

A. HORSTSCHAFER.
BLOCK SIGNAL SYSTEM FOR RAILWAYS.

APPLICATION FILED AUG. 17, 1904.

4 SHEETS—SHEET 1.

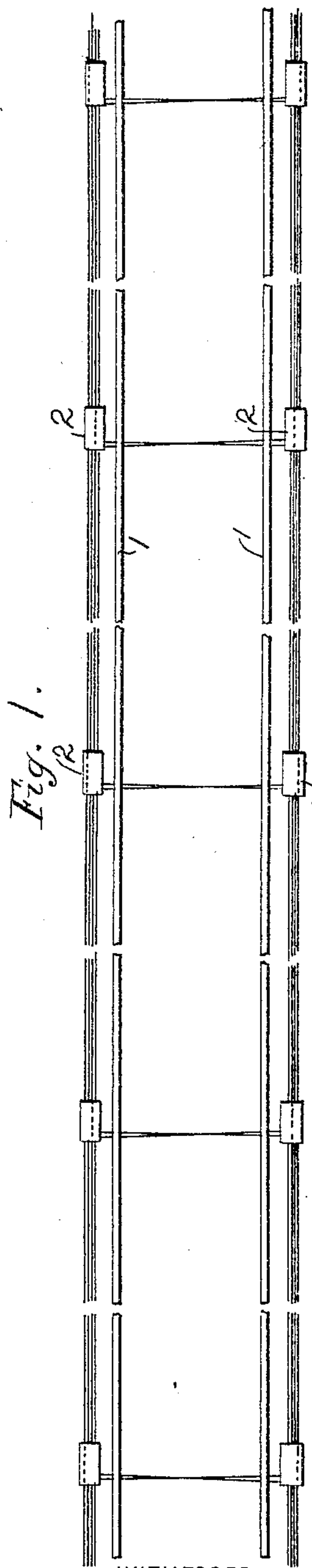


Fig. 1.

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John H. Taugher

Fig. 3.

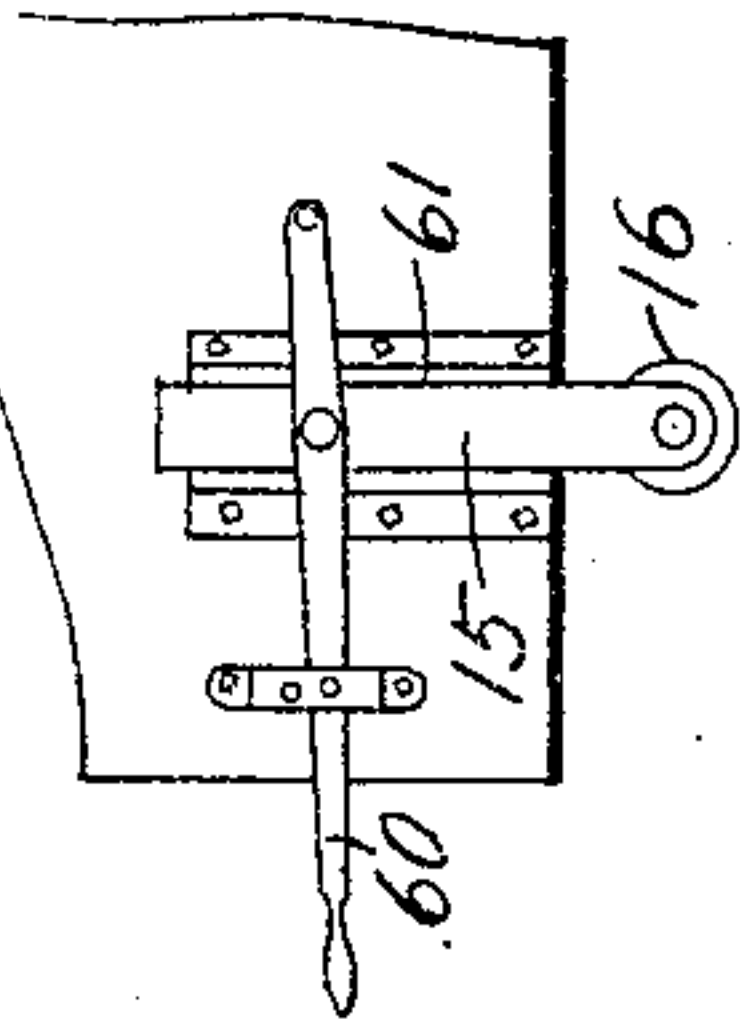


Fig. 2.

