

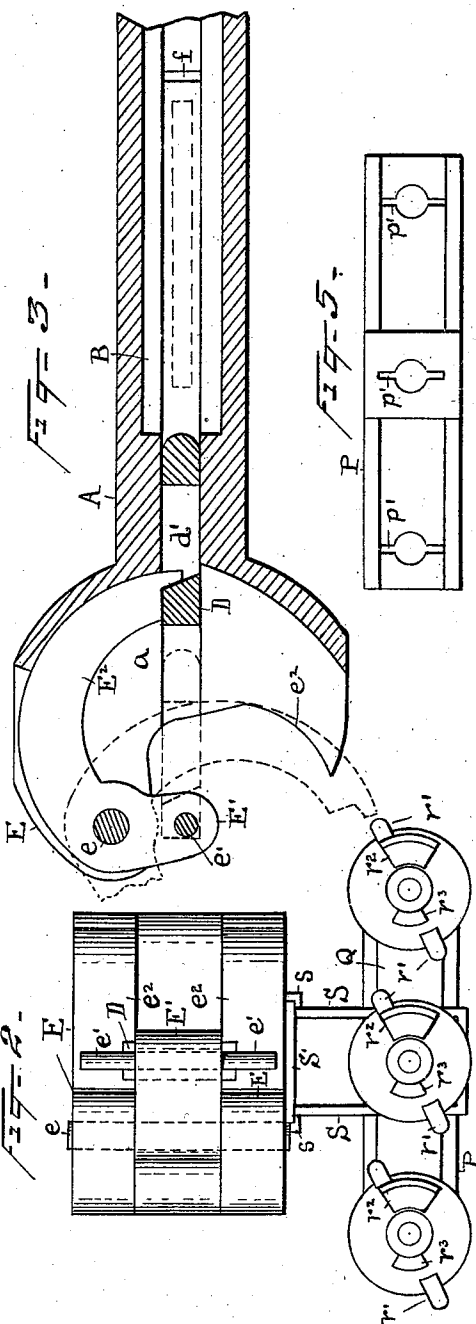
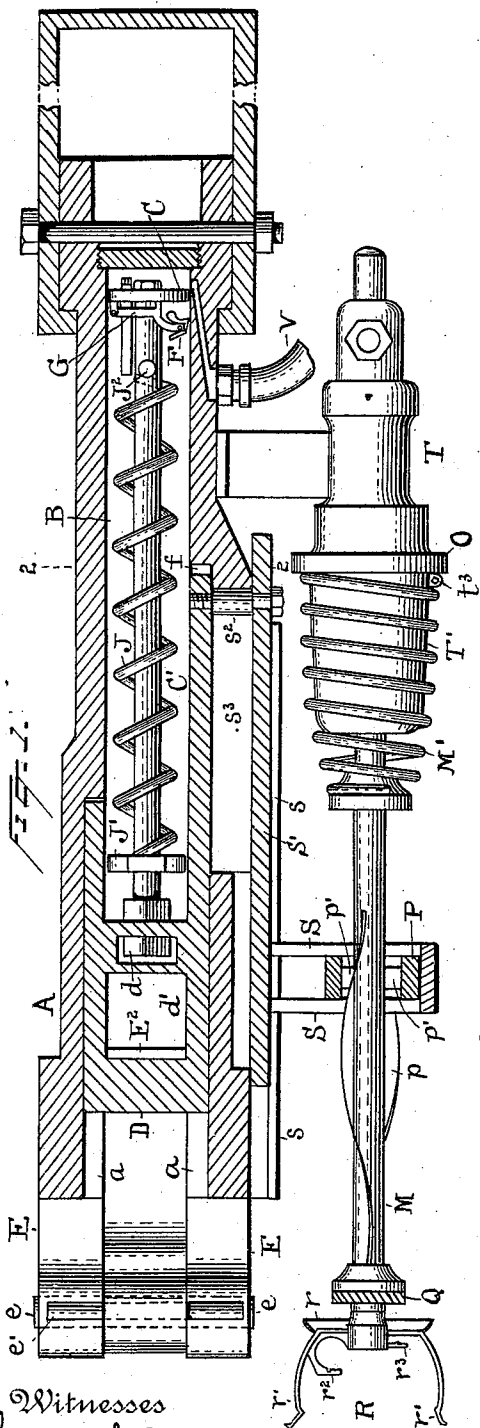
(No Model.)

