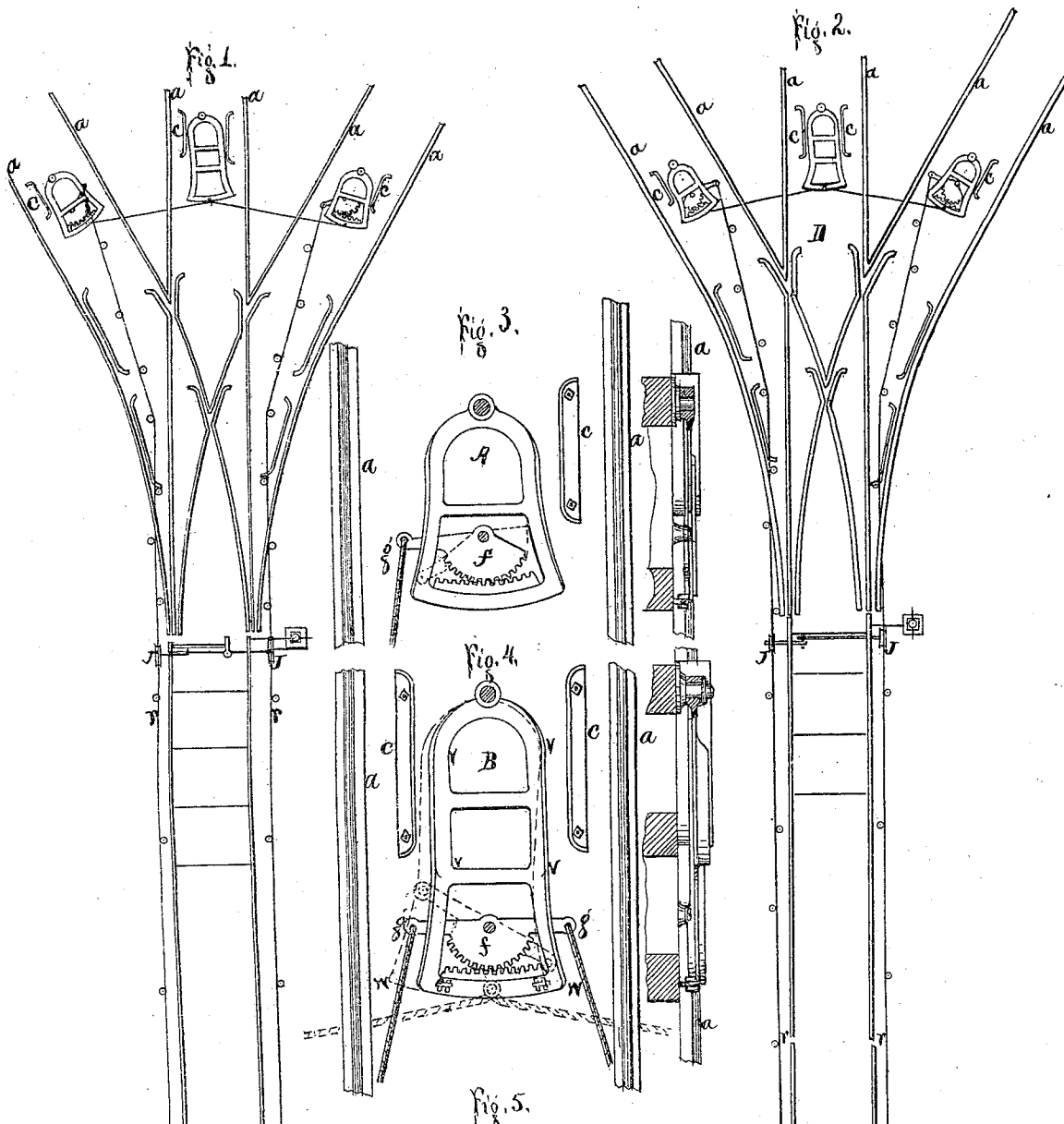


Improvement in Railway Switches.

No. 119,672.

Patented Oct. 3, 1871.



UNITED STATES PATENT OFFICE.

EDWARD A. TRAPP, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-FOURTH OF HIS RIGHT TO HENRY J. HUTTNER, OF SAME PLACE.

IMPROVEMENT IN RAILWAY SWITCHES.

Specification forming part of Letters Patent No. 119,672, dated October 3, 1871.

To all whom it may concern:

Be it known that I, EDWARD A. TRAPP, of the city and county of San Francisco and State of California, have invented a new Switch and Signal-Setting Machine, of which the following is a specification:

The purpose of the invention is to operate switches and signals from the cars; and its general nature consists in moving the switch-tongues by ropes connected with cams placed on the track at considerable distances from the switch each way, and operated by one or more set bars under the control of the operator on the car.

Figures 1 and 2 are top views of my machine applied to a straight track having two side-tracks from the same point. Fig. 3 is a top and side view of a single cam and its adjuncts in place. Fig. 4 is a top and side view of a double cam and adjuncts in place. Fig. 5 is a view transverse to the track of a cow-catcher and cam. Fig. 6 is a view in line with the track of the under-ground machinery. Fig. 7 is a view of the same transverse to the track. Fig. 8 is a sketch showing the set-bar in place. Fig. 9 shows a lamp and signal. Fig. 10 shows two kinds of set-bar and the mode of operating it.

Like letters refer to the same parts in all the figures. The term "car" is intended to embrace also the locomotive.

For the sake of convenience and clearness I shall give the purpose and operation of each part as I describe it.

