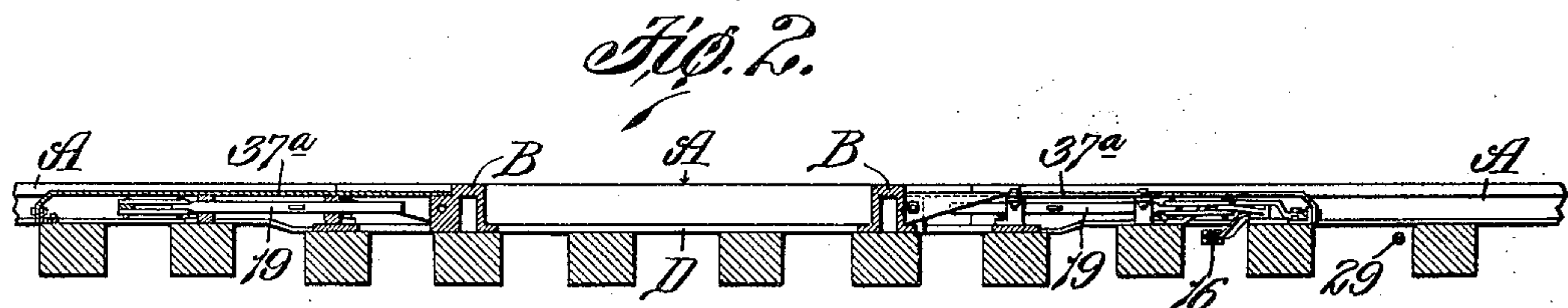
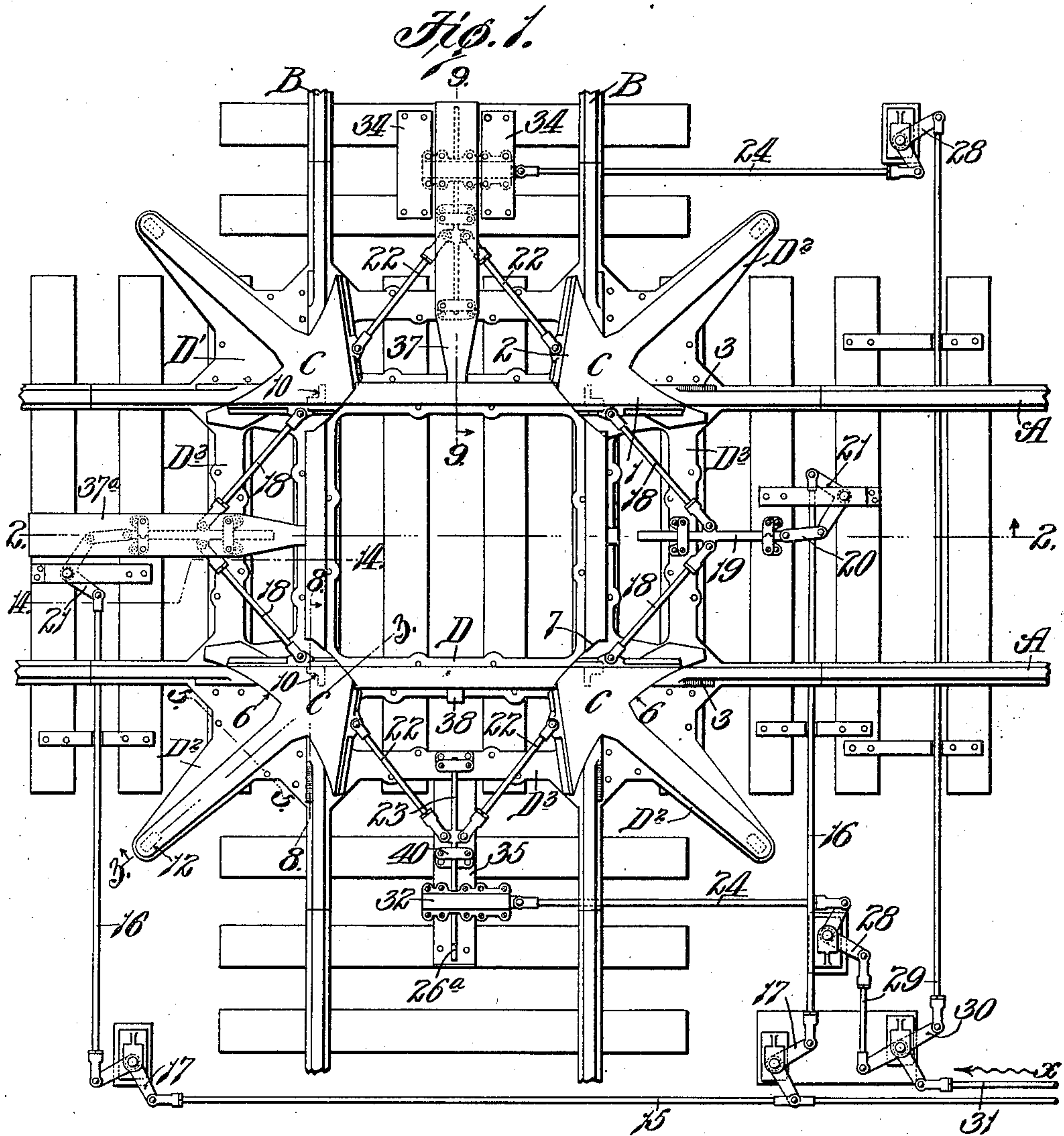


H. F. ROACH.
RAILWAY CROSSING.
APPLICATION FILED DEC. 5, 1910.

999,400.

