No. 648,781. Patented May 1, 1900.

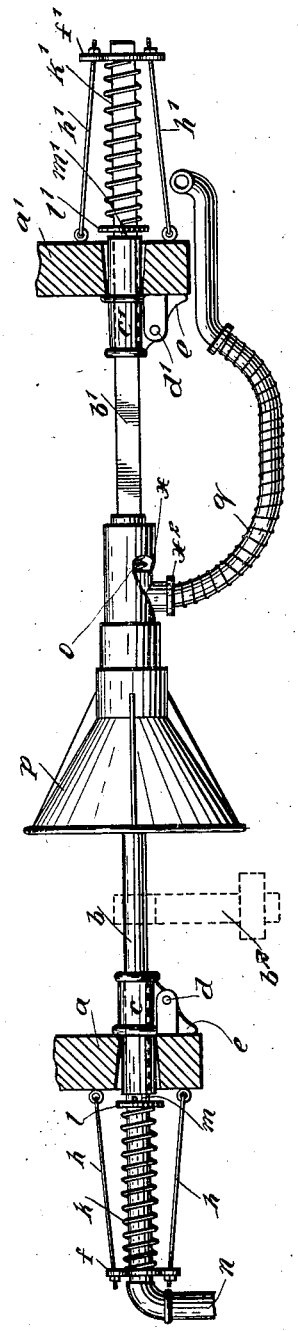
T. H. PATCHING & R. H. FINCH.

AUTOMATIC COUPLING FOR AIR BRAKES.

(Application filed Sept. 25, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1



WITNESSES:

J. F. Brophy

John Lotka

INVENTORS

Thomas H. Patching

Robert H. Finch

ATTORNEYS

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Fig. 2

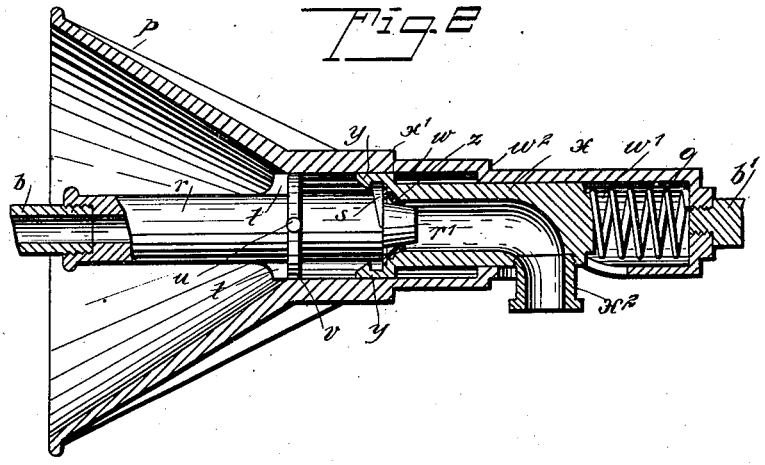


Fig. 3

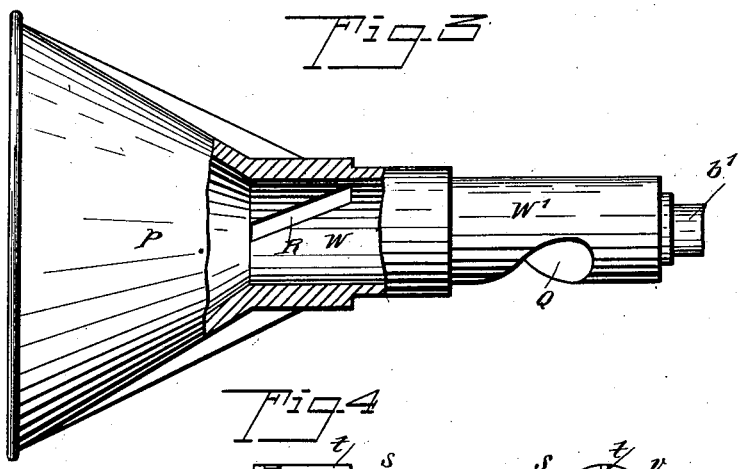


Fig. 4

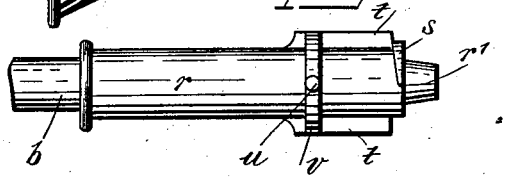


Fig. 5

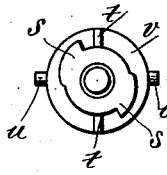


Fig. 6

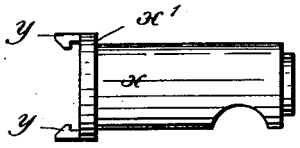
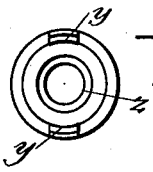


Fig. 7



WITNESSES:

J. A. Brophy

John Lotka

INVENTORS

Thomas H. Patching

Robert H. Finch

By Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS HENRY PATCHING, OF STRATHFIELD, AND ROBERT HOSKINS FINCH, OF BURWOOD, NEW SOUTH WALES.