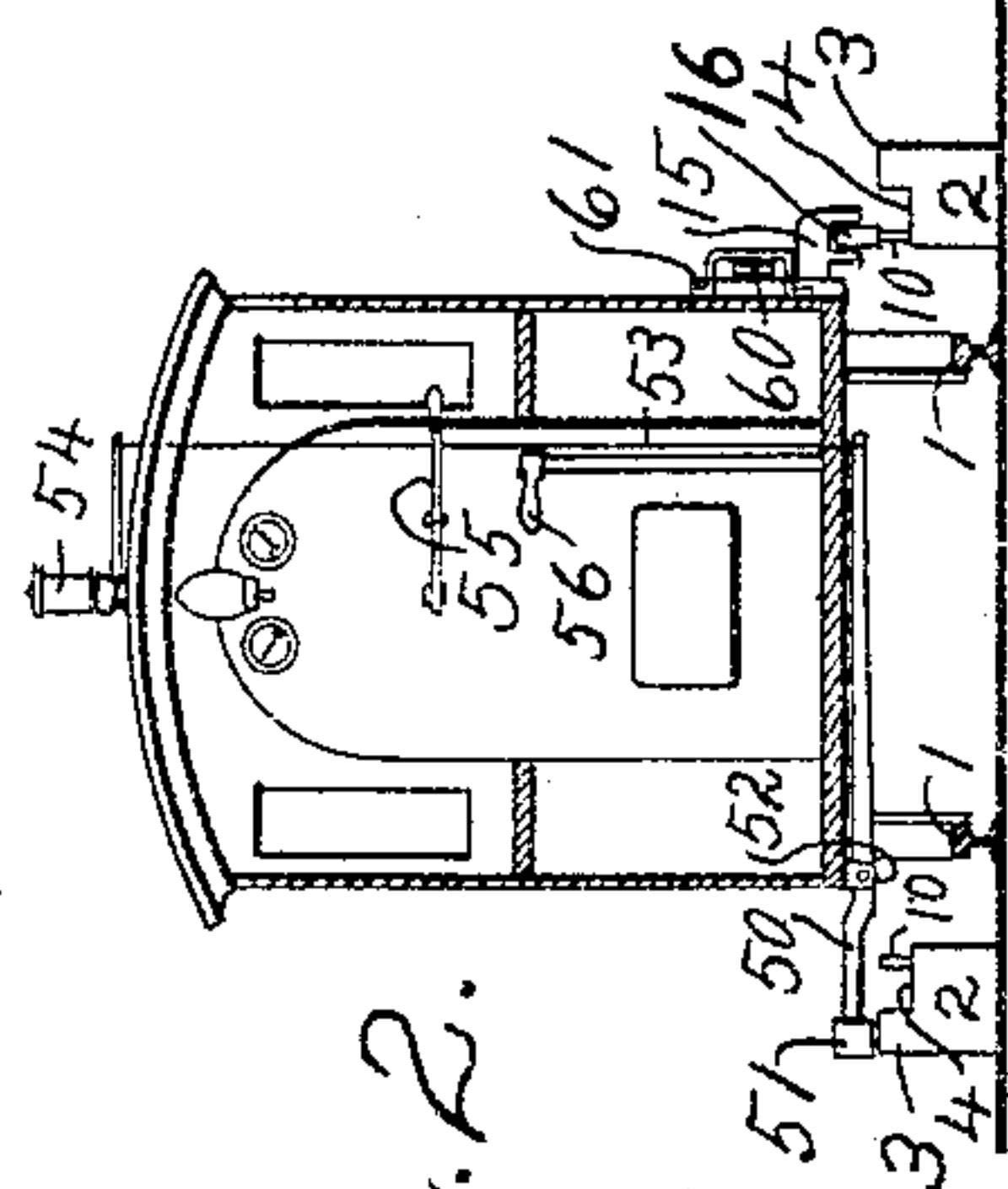


Fig. 4.

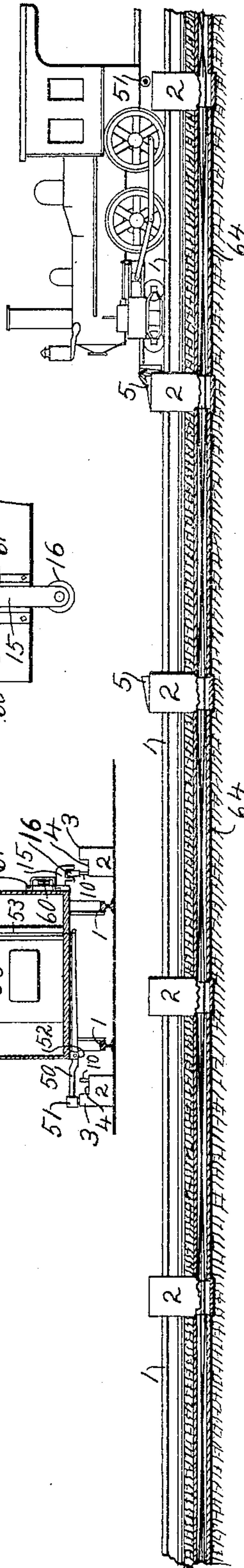
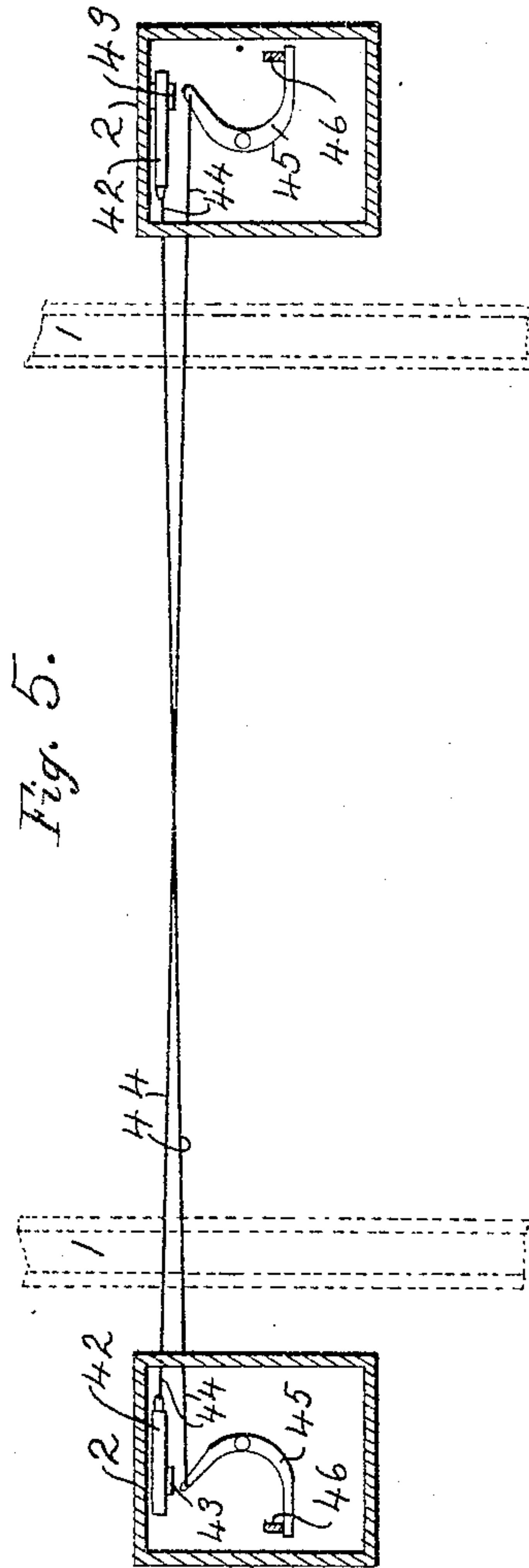


Fig. 5.