Patented Aug. 1, 1911.

4 SHEETS—SHEET 1.



Witnesses:
Geo. R. Landon
Wells L. Church.

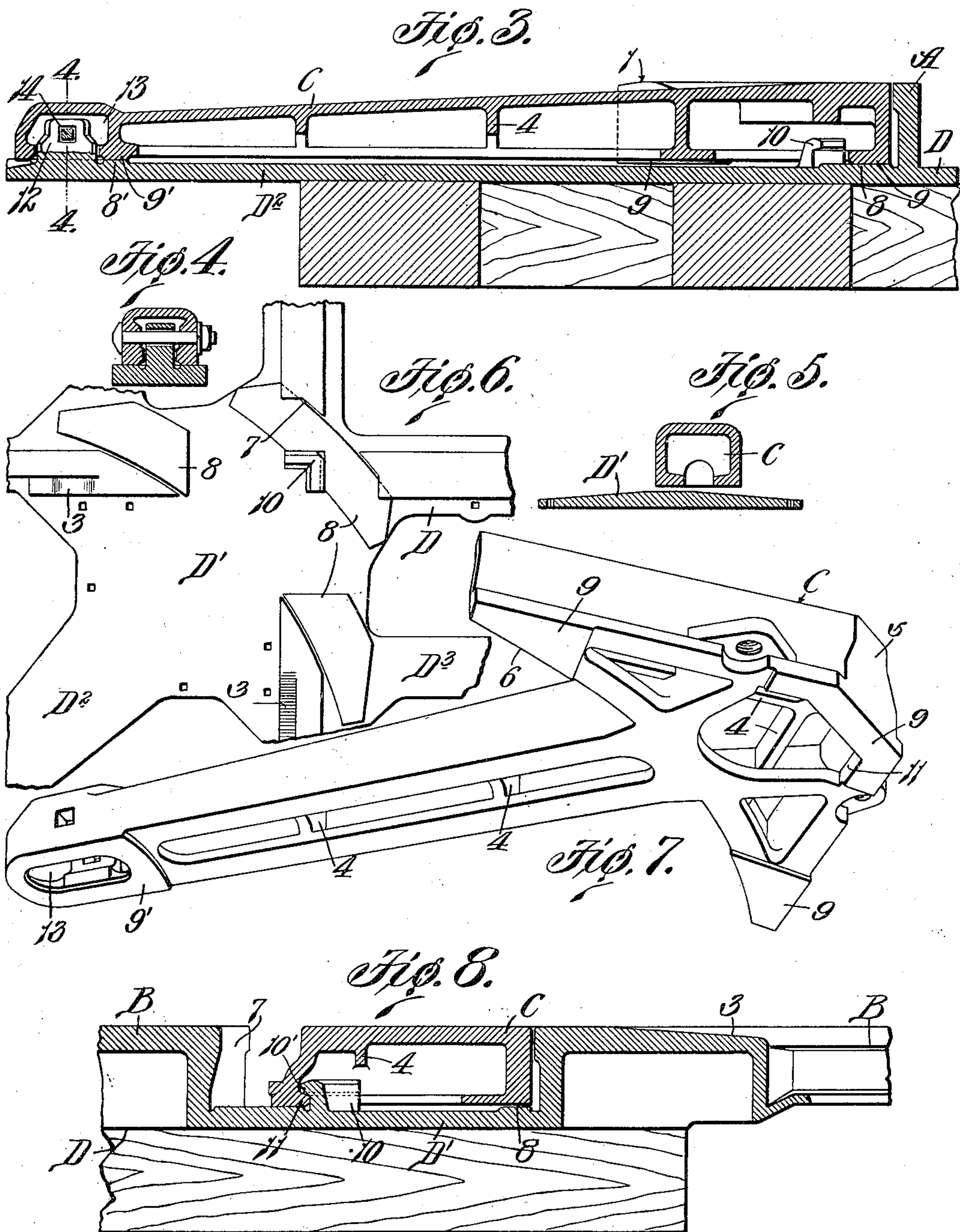
Inventor:
Harry F. Roach.
By Paul Bakewell Atty.

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4 SHEETS—SHEET 2.



Witnesses:
Geo. P. Radson
Wells L. Church.

