bars, to lock the other bar into engagement with the movable frame, substantially as set forth.

2. In a signal apparatus, the combination of a movable signal, a movable frame connected to the signal, three or more signal-operating bars movable in said frame, a dog pivotally connected to one of said bars, and two or more blocks arranged in grooves in said frame and movable transversely of the signal-bars, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES T. HAMBAY.

Witnesses:
W. B. CORWIN,
DARWIN S. WOLCOTT.