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4 SHEETS—SHEET 2.

Fig. 6.

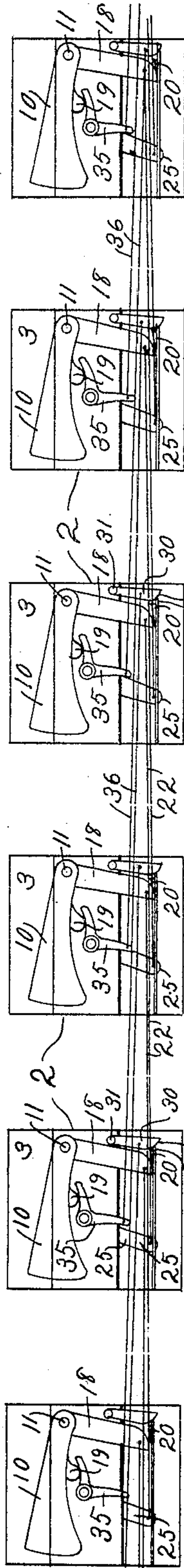
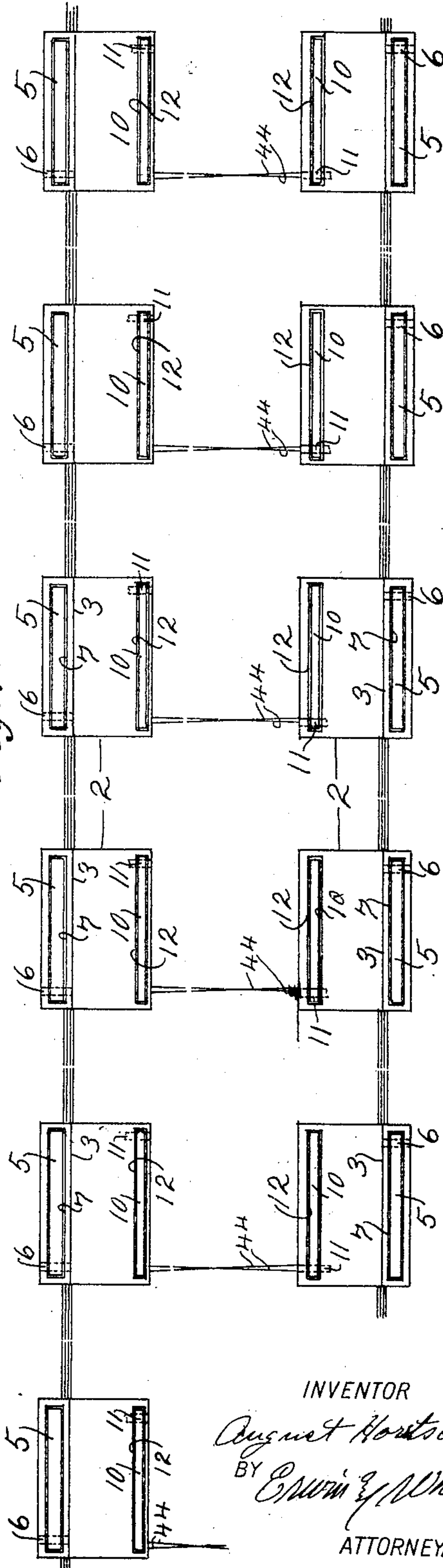


Fig. 7.



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4 SHEETS—SHEET 3.

Fig. 8.