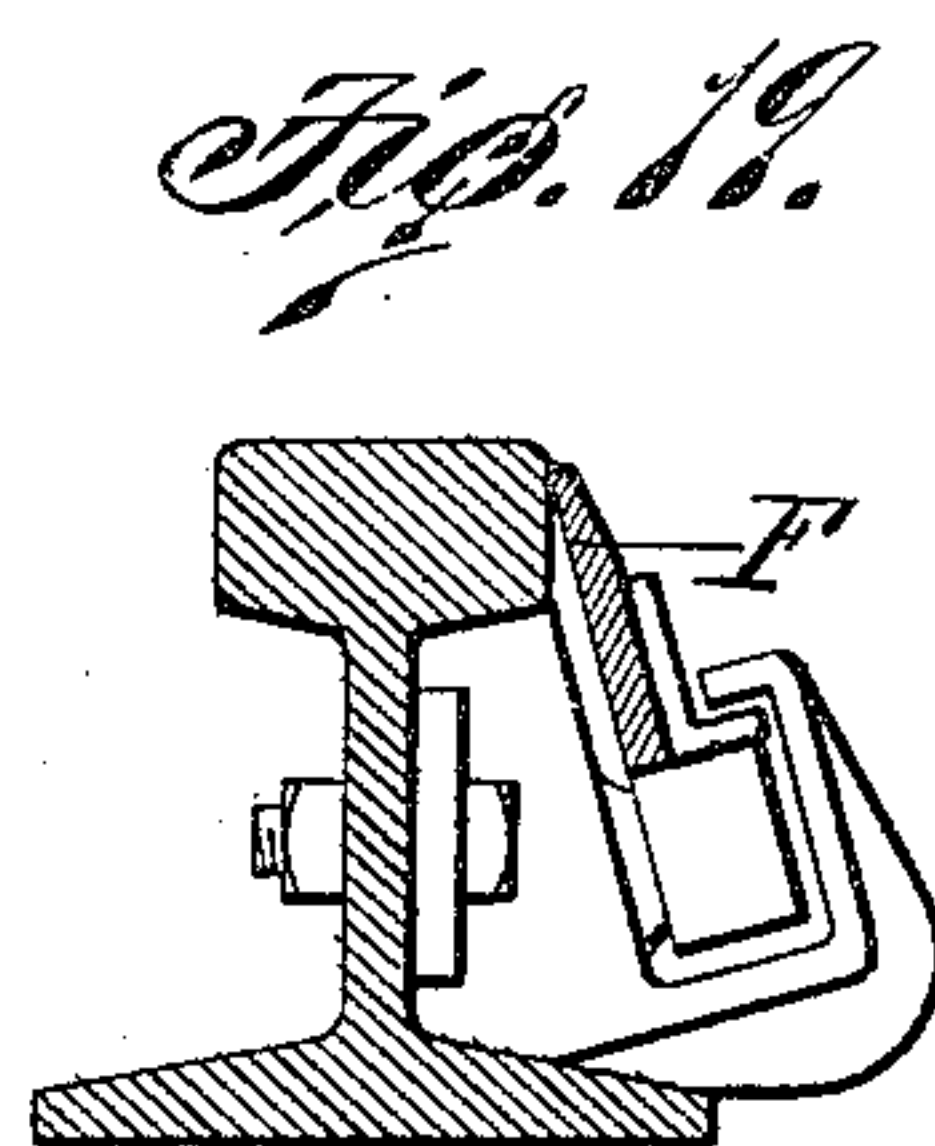
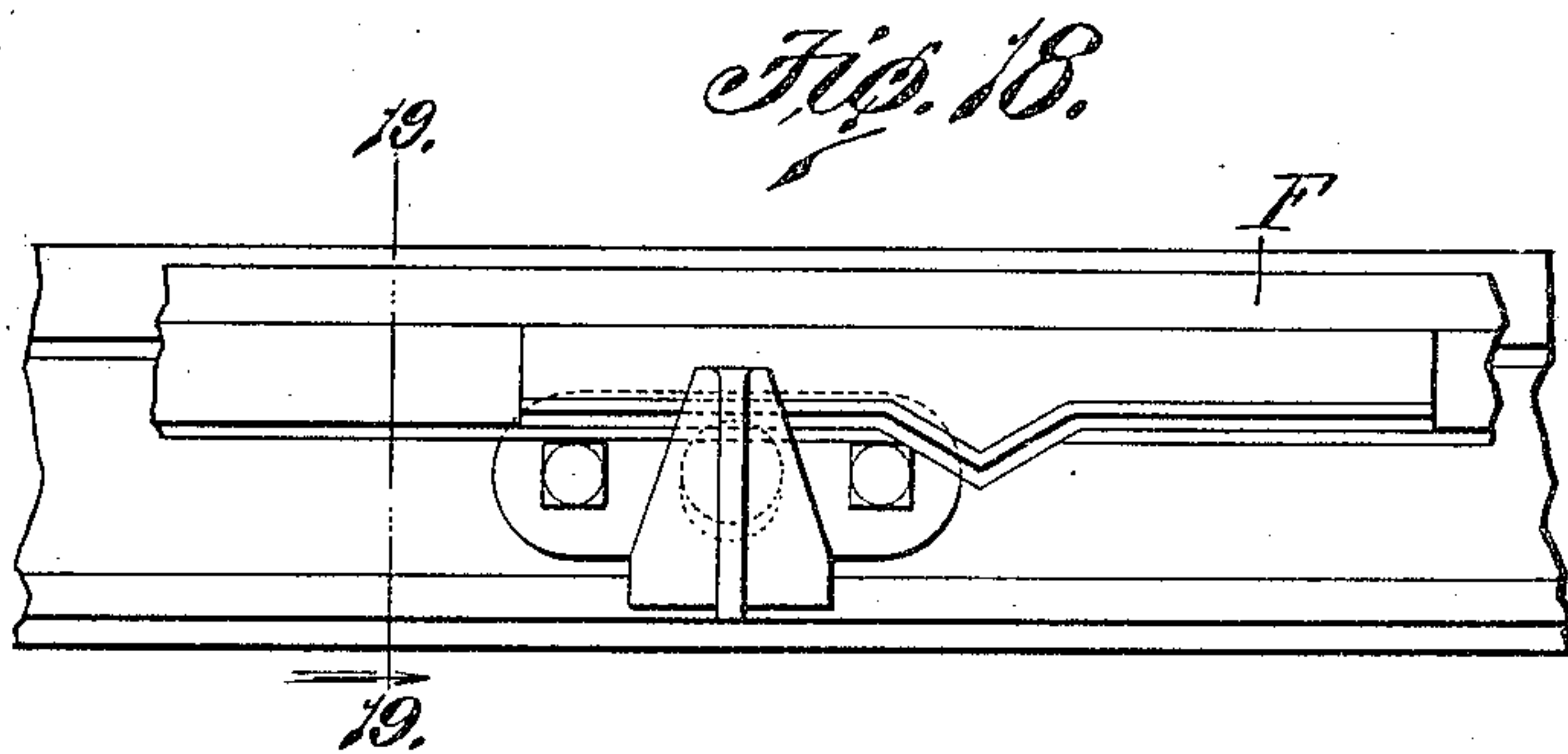
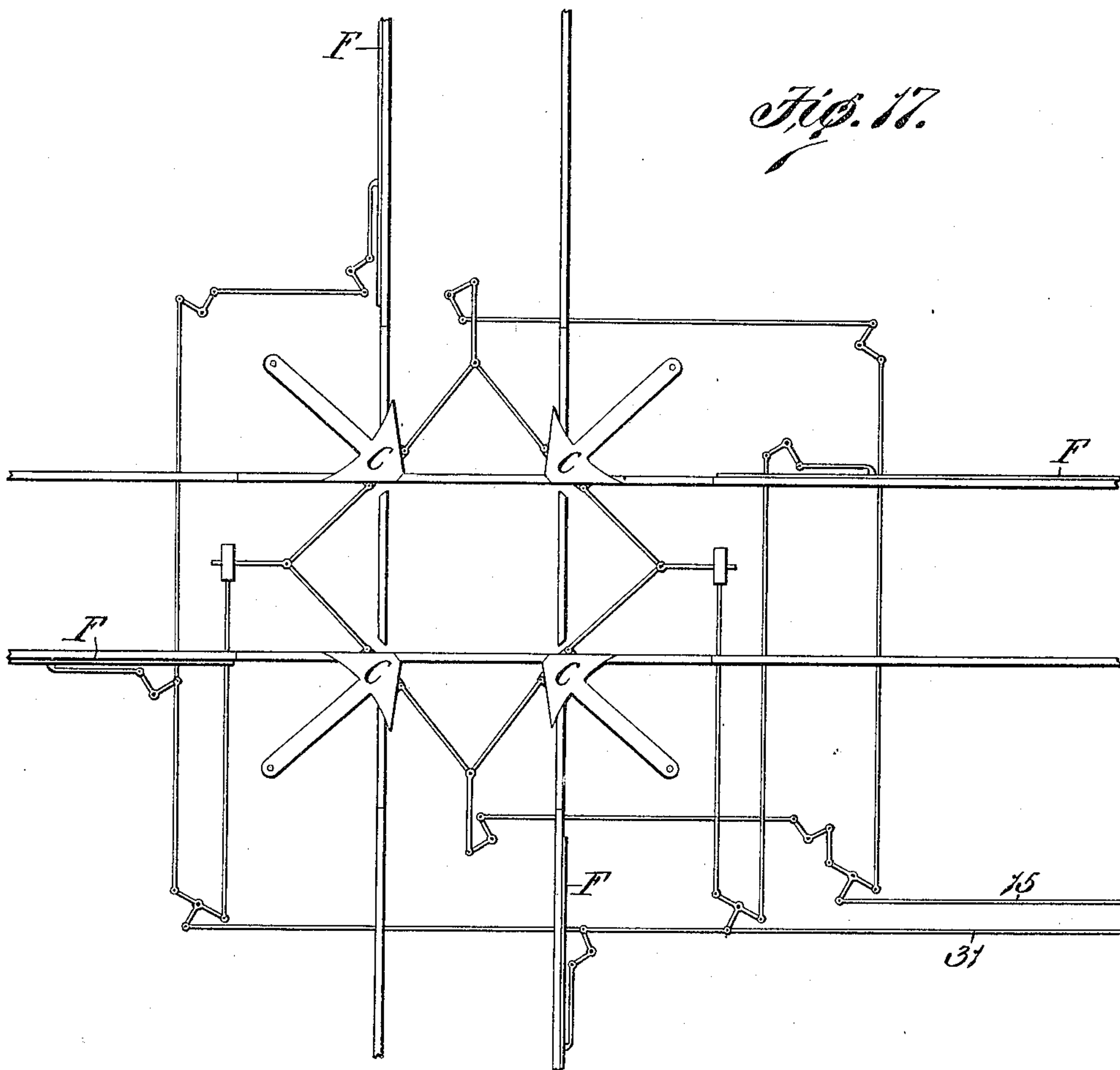
Inventor,
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H. F. ROACH.
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999,400.