The rails are indicated by *a* and the ties by *b*. The single cam *A* consists of an iron frame of the general form shown. Its vertical face, on each exterior side, is made wider by a flange, shown by the dark side lines in the top view of Fig. 3. The cam swings on a pin through its head secured to a tie midway between the rails. The guide-rail *c*, of angle iron and bent outwardly at the ends, is placed near the head of the cam. The set-bar *d* plays vertically in any properly-constructed frame beneath the car, and is located in line with the space between the cam-face and the guide-rail. On its lower end is the friction-roller *e*. There are two of these set-bars, one for each side of the cam. It is operated as shown in Fig. 10, or in any other convenient manner. By lowering it before the car reaches the head of the cam, its roller *e* passes between the guide-rail and the face of the cam and gra-

dually swings the tail of the cam toward the opposite side of the track. It will be observed that the first part of the cam-face reached by the set-bar is almost in line with the track, and that the cam-face gradually curves outwardly. This causes the cam to give an accelerated motion, slow at first, to accommodate inertia, and more rapid afterward. All the other movements are derived from that of the cam thus produced. Between the sides of the cam vibrates the cogged sector *f*, playing into the inside gear on the interior of the rim of the cam, and carrying one or more arms *g g*. Instead of teeth or cogs for the communication of motion from the cam to the sector, chains or ropes connecting their diagonally-opposite corners may be employed. The tail of the cam is supported by a pair of small friction-rollers. By this means the ends of the arms are made to move a considerable distance and mainly in the line of the track by a slight movement of the face of the cam transverse to the track. Beneath the extremities of the switch-tongues are placed two shafts, *h h*, in proper boxes, and connected by a pinion, *i*, on each shaft of the same size, so as to cause them to turn with the same speed in opposite directions. On each shaft, at a convenient distance outside the rail, is a flanged drum, *j*. To one of these shafts is attached the cogged sector *k*, which plays into the pinion *l* on the counter-shaft *m*, arranged to turn at considerable distance below the outer two, and parallel with them. The lower or counter-shaft *m* is furnished with a worm-screw, *n*, in which works the toothed lever *o*, pivoted to the stationary frame-work, and having its upper end pinned through a vertical slot to the iron rail-tie *p* nearest to the movable ends of the switch-tongues. By turning either drum it will be seen that the switch-tongues will be moved laterally by means of the gearing described, and that the switch will be constantly locked by the worm-gear. The drums are turned by means of wire ropes or chains *r* running from the sector-arms *g*, guided and supported in a proper manner by pulleys to the drums *j*, to which they are attached by being looped to the heads of bolts which pass freely through a radial plate secured to the drum across its face. By turning the nuts on these bolts all slack in the rope can be taken up. For convenience and emergencies a lever, *t*, is prepared for one end of

M. P. Warner & E. W. Payne. Lock.

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Fig. 1

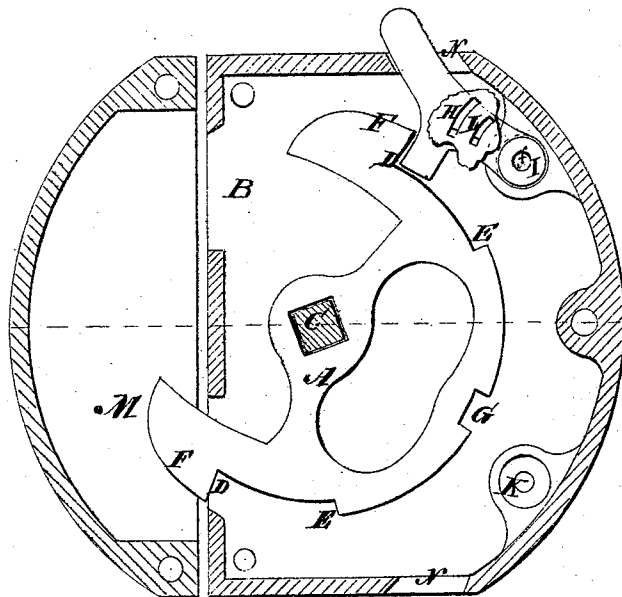


Fig. 2.

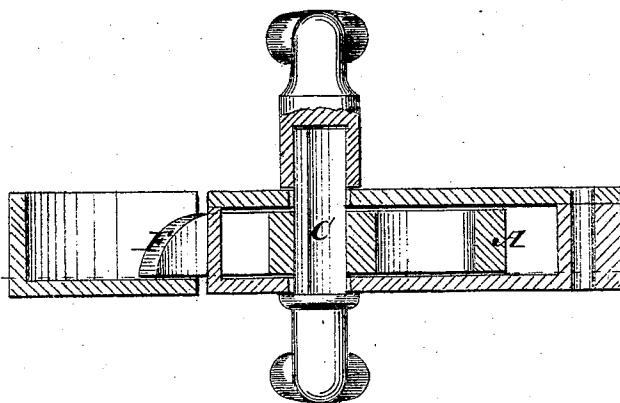


Fig. 3.



Witnesses:

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Attorneys.

1. The first part of the document

describes the general situation

and the main objectives of the study.

2. The second part of the document

describes the methodology used

to collect and analyze the data.

3. The third part of the document

describes the results of the study

and discusses the implications of the findings.

4. The fourth part of the document

describes the conclusions of the study

and provides recommendations for future research.

5. The fifth part of the document

describes the limitations of the study

and provides a summary of the findings.

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