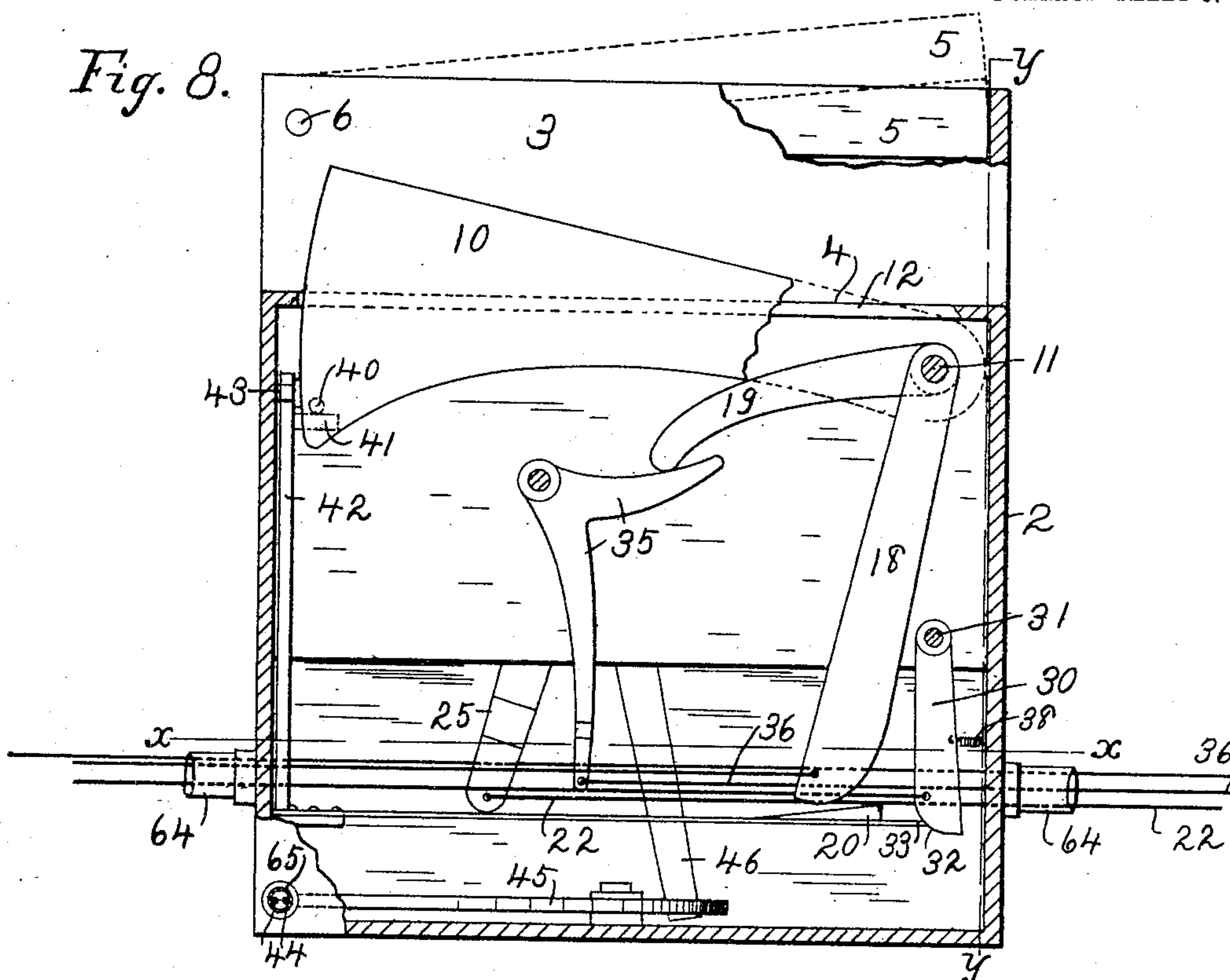
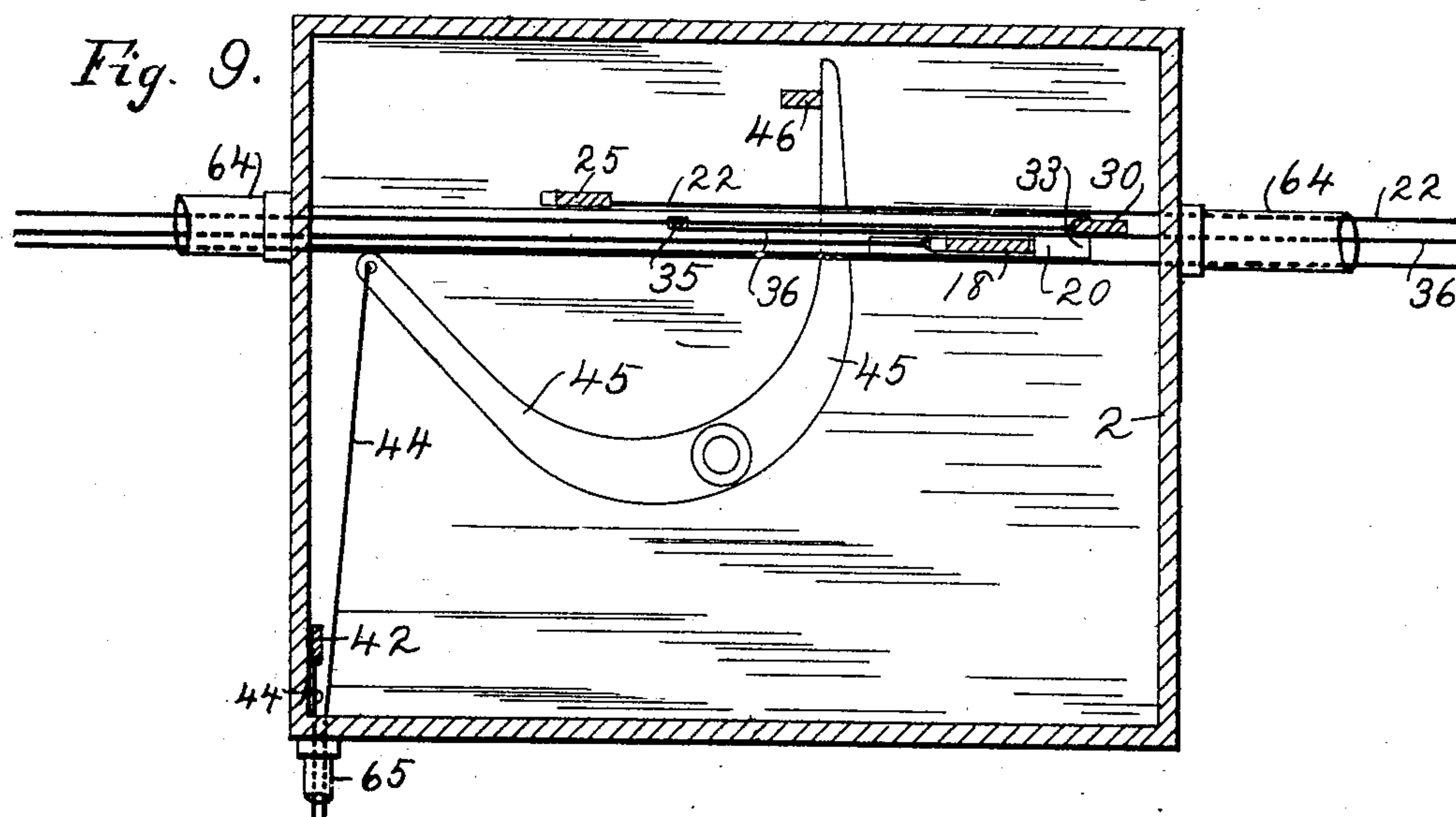


Fig. 9.



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No. 785,807.

PATENTED MAR. 28, 1905.

A. HORSTSCHAFER.

BLOCK SIGNAL SYSTEM FOR RAILWAYS.

APPLIOATION FILED AUG. 17, 1904.