Patented Aug. 1, 1911.

4 SHEETS—SHEET 4.



Witnesses:
Geo. R. Radson.
Wells L. Church.

Inventor,
Harry F. Roach.
By Paul McKewell Atty.

UNITED STATES PATENT OFFICE.

HARRY F. ROACH, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
CONTINUOUS FROG & CROSSING COMPANY, OF WILMINGTON, DELAWARE, A COR-
PORATION OF DELAWARE.

RAILWAY-CROSSING.

999,400.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed December 5, 1910. Serial No. 595,656.

To all whom it may concern:

Be it known that I, HARRY F. ROACH, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Railway-Crossings, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

10 This invention relates to railway crossings of the type which comprises a plurality of movable tongues arranged at the intersection of the rails of the tracks.

One object of my invention is to provide a crossing of the type referred to which is so constructed that it will be practically impossible for the tongues to become displaced or shifted accidentally as, for example, by means of a device trailing from the train that passes over the crossing.

Another object is to provide a crossing which is so designed that the switchman or person who operates same will be notified if any of the tongues are misplaced so that there will be no excuse for him to leave the crossing in an unsafe condition.

Another object is to provide a crossing of the type referred to in which the means for actuating the tongues is so constructed that breakage of one element of said means will not cause the tongues to fail to move to their proper positions when said means is operated.

Another object is to provide a crossing of the type referred to in which the movable tongues are of novel construction. And still another object is to provide a crossing of the type referred to that comprises means for actuating the tongues and also means for positively locking the tongues in either of their extreme positions.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is a top plan view of a railway crossing constructed in accordance with my invention; Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is an enlarged vertical sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 3; Fig. 5 is a cross sectional view taken on the line 5—5 of Fig. 1; Fig. 6 is an enlarged top plan view of a portion of

the base plate; Fig. 7 is a perspective view of one of the tongues; Fig. 8 is a vertical sectional view taken on the line 8—8 of Fig. 1; Fig. 9 is an enlarged vertical sectional view taken on the line 9—9 of Fig. 1; Fig. 10 is a cross sectional view taken on the line 10—10 of Fig. 9; Fig. 11 is a cross sectional view taken on the line 11—11 of Fig. 10; Figs. 12 and 13 are cross sectional views taken on the lines 12—12 and 13—13 of Fig. 9; Fig. 14 is an enlarged vertical sectional view taken on the line 14—14 of Fig. 1; Figs. 15 and 16 are cross sectional views taken on the lines 15—15 and 16—16 of Fig. 14; Fig. 17 is a top plan view of my improved crossing provided with detector bars; Fig. 18 is a side elevational view of one of the detector bars; and Fig. 19 is a cross sectional view taken on the line 19—19 of Fig. 18.

Referring to the drawings which illustrate the preferred form of my invention, A designates the rails of one track of my crossing, B designates the rails of the other track, and C designates four movable tongues arranged at the intersection of said rails, each of said tongues consisting of an approximately arrow-shaped member that is provided with a head and a shank or arm projecting laterally from said head and pivotally connected at its outer end to a stationary support or base plate. The heads of said tongues are provided with wheel-tread surfaces 1 that coöperate with the rails A of one track when the tongues are arranged in the position shown in Fig. 1, and also wheel-tread surfaces 2 which coöperate with the rails B of the other track when the tongues are arranged in their other extreme position. The rails of both tracks are cut away sufficiently to receive the heads of the tongues, and said heads are so proportioned and designed that they coöperate with the rails to form continuous wheel-tread surfaces for the wheels which pass over the crossing, the portions of the rails which lie between the heads of the tongues being wide enough to provide a tread surface for the outer flange of a "double-flanged" wheel, and the portions of the rails which lie outside of the heads of the tongues being provided with upwardly inclined surfaces 3 which are so arranged that they will be

engaged by the outer flange of a double-flanged wheel and thus guide such a wheel upwardly onto the heads of the tongues.

A crossing of the construction above described will successfully carry a double-flanged wheel across the intersecting track without subjecting the rolling stock to excessive shocks or jars because the upwardly inclined portions 3 of the rails raise the outer flanges of guttered wheels upwardly onto the tongues, and the wide tread surfaces which lie between the tongues provide tread surfaces for the outer flanges when the wheels are passing from one pair of tongues to the other pair.