3 Sheets—Sheet 1.

C. L. BANCROFT.
CAR AND AIR PIPE COUPLING.

No. 574,597.

Patented Jan. 5, 1897.



Witnesses
Lorris A. Clark
Jno. R. Saylor

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By his Attorneys
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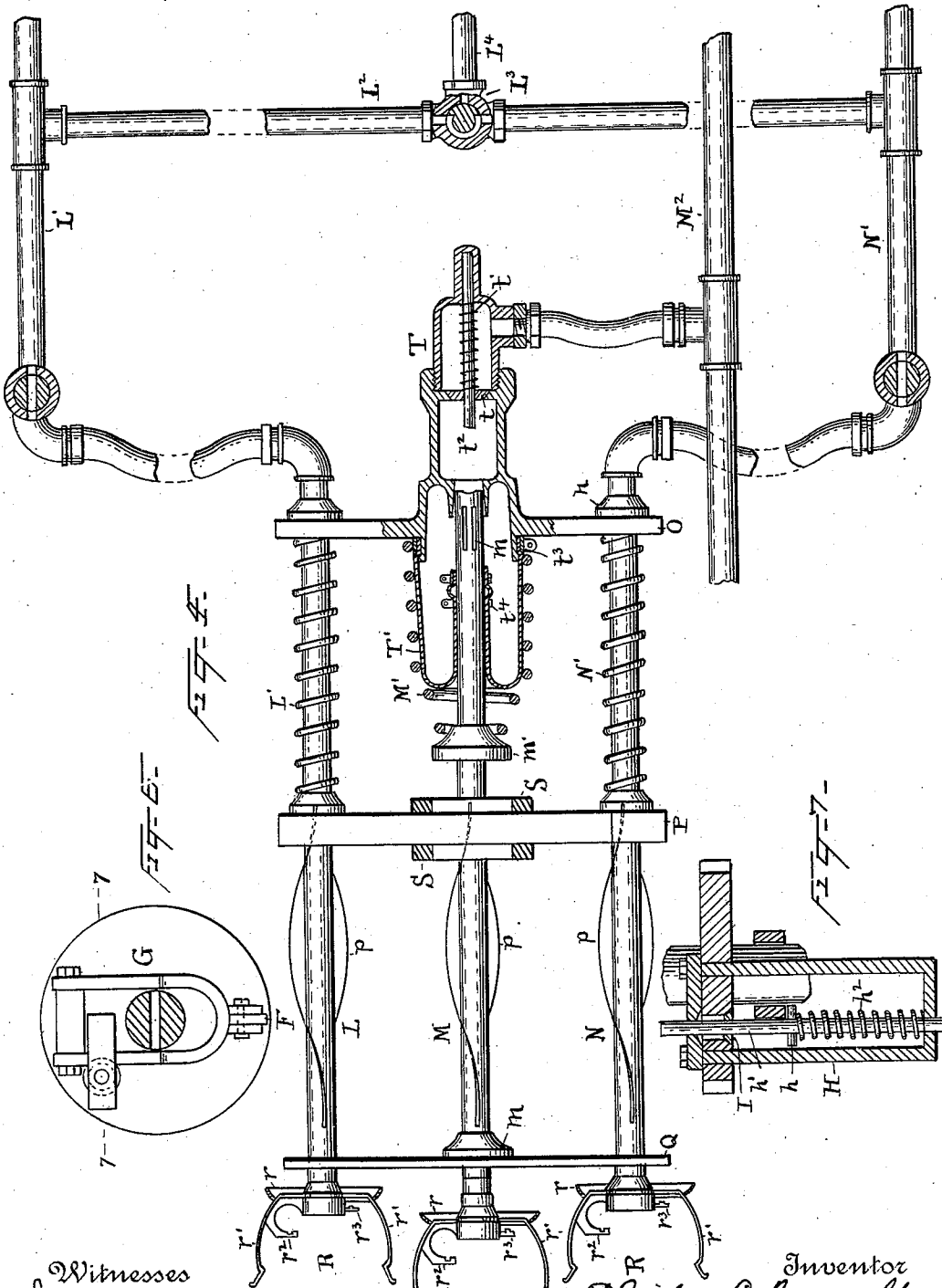
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3 Sheets—Sheet 2.