4 SHEETS—SHEET 4.

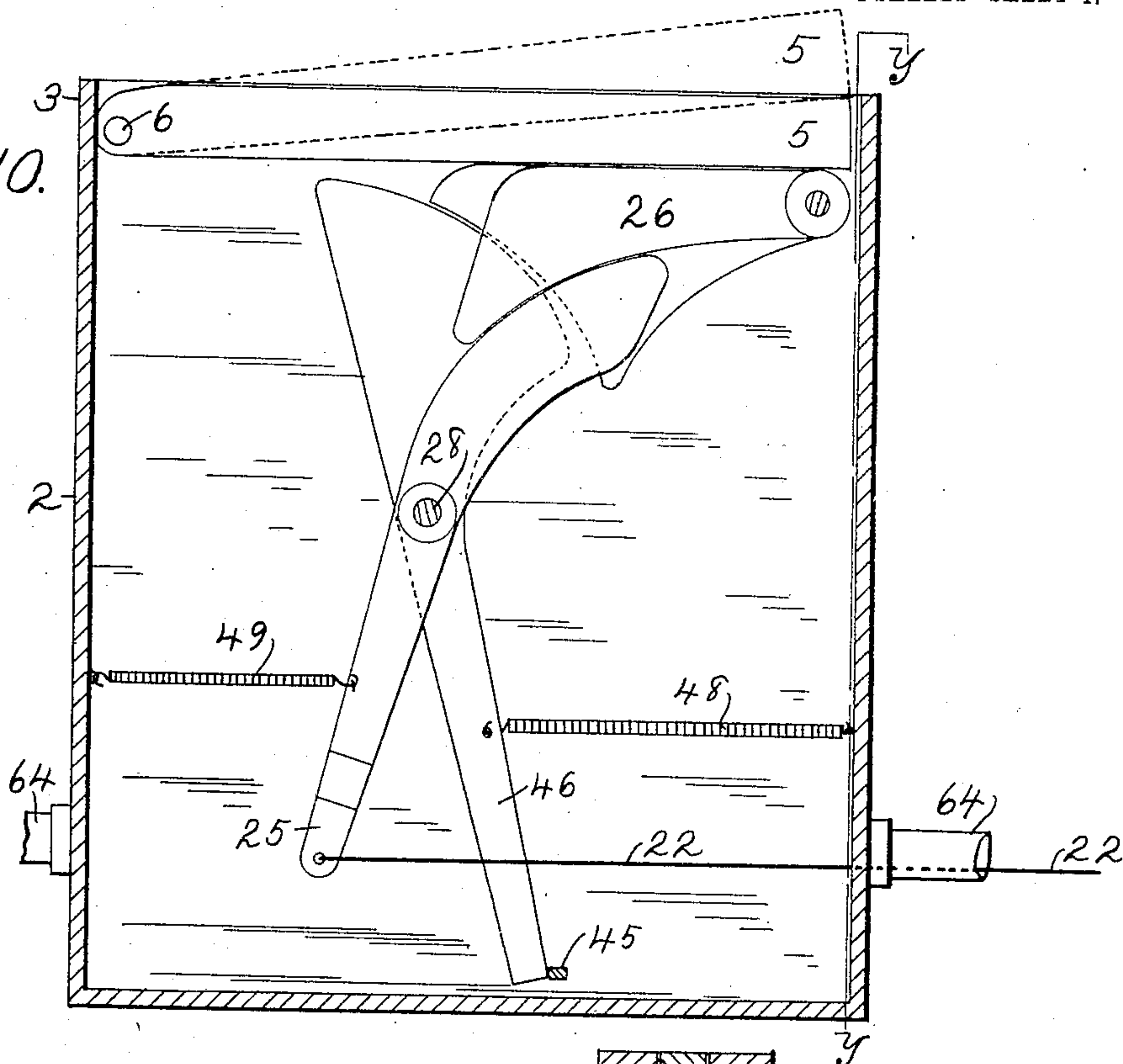
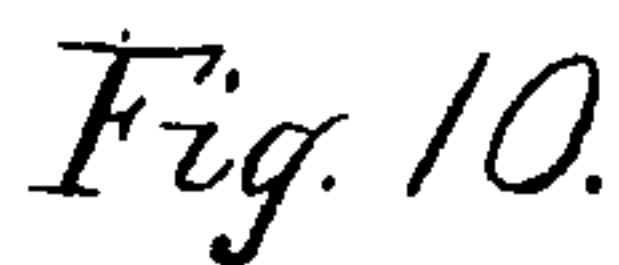
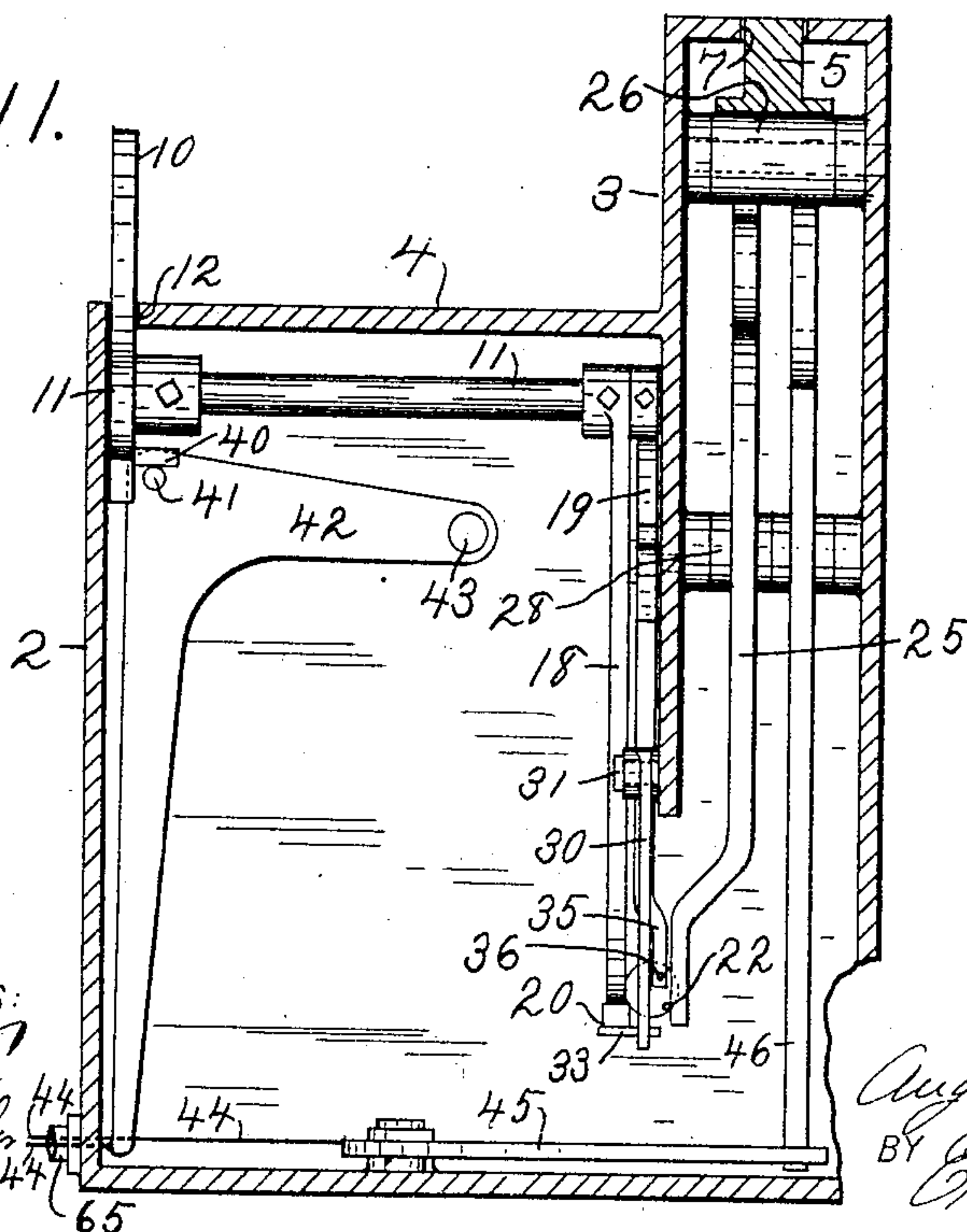