The rails are preferably formed integral with the base plate D which, for the sake of economy and lightness, conforms to the general outline of the rails of the crossing. The portions D' of the base plate on which the heads of the tongues C rest, conform to the general outline of the tongues so as to close the under side of the tongues and prevent foreign matter from getting into same, and said portions are provided with extensions D² to which the outer ends of the shanks or arms of the tongues are pivotally connected, as hereinafter more fully described. I also prefer to provide said base plate with cross-pieces D³, as shown in Fig. 1, which reinforce and strengthen the structure and also form supports for certain elements of the mechanisms which actuate and lock the tongues.

Each of the tongues preferably consists of a hollow casting provided with internal strengthening braces 4, as shown clearly in Fig. 7, and the end face 5 of the head of the tongue extends at substantially an obtuse angle to the two side faces of said head, the other end face 6 of the head which lies adjacent to the shank, being curved on an arc whose center is the axis about which the tongue swings. The terminals of the rails which coöperate with this end face 6 are curved so that they will conform radially therewith and fit against same, and the terminals of the heads of the intermediate portions of the rails which coöperate with the other end face of the head of the tongue are notched out at 7, as shown in Figs. 1 and 6, so that said tongue will lie against said terminals in either of its extreme positions. The base flanges of the intermediate portions of said rails terminate diagonally, as shown in Fig. 6, so as to provide a clearance for any dirt or foreign matter which collects at the side of the tongue when the tongue is shifted laterally. By forming the base flanges of the terminals of the rails in this manner, namely, cutting them diagonally, it will be impossible for dirt or other foreign matter to lodge at the terminals of the rails and thus prevent the tongue from moving to its extreme positions. Each portion D' of the

base plate is provided with raised projections 8 which are so arranged that they form a three-point bearing for the head of the tongue, and said head is preferably provided on its under side with bearing surfaces 9 that rest upon said projections, thereby producing a true and level bearing surface for the head of the tongue. A stop 10 on the portion D' of the base plate projects upwardly into the hollow head of the tongue so as to limit the lateral movement of the tongue in either direction. Said stop 10 is substantially L-shaped in cross section, and it is provided with a flange 10' that coöperates with a flange 11 on the head of the tongue to limit any tendency of the tongue to rise or move upwardly from the base plate. The tongues may be connected to the base plate in any suitable manner but I prefer to provide the laterally projecting extensions D² on the base plate with integral lugs 12 which project upwardly into pockets 13 formed in the outer ends of the shanks of said tongues. The pocket 13 of each tongue is so designed that the tongue will have only a slight bearing on the lug 12 that projects into said pocket, and the base plate is provided with a raised bearing 8' with which a bearing surface 9' on the under side of the arm coöperates, as shown in Fig. 3. A cross pin or bolt 14 is preferably arranged in the lug 12 and in the side walls of the pocket into which said lug projects so as to prevent the outer end of the tongue from moving upwardly.

The mechanism for shifting the tongues consists of a throw rod 15 controlled from a switch-stand or switch-tower, not shown, a pair of links 16 arranged at substantially right angles to said throw rod and connected thereto by means of bell crank levers 17, two toggles 18 each of which is connected to one pair of tongues, and a suitable connection between said toggles and the links 16. In the embodiment of my invention herein shown, the toggles 18 are arranged between the rails A of one track, and each of said toggles is connected at its inner end to a guide rod 19 whose outer end is connected by means of a short link 20 to a bell crank lever 21 fastened to the long link 16, the opposite end of the toggle being pivotally connected to one pair of tongues. Two toggles 22 which are arranged between the rails B of the other track, are pivotally connected to the tongues, as shown in Fig. 1, so as to connect all of the tongues together by a substantially diamond-shaped device that is composed of four separate toggles. The toggles 22 are also pivotally connected to guide rods 23 which coöperate with a locking mechanism, hereinafter described, to hold the tongues in adjusted position.

The locking mechanism consists of lock rods 24 provided with heads 25 in which

openings are formed to receive the guide rods 23 of the toggles 22. The head 25 of each lock rod is provided with two lugs 26 and 27, and the guide rod 23 which coöperates with said head, is provided with a notch 26^a that coöperates with the lug 26 and a notch 27^a that coöperates with the lug 27 so as to positively lock the guide rod 23 to which the movable tongues C are connected by means of the toggle 22. The lock rods 24 are connected by means of bell crank levers 28 and links 29 to a substantially T-shaped lever 30 to which an actuating rod 31 is connected, said links and levers being so arranged that when they are in the position shown in Fig. 1 the lugs 27 on the lock rods 24 will project into the notches 27^a in the under sides of the guide rods 23.