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CAR AND AIR PIPE COUPLING.

No. 574,597.

Patented Jan. 5, 1897.



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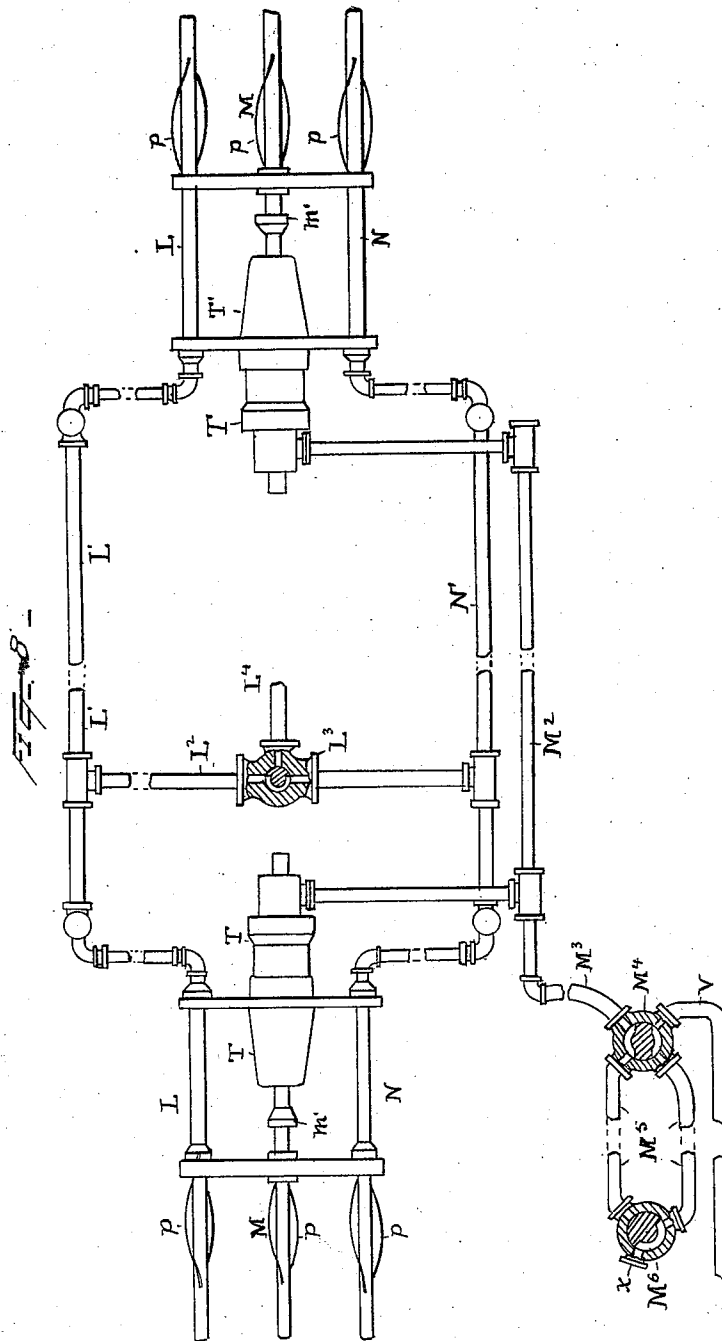
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3 Sheets—Sheet 3.

C. L. BANCROFT.
CAR AND AIR PIPE COUPLING.

No. 574,597.