Fig. 11.



WITNESSES:

Fact!

Kellie Tanager!

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UNITED STATES PATENT OFFICE.

AUGUST HORSTSCHAFER, OF MILWAUKEE, WISCONSIN.

BLOCK-SIGNAL SYSTEM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 785,807, dated March 28, 1905.

Application filed August 17, 1904. Serial No. 221,011.

To all whom it may concern:

Be it known that I, AUGUST HORSTSCHAFER, a citizen of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Block-Signal Systems for Railways, of which the following is a specification.

My invention relates to improvements in block-signal systems for railways.

The object of my invention is to provide simple and practical means for mechanically setting and resetting signals at the side of a railway-track from a vehicle moving along said track, each such vehicle being provided with auxiliary signaling mechanism adapted to be operated from the mechanism at the side of the track when the latter has been set in operative position by either a preceding or an approaching vehicle.

In the following description reference is had to the accompanying drawings, in which—

Figure 1 is a plan view of a railway-track equipped with my improved signaling apparatus. Fig. 2 is a cross-sectional view of a vehicle and track embodying my invention. Fig. 3 is a detail view illustrating the means for controlling the signal-setting mechanism of the vehicle. Fig. 4 is a view showing a portion of the road-bed and signal-boxes in longitudinal section, the track and a portion of a vehicle thereon being illustrated in elevation. Fig. 5 is a plan view of the connections between signal-boxes on opposite sides of the track, the track-rails being indicated in dotted lines. Fig. 6 is a detail view showing a series of signal-boxes in vertical section illustrating the connections between the boxes in such series. Fig. 7 is a plan view showing a series of boxes on each side of a railway-track and provided with longitudinal and transverse connections. Fig. 8 is an enlarged vertical sectional view of a signal-box, showing the signal-setting mechanism in elevation. Fig. 9 is a horizontal sectional view of a single signal-box, drawn on line *xx* of Fig. 8. Fig. 10 is a vertical sectional view of a signal-box, showing the signalcommunicating mechanism. Fig. 11 is a sectional view of a signal-box, drawn on line *yy* of Figs. 8 and 10.

Like parts are identified by the same reference characters throughout the several views.

1 represents the rails of a railway-track, at each side of which a series of signaling-boxes 2 are located, as best shown in Figs. 1 and 7. Each of these signaling-boxes 2 is provided on the side farthest from the track with a raised extension 3, the part 4 of the box being materially lower than the part 3, as shown in Figs. 2 and 10. Each box is provided with a signal-conveying arm 5, pivoted at 6 near one end of the box and adapted to be lifted through a slot 7 in the top of part 3 to an angular position, as indicated by dotted lines in Fig. 10. A signal-setting arm is pivoted at 11 in the part 4 of the box and normally projects upwardly in an annular position through a slot 12 in the top of the box, Figs. 8 and 11. The pivot-rod 11 of the signal-setting arm is, however, located near the other end of the box from that at which the pivot-rod 6 of the arm 5 is located, the arms 5 and 10 being therefore adapted when raised to project angularly from the box in opposite directions and at different levels. An arm 15, connected with one side of the moving vehicle, is provided with a contact-roller 16, which is located in a position to engage and move along the inclined upper surface of the signal-setting arms 10 for the purpose of depressing said arms successively as the vehicle moves along the track, this motion being communicated to elevate signal-conveying arms in other boxes, as hereinafter explained.

Referring to Fig. 8, it will be observed that the arm 10 is mounted upon a pivot pin or rod 11, which is provided with motion-transmitting arms 18 and 19, respectively. The arms 10, 18, and 19 are rigidly connected with the rod 11, and the latter is adapted to oscillate in suitable bearings in the box. When the arm 10 is depressed, the depending arm 18 is moved rearwardly past a spring-latch 20. The latter is depressed until the end of the lever swings past it, whereupon it reacts and abuts the inner face of the lever-surface as a stop to hold arm 10 in its depressed position.

A wire or cable connection 22 is provided between the lower end of the arm 18 and the lower end of an arm 25 in a similar box to

that at which the motion originates, this connection being best illustrated in Fig. 6. The motion thus communicated to the arm 25 of another box is transmitted, through said arm 25 and a lifting-lever 26, to elevate the signaling-arm 5 of the box to which such motion has been communicated, the arm 5 being thus held in a position to communicate a signal to a vehicle approaching the one by means of which said signaling-arm is raised. The levers 25 and 26 are arranged to slidably engage each other along curved surfaces, whereby said levers may move in contact with each other and the lever 26 be lifted vertically when lever 25 is swung upon its horizontal pivot-pin 28.