If it is desired to shift the tongues C from the position shown in Fig. 1 so as to bring them into operative position with reference to the rails B, the actuating rod 31 is first moved slightly in the direction indicated by the arrow *x* in Fig. 1 so as to withdraw the lugs 27 on the lock rods 24 from the notches 27^a in the under sides of the guide rods 23. After the guide rods 23 have been released the throw rod 15 is moved in the direction indicated by the arrow *x* in Fig. 1 so as to shift the tongues C into their other extreme position and thus bring the wheel-tread surfaces 2 thereon into alinement with the rails B of the crossing, the actuating rod 31 being thereafter moved farther in the direction indicated by the arrow *x* in Fig. 1 so as to force the lugs 26 on the lock rods 24 into the notches 26^a in the upper sides of the guide rods 23. If the operator has failed to move the tongues C clear over to their extreme positions the lugs 26 will strike against the solid portions of the guide rods 23, thereby notifying the operator that the tongues are not positioned properly. Consequently, in a crossing of the construction previously described there is no excuse for the operator to leave it in an unsafe condition for the tongues cannot be locked unless they are positioned properly. Another desirable feature of such a crossing is that breakage of one of the rods 16 does not prevent the tongue-shifting mechanism from performing its function for the other rod 16 will impart movement to the tongues. Likewise, if one of the toggles breaks this does not affect the shifting mechanism because the other three operative toggles connect all of the tongues together and cause them to move in unison. In view of the fact that the toggles of the locking mechanism are arranged between the rails of one track and the toggles of the shifting mechanism are arranged between the rails of the other track, a disarrangement or breakage of one set of toggles, say, for example, the toggles of the actuating mechanism, will

have no effect on the tongues for the locking mechanism which is arranged between the rails of the other track holds the tongues in position. Likewise, if the locking mechanism which is arranged between the rails B of one track should become damaged or broken when a train is passing over said rails, this would have no effect on the tongues for the toggles of the shifting mechanism, which are arranged between the rails A of the other track, would securely hold the tongues in position.

The head 25 of each lock rod is arranged in a housing which preferably consists of a cast metal member 32 of substantially inverted channel-shape in cross section that is provided on its inner side with guideways which receive guiding flanges 33 on the head of the lock rod, as shown in Figs. 10 and 11. Said housing is supported by means of a pair of truss-shaped plates 34 which are secured to the ties of the track, and also by means of a supporting plate 35 that is connected to one of the cross-pieces D³ of the base plate D, as shown in Figs. 1 and 9, which supporting plate 35 is also connected to the ties of the track. Each of the guide rods 23 is protected by means of a cover plate 37 connected at one end to the supporting plate 35 and at its other end to a lug or lateral projection 38 on the intermediate portion of the adjacent rail A, the inner end of said cover plate being substantially inverted V-shaped in cross section, as shown in Fig. 13, so that it will snugly embrace the lug 38 to which it is secured by a bolt 39 or other suitable fastening device. Guides 40 for the rods 23 are mounted on the supporting plates 35 and on the cross-pieces D³ of the base plate so as to hold the rods 23 parallel with the rails B. By mounting the lock rods and the guide rods in the manner above described I reduce the liability of said parts becoming displaced relatively to the tongues for the supporting plate 35 and cover plate 37, which carries said parts, are securely connected to the base plate and to the rails A. Cover plates 37^a are also provided for the rods 19 which form part of the tongue-shifting mechanism, and guides 40^a are employed to hold said rods parallel with the rails A between which they are arranged.

In Fig. 17 I have illustrated a crossing that is practically the same as the one shown in Fig. 1 except that detector bars F are connected to the locking mechanism by suitable links and levers so as to prevent the locking mechanism from being released when a train is in a certain zone.

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

1. A railway crossing provided with pivotally mounted tongues arranged at the in-

tersection of the rails, each of said tongues having a substantially arrow-shaped head that is provided with a pair of wheel-tread surfaces, means for shifting said tongues
 5 so as to bring one or the other wheel-tread surfaces thereon into operative position, and means for locking said tongues.

2. A railway crossing provided with pivotally mounted tongues that are arranged at
 10 the intersection of the rails, each of said tongues having a substantially arrow-shaped head that is provided with two wheel-tread surfaces, a connecting means which joins all of said tongues together, and means for ac-
 15 tuating said connecting means so as to shift the tongues simultaneously.

3. A railway crossing provided with wheel-tread members arranged at the inter-
 20 section of the rails, a substantially diamond-shaped connecting device for said members composed of four toggles which are pivotally connected to said members, an actuating mechanism connected to the two toggles that
 25 are arranged between the rails of one track, a locking mechanism cooperating with the toggles that are arranged between the rails of the other track, said locking mechanism comprising guide rods provided with notches,
 30 and lock rods provided with lugs that enter said notches when the wheel-tread members occupy certain positions.

4. A railway crossing provided with a plurality of movable wheel-tread members
 35 arranged at the intersection of the rails, stops projecting into openings or chambers on the under sides of said members to limit the movement of same, means for moving all of said members simultaneously to bring
 40 them into operative position with relation to one track and into inoperative position with relation to the other track, and means for locking said members in adjusted position.

5. In a railway crossing, a movable wheel-
 45 tread member arranged at the intersection of two rails and provided at one end with an end face that moves into and out of engagement with the terminals of the rails and at its other end with a curved end face that
 50 always remains in engagement with the portions of the rails with which it cooperates in both positions of said member.

6. A railway crossing provided with movable wheel-tread members arranged at the
 55 intersection of the rails, the portions of the rails which lie outside of said members being provided with surfaces for receiving the outer flanges of double-flanged wheels so as to raise or lift them upwardly onto said
 60 wheel-tread members, and the portions of the rails which lie between said members being wide enough to form a tread for the outer flanges of such wheels in passing over the crossing.