AUTOMATIC COUPLING FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 648,781, dated May 1, 1900.

Application filed September 25, 1899. Serial No. 731,696. (No model.)

To all whom it may concern:

Be it known that we, THOMAS HENRY PATCHING, tailor, of Strathfield, and ROBERT HOSKINS FINCH, builder, of Burwood, in the Colony of New South Wales, have invented certain new and useful Improvements in Automatic Couplings for Air-Brakes; and we do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

Our invention consists of an automatic coupling for air-brakes for use on railway rolling-stock; and its object is to provide a means whereby the air-brakes can be connected and disconnected without the necessity of the operator going between the carriages.

Referring to the drawings, in which similar letters of reference indicate the same parts in all the views, Figure 1 is an elevation showing the invention complete. The position of the coupling indicated in this drawing is the first point of contact between the two parts (hereinafter called the "male" and "female" portions) before pressure has been applied to drive them home. Fig. 2 shows a vertical section through the female connection with the male connection partly in elevation, the positions being the same as in Fig. 1. Fig. 3 shows a partial section of the female connection. Fig. 4 is an elevation of the male connection. Fig. 5 is an end view of Fig. 4. Fig. 6 is an elevation of hollow piston which works inside the cylinder of female connection, as hereinafter described. Fig. 7 is an end view of Fig. 6.

In Fig. 1, a and a' are the ends of the two vehicles, the portions shown representing the sole-plates in section. b is a round tube which forms a part of the male portion of the coupling. This tube passes through the sole-plate a, as shown, being supported by a bracket c, in which it moves freely. The bracket c, a portion of which also passes through a tapered hole in the sole-plate, is attached thereto by means of a knuckle-joint d and is provided with a heel e for the purpose of maintaining the coupling in a horizontal position and keeping it at right angles to the sole-plate. On the other side of the sole-plate—that is, underneath the vehicle—the tube b passes through a collar f, which is attached to the sole-plate by means of the stays h h. k is a strong spiral spring which surrounds the tube b, as shown, being confined at the one end by the collar f and at the other by the loose disk or washer l, which is held in position by the pin m. This spring is provided for the purpose of keeping the male connection r pressed forward into the required position and of allowing for the backward and forward play of the carriages when connected and in motion. n is the air-supply pipe. b' is a square metal bar which forms the part of the female portion of the coupling corresponding to the tube b of the male portion. This bar passes through the sole-plate a' in a manner similar to that in which the round tube b passes through the sole-plate a, excepting that the passage-way through the bracket c' must necessarily correspond to the section of the bar b'. The spiral spring k' and the attachments f', h', l', and m' correspond exactly to the similar parts already described in the male portion. p is the bell-shaped orifice of female connection, as hereinafter described. q is an air-pipe.

In Fig. 2, r is the male connection, attached to tube b, and consists of a hollow cylinder ending in a tapered nozzle r', as hereinafter described. s is one of two tapered gripping-lugs, the other being on the opposite side of the cylinder, as shown clearly in Fig. 5. t t are two longitudinal guide-pieces lying along the cylinder r, as shown clearly in Figs. 4 and 5. u is one of a pair of pins projecting on either side of the male connection, both of which are clearly shown in Fig. 5. v is a guide-collar consisting of a disk surrounding the cylinder r. (Also clearly shown in Figs. 4 and 5.) The internal area of the female connection consists of two cylinders of unequal diameter, the first, w, being of the same diameter as the inner end of the bell-shaped orifice p, the other, w', somewhat smaller, so as to form a shoulder w^2 for the purpose hereinafter described. x is a hollow piston which slides in the smaller cylinder w', having a collar x', fitting the larger cylinder w, as shown. x' is an air-pipe connection fitted into the

piston x at right angles thereto. Attached to the collar x' are a pair of grips $y\ y$ for the purpose of locking the lugs $s\ s$, as hereinafter described. (See also Figs. 6 and 7.) The mouth of the hollow piston x, into which the nozzle-piece r' of the male connection intrudes, is fitted with a tapered rubber ring or washer z for the purpose of insuring an air-tight joint between the male and female portions. o is a spiral spring acting on the closed end of piston x for the purpose of pressing the latter forward into the position necessary to establish and maintain a connection with the male portion.