Referring again to Fig. 8, it will be observed that each of the boxes 2 is provided with a lever 30. This lever is pivoted at 31 and is provided with a rounded or angular face at its lower end 32, which when the lever is swung is adapted to impinge upon and depress the spring 33, thereby depressing the latch 20 and releasing arm 18, thus permitting the signal-setting arm 10 to return to its normal raised position. When the arm 10 is depressed in any one of the boxes, motion is communicated, through the corresponding arm 19, bell-crank lever 35, and a cable 36, to actuate a lever 30 in another box located in the rear of the box from which the motion originates, this connection being also illustrated in Fig. 6. 38 is a spring adapted to retract lever 30 to normal position. It will therefore be observed that by means of the signal-setting levers 10 in a series of boxes on one side of the track motion may be communicated, through the arms 18 and 19, respectively, to simultaneously cause the elevation of a signal-conveying arm 5 at a box in front of the moving vehicle and to also release and permit the readjustment of a signal-setting arm 10 at a box in the rear of the moving vehicle. The distant boxes so connected with the box from which the motion originates are in the construction shown the second boxes to the front and rear from the one being passed by the vehicle.

For convenience in description I shall hereinafter refer to the boxes from which the motion originates as those of the "right-hand series," for it will be observed that in the construction illustrated the arm 15 is located at the right-hand side of the vehicle and is therefore in a position to contact only with the arms 10 of those boxes which are at the right-hand side of the track when viewed in the direction of vehicle movement. My invention, however, contemplates the provision of means for raising signaling-levers 5 in the boxes of the left-hand series simultaneously with the depression of the signal-setting levers 10 in the boxes of the right-hand series. To accomplish this result, I have provided each arm 10 with a laterally-projecting pin 40, which rests upon a similar pin 41, extending at right an-

gles to the pin 40 from an elbow-lever 42, Fig. 11. The elbow-lever 42 is provided with a horizontal arm, pivoted at 43, and a downwardly-extending arm, connected at its lower end by a cable 44 with the yoke-lever 45 on the other side of the track and in the bottom of the opposing box of the left-hand series, Fig. 9. When the signal-setting arm 10 of a box in the right-hand series is depressed, its motion will therefore be communicated, through the crossed pins 40 and 41, elbow-lever 42, cable 44, yoke-lever 45, and a vertically-extending lever 46, to raise lever 26, Fig. 10, and signal-conveying lever 5 to operative position. It will be observed that the lever 46 is provided at its upper end with a curved contacting-surface adapted to move along and under a similarly-curved surface toward lever 26, whereby the swinging movement of levers 46 is effective to lift the lever 26 and arm 5. The springs 48 and 49 are used to retract levers 46 and 45, respectively, to normal position when such levers are released by their actuating connections. The signal-conveying arm 5 in the left-hand series after being elevated as above described is held in raised position until the opposing box in the right-hand series receives motion from the advancing vehicle to release arm 18 from latch 20, whereupon the reaction of spring 48 retracts lever 46 to normal position, permits arm 5 to descend by gravity to normal position, and communicates a reverse movement, through the yoke-lever 45, cable 44, elbow-lever 42, and pins 41 and 40, to raise the signal-setting arm 10 of the opposing box in the right-hand series, thus restoring all the parts in both boxes to normal position.

From the foregoing description it will be understood that the signal-conveying arms raised in advance of a moving vehicle are those in the series at the right of such vehicle, while the signal-conveying arms raised in the rear of a moving vehicle are those at the left of such vehicle. It is therefore obvious that the raised ends of the arms 5, whether in advance or in the rear of the vehicle, will point toward such vehicle and will occupy positions for contacting with the contact-lever carried on the left-hand side of any other vehicle approaching from either the front or rear. Referring to Fig. 2, it will be observed that the vehicle is provided at 50 with such a lever, a roller 51 being mounted on the end of the lever in position for contacting with the arms 5 when raised from the part 3 of the box. The lever 50 is pivoted at 52 or any other convenient point on the vehicle and is connected by a wire 53 with any suitable form of signal, such as a whistle 54. It may also be connected with a throttle-lever 55 or with a brake-lever 56, whereby the vehicle may be automatically stopped and an alarm sounded as soon as the roller 51 contacts with the raised signaling-arm 5.

When it is desired to back the vehicle or when for any purpose it is desired to move the vehicle without actuating the signal-setting arms 10, the contacting arm 15 may be raised out of operative position by means of a lever 60, pivotally connected with the arm 15. The latter is simultaneously mounted in suitable guides 61 on the side of the vehicle.

It will be understood that the various connecting parts will be suitably housed and protected from damage. For example, the connecting-cables 22 and 36 are inclosed in a tubular covering 64. The cross-cables 44 are suitably inclosed by a tubular covering 65, Fig. 11.

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

1. In apparatus of the described class, the combination of a signal-box; a signal-setting arm connected with the box and arranged to project normally therefrom in a raised position and with an angular pitch along the trackway; a signal-conveying arm connected with said box and normally in lowered position; and mechanism for raising the signal-conveying arm to an angular position and with a pitch in the opposite direction from that of the signal-setting arm.

2. In apparatus of the described class, the combination of a signal-box; a signal-setting arm connected with the box and arranged to project normally therefrom in a raised position and with an angular pitch along the trackway; a signal-conveying arm connected with said box and normally in lowered position; and mechanism for raising the signal-conveying arm to an angular position and with a pitch in the opposite direction from that of the signal-setting arm; together with means for locking the signal-setting and signal-conveying arms when out of normal position; and means for unlocking said arms from a distant point.