7. A railway crossing comprising a base
 65 plate, rails connected to said base plate and

arranged to form two intersecting tracks, substantially arrow-shaped tongues ar-
 ranged at the intersection of said rails to form wheel-tread members, toggles ar-
 70 ranged between said tongues for connecting them together, guide rods to which said toggles are pivotally connected, and means on the base plate for holding said guide rods in position.

8. A railway crossing having a base
 75 plate, substantially arrow-shaped tongues mounted on said base plate and arranged at the intersection of the rails of the crossing, and a three-point bearing on the base plate
 80 for the head of the tongue.

9. A railway crossing having movable wheel-tread members arranged at the inter-
 section of the rails of the crossing, the por-
 85 tions of the rails which lie between said wheel-tread members having wide wheel-tread surfaces, and means on the portions of the rails which lie outside of said wheel-tread members for raising the outer flanges
 90 of double-flanged wheels or lifting them upwardly onto said wheel-tread members.

10. In a railway crossing, a pair of mov-
 able wheel-tread members, a toggle arranged
 between said members and pivotally con-
 95 nected to same, a guide rod connected to said toggle, a lock rod having a head provided with an opening through which said guide rod passes, lugs on said head that cooperate
 100 with notches in said guide rod, a supporting plate having guides through which said guide rod passes, and a housing arranged at substantially right angles to said support-
 ing plate for receiving the head of the lock rod.

11. In a railway crossing, a pair of mov-
 105 able wheel-tread members, a toggle arranged between said members and pivotally connected to same, a guide rod connected to said toggle, a lock rod having a head provided with an opening through which said
 110 guide rod passes, lugs on said head that cooperate with notches in said guide rod, a supporting plate having guides through which said guide rod passes, a housing arranged at substantially right angles to said
 115 supporting plate for receiving the head of the lock rod, a cover plate extending over said guide rod, and a base plate having a portion to which said supporting plate is
 120 connected, one end of said cover plate being connected to one rail of the crossing.

12. A railway crossing having movable wheel-tread members arranged at the inter-
 section of the rails, toggles arranged be-
 125 tween said wheel-tread members in such a manner that they form a substantially diamond-shaped connecting means for said wheel-tread members, a shifting mechanism connected to two of said toggles for holding
 130 said wheel-tread members in adjusted position, and housings arranged over certain ele-

ments of said shifting mechanism and locking mechanism which lie between the rails of the track for protecting said elements and preventing them from being moved accidentally.

13. A railway crossing having movable wheel-tread members arranged at the intersection of the rails of the crossing, mechanism for shifting said wheel-tread members, mechanism for locking said members, and detector bars connected to said locking mechanism in such a manner that said mechanism cannot be released when a train is in a certain zone adjacent the crossing.

14. In a structure of the character described, a pair of rails or wheel-tread members arranged at approximately right angles to each other, a movable tongue that is adapted to be shifted into operative relation with either of said rails, a base plate on which said tongue rests, and a stop on said base plate projecting upwardly into a pocket on the under side of said tongue and having two right angularly-disposed surfaces that limit the movement of the tongue in opposite directions and thus cause it to aline with said rails.

15. In a structure of the character described, a base plate, a movable tongue mounted on said base plate and provided at one end with a pocket formed on the under side of same, a lug on said base plate that projects upwardly into said pocket so as to form a pivot for the tongue, and a transversely arranged device on the tongue that passes through an opening in said lug and thus prevents the pivoted end of the tongue from moving upwardly.

16. In a railway crossing, a movable wheel-tread member having a head that lies in notches or cut-out portions formed in two intersecting rails, a shank projecting outwardly from said head and pivotally connected at its outer end to a stationary support, and curved surfaces on said head on opposite sides of said shank which remain

in engagement with the rails in both positions of the wheel-tread member.

17. In a railway crossing, a movable wheel-tread member having a head that lies in notches or cut-out portions formed in two intersecting rails, a shank projecting outwardly from said head and pivotally connected at its outer end to a stationary support, curved surfaces on said head on opposite sides of said shank which remain in engagement with the rails in both positions of the wheel-tread member, and a stop arranged in a pocket on the under side of said head for limiting the movement of said member in opposite directions.

18. In a railway crossing, a pivotally mounted wheel-tread member arranged at the intersection of two rails of the crossing and having a head which is provided at one end with a curved surface which always remains in engagement with the rails, a stop that projects upwardly into a pocket on the under side of said member for limiting the movement of same in opposite directions, and cooperating means on said stop and member for preventing said member from moving upwardly.

19. In a railway crossing, a pivotally mounted wheel-tread member arranged in cut-out portions formed in two intersecting rails, a base plate that supports said tongue and rails, and notches in the heads of the rails which conform to the shape of the end face of said wheel-tread member, the base flanges of the rails being so formed that foreign matter cannot collect between same and the base portion of the wheel-tread member and thus prevent said member from moving to its extreme positions.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, the first day of December 1910.

HARRY F. ROACH.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.