In Fig. 3, which shows female connection partially in section, R is one of a pair of right-handed helical slots or channels into which the projecting pins $u\ u$ on the male connection fit and by means of which the latter is partially rotated for the purpose of locking the connection, as hereinafter described. Q is a left-handed helical opening in the under portion of the cylinder w' of the same pitch as the helical slots R R.

The method by which our brake operates is as follows: When the carriages are detached, the male and female portions of the coupling stand out in horizontal positions, in which it is essential that they should be maintained by the brackets c and c'. It is also essential that in the male connection the projecting-pins $u\ u$ should be in a horizontal position. It will probably be found in practice that the weight of the supply-pipe n will be sufficient to maintain this latter position in the male connection; but should it be deemed advisable a weighted lever b^2 may be attached to the under portion of tube b, as indicated by dotted lines in Fig. 1. On the vehicles being run together the male connection enters the orifice of the female connection, the said orifice being made bell-shaped, so as to insure entry should one of the vehicles be more heavily loaded than the other or should the coupling take place on a curve, the tapered holes in the sole-plates allowing for the necessary play in all directions. The horizontal cross-pins $u\ u$ enter the helical slots R R (the points of entrance to which are also horizontally set) at the same time that the conical nozzle r' enters the mouth of the hollow piston x. The connection being thus established and the air-channel completed through tubes b and q, the continued pressure of the two vehicles coming together causes the cross-pins $u\ u$ to travel along the helical channels R R, thus causing the male connection to revolve in one direction, while the forward pressure of the male connection r forces the sliding piston x backward along the cylinder w', the spring o being somewhat weaker than the main spiral springs $k\ k'$. This backward movement of piston x, carrying the pipe connection x^2 along the left-handed helical opening Q, causes the piston x to rotate in the opposite direction. These two opposite rotary movements of the separate parts, as described, forces the tapered lugs $s\ s$ under the grips $y\ y$, thus securely locking the connection, which cannot become unlocked till the vehicles are separated, when the mere act of withdrawal reverses the action above described and releases the connection.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. The combination in an automatic air-brake coupling of the tube b; the tube r having a nozzle-piece r', taper-lugs $s\ s$, horizontal guide-pieces $t\ t$, disk v, cross-pins $u\ u$, the whole being secured to the sole-plate of the vehicle, and controlled by the spring k; the bracket c fitted with the knuckle-joint d, and heel e, for the purposes set forth.

2. The combination in an automatic air-brake coupling of the cylinder w provided with the helical channels R, R, and having a bell-shaped mouth; the cylinger w', having the helical opening Q; the sliding piston x with the pipe connection x^2 set at right angles thereto, provided with a tapered rubber mouthpiece z, the shoulder x' grip-pieces $y\ y$; the bar b'; and the spring o for the purposes set forth.

3. In an automatic air-brake coupling, the combination, with a male portion secure to one car and provided with cross-pins, of a female portion secured to another car and comprising a hollow cylinder provided with helical channels adapted to receive said cross-pins, and connecting devices located on the male portion and the female portion respectively and adapted to be brought into engagement with each other through the coöperation of the pins on the male portion with the helical channels of the female portion.

4. In an automatic air-brake coupling, the combination, with a male portion mounted to turn on one car and provided with projections upon its outer surface, of a female portion secured to another car non-rotatably and provided with helical channels adapted to receive said projections, and connecting devices located on the male portion and the female portion respectively and adapted to be brought into engagement with each other through the coöperation of the pins on the male portion with the helical channels of the female portion.

5. In an automatic air-brake coupling, the combination, with a male portion mounted to turn on one car and provided with projections upon its outer surface, of a female portion secured to another car non-rotatably and provided with helical channels adapted to receive said projections, and with a helical opening located in the rear of said channels, a hollow piston mounted to slide and turn in said female portion and having an air-pipe connection passing through and engaging said helical opening, and connecting devices located respectively on said piston and on the male portion of the coupling and adapted to be

brought into engagement with each other through the coöperation of the said pins and channels.

6. A coupling, comprising a tubular male member, a tubular female member having a flaring mouth, brackets in which said coupling members are adapted to slide and pivoted to the respective cars about horizontal axes, means for connecting the free ends of the coupling members, and springs for throwing said members forward in the brackets.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

THOMAS HENRY PATCHING.
ROBERT HOSKINS FINCH.

Witnesses:
WALTER SIGMONT,
F. C. ALLEN.