3. In apparatus of the described class, the combination with a railway-track, of a series of signal-boxes arranged at the side thereof; a set of movable signal-setting and signal-conveying arms pertaining to each box and adapted to project angularly in opposite directions and along the trackway; motion-transmitting connections between the signal-setting arm of each box and the signal-conveying arms of other boxes; said arms being adapted to be adjusted in position for contacting with co-operative devices carried by vehicles on the track.

4. In apparatus of the described class, the combination with a railway-track; of a series of signal-boxes arranged along the trackway; movable signal-setting and signal-conveying arms pertaining to each box and adapted to project angularly in opposite directions along the trackway; motion-transmitting connections between the signal-setting arm of each

box and the signal-conveying arms of distant boxes; and devices carried by moving vehicles on the track for contacting with the signal-setting and signal-conveying arms respectively; together with connections pertaining to each box for maintaining each of said arms in horizontal position when the other arm is raised.

5. In apparatus of the described class, the combination with a railway-track, of a series of signal-boxes at each side thereof; each such box being provided with signal-setting and signal-conveying arms adapted to project angularly from the box in opposite directions and at different levels; levers in each box adapted to move the signal-conveying arm thereof to operative position; connections between one such lever and the signal-setting arm of another box in the same series; and connections between another such lever and the signal-setting arm of a box in the other series; whereby movements of the signal-setting arms of either series, are transmitted to signal-conveying arms in both series.

6. In apparatus of the described class, the combination with a railway-track, of a series of signal-boxes at each side thereof; each such box being provided with signal-setting and signal-conveying arms adapted to project angularly from the box in opposite directions and at different levels; levers in each box adapted to move the signal-conveying arm thereof to operative position; connections between one such lever and the signal-setting arm of another box in the same series; and connections between another such lever and the signal-setting arm of a box in the other series; whereby movements of the signal-setting arms of either series are transmitted to signal-conveying arms in both series; together with devices, carried by moving vehicles on the track, for locking the signal-setting arms, and the connected signal-conveying arms of some of the boxes in signal-conveying position, and other devices, carried by said vehicles, for receiving such signals.

7. In apparatus of the described class, the combination with a railway-track, of a series of signal-boxes at each side thereof; each such box being provided with signal-setting and signal-conveying arms adapted to project angularly from the box in opposite directions and at different levels; levers in each box adapted to move the signal-conveying arm thereof to operative position; connections between one such lever and the signal-setting arm of another box in the same series; and connections between another such lever and the signal-setting arm of a box in the other series; whereby movements of the signal-setting arms of either series are transmitted to signal-conveying arms in both series; together with devices, carried by moving vehicles on the track, for locking the signal-setting arms, and the connected signal-conveying arms of

some of the boxes, in signal-conveying position, and other devices, carried by said vehicles, for receiving such signals, said signal-setting arms of each box being also connected
5 with unlocking devices in other boxes adapted to release the signal setting and conveying arms.

8. In apparatus of the described class, the combination with a railway-track, of a series
10 of signal-boxes at each side thereof; each such box being provided with signal-setting and signal-conveying arms adapted to project angularly from the box in opposite directions and at different levels; levers in each box
15 adapted to move the signal-conveying arm thereof to operative position; connections between one such lever and the signal-setting arm of another box in the same series; and connections between another such lever and
20 the signal-setting arm of a box in the other series; together with devices, carried by moving vehicles on the track, for locking the signal-setting arms, and the connected signal-conveying arms of some of the boxes, in signal-
25 conveying position, and other devices, carried by said vehicles, for receiving such signals, said signal-setting arms of each box being also connected with unlocking devices in other boxes adapted to release the signal setting and
30 conveying arms, and each such box being provided with means for automatically restoring said arms to normal position when unlocked.

9. In apparatus of the described class, a signaling-block, comprising two series of signal-
35 ing-boxes; each box being provided with signal setting and conveying arms, a pair of actuating-levers for each signal-conveying arm, a pair of motion-transmitting arms, arranged to be actuated by the signal-setting arm, and
40 locking and unlocking mechanisms for the arms; connections between one of said motion-transmitting arms and an actuating-lever of a signal-conveying arm in another box of the same series; connections between another of
45 said motion-transmitting arms and the unlocking mechanism of a third box in the same series; and motion-transmitting connections between said signal-setting arm and the signal-conveying arm of a box in the other series;
50 together with means for automatically restoring the parts to normal position after the operation of said unlocking mechanism.

10. In apparatus of the described class the combination with a railway-track, of a series

of signal-setting arms arranged in angular po- 55
sitions on each side of the track, with those on one side extending in a direction opposite that of the similar arms on the other side of the track; a series of signal-conveying arms on
60 each side of the track, each adapted to be adjusted to angular positions corresponding in direction of inclination with the signal-setting arms on the other side of the track; and connections between the signal-setting and cer-
65 tain of the signal-conveying arms in the same, and the other series; the signal-setting arms on one side of said track and the connected signal-conveying arms being arranged for simultaneous movement in opposite directions.

11. In apparatus of the described class, the
70 combination with a railway-track, of a series of signal-setting arms arranged in angular positions on each side of the track, with those on one side extending in a direction opposite that
75 of the similar arms on the other side of the track; a series of signal-conveying arms on each side of the track, each adapted to be adjusted to angular positions corresponding in direction of inclination with the signal-setting
80 arms on the other side of the track; and connections between the signal-setting and certain of the signal-conveying arms in the same, and the other series; the signal-setting arms on one side of said track and the connected
85 signal-conveying arms being arranged for simultaneous movement in opposite directions; said signal setting and conveying arms being arranged at different levels, and adapted for contact with different devices carried by vehicles moving on the track. 90

12. In apparatus of the described class, the combination with a railway-track; of a series of movable signal-setting and signal-conveying arms, arranged in pairs at the side of the track and at different levels; and connections
95 between the signal-setting arms of one pair and the signal-conveying arms of other pairs adapted to communicate a reverse motion from the arms of one kind to those of the other; and means, controlled by the signal-setting
100 arms, for locking and releasing the same and similar arms at the same and distant points.

In testimony whereof I affix my signature in the presence of two witnesses.

AUGUST HORSTSCHAFER.

Witnesses:

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LEVERETT C. WHEELER.