Patented Jan. 5, 1897.



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UNITED STATES PATENT OFFICE.

CLINTON L. BANCROFT, OF BROWN'S, NEVADA.

CAR AND AIR-PIPE COUPLING.

SPECIFICATION forming part of Letters Patent No. 574,597, dated January 5, 1897.

Application filed July 21, 1896. Serial No. 600,017. (No model.)

To all whom it may concern:

Be it known that I, CLINTON L. BANCROFT, a citizen of the United States, residing at Brown's, county of Humboldt, and State of Nevada, have invented a certain new and useful Improvement in Car and Air-Pipe Couplers, of which the following is a specification.

My invention relates to automatic car and air-pipe couplers; and it consists in the novel devices and combination of devices herein-after more fully specified, and pointed out in the claims.

In the accompanying drawings, which illustrate my invention, Figure 1 is a central longitudinal section of my improved apparatus, showing the air-pipes and pipe-couplings; Fig. 2, a front view of the apparatus; Fig. 3, a partial plan view and partial section of the car-coupler and illustrating its unlocked position in dotted lines; Fig. 4, a plan view and partial section of the piping at each coupler; Fig. 5, a front view of a yoke or guide-plate for the air-pipe couplers; Fig. 6, an enlarged view of the piston-head and its attachments; Fig. 7, a longitudinal section on the line 7 7 of Fig. 6, and Fig. 8 a diagram illustrating the piping under each car.

Referring to the drawings, A is the draw-head of a car, the rear end of which is provided with a cylindrical chamber B for the piston C.

D is a locking and unlocking head working in grooves *a a* in the draw-head. To the inner end of the head D at *d* is rigidly attached the piston-rod C' of the piston C by any suitable means.

E E are the hooked ends of the draw-head, of a well-known form, between which the coupler E' is pivoted by a pin *e*. The coupler E' has a long curved arm E², which extends rearward, and the head D in its normal position, *i. e.*, the locked position, stands in the path of arm E² and prevents the same moving over the center line of the draw-head, thus holding the coupler in its locking position.

To release the coupler, it is necessary to remove head D from the path of arm E². This is done by moving the head forward through piston C a sufficient distance to allow the arm E² to pass through the opening *d'*, as indicated in dotted lines in Fig. 4. The piston C has a latch F, suspended by a clevis G, attached to

the piston-head, and when the piston-head reaches the line 2 2, Fig. 1, the limit of its forward movement, as it does when the car-coupler is in its unlocked position, the latch F drops down into the recess at *f'*, formed by the groove for the base of the head D, and as the piston is moved backward a short distance by the car-couplers striking against each other the clevis G is retarded by the latch F, and the left leg of the clevis G strikes a pin *h*, Fig. 7, on the valve-stem *h'*, which is supported by the frame H, attached to the piston-head. This action lifts the valve I from its seat on the piston-head against the tension of its spring *h*², opening the valve and reducing the pressure behind the piston.

J, Fig. 1, is a spring which forces the piston C to its normal position when the air-pressure is reduced by the opening of valve I.

J' is a yoke having two arms *k*, entering slots in the sides of the draw-head to rigidly secure the same in position, and this yoke is employed to form a seat for the spring J. This yoke has a central opening through which the piston-rod C' works freely. The other end of the spring J is seated against the pin J² on the piston-rod. This pin passes horizontally through the piston-rod so, as to clear the frame H. The coupler E', when it enters an opposite coupler, is moved into locking position by the pins *e'* engaging with the curved surfaces *e*² of the draw-head.

Under the draw-head the pipes L M N are located in a horizontal line, the pipe L being for the air signaling device, the pipe M for supplying air to operate the piston C in coupling the cars, and pipe N is for conveying the air to the air-brakes. These pipes are supported by means of two stationary yokes O and Q and a movable yoke P. The pipe M is designed to project a short distance in advance of the pipes L and N and beyond the draw-head, so that pipes M of adjacent cars strike each other in advance of the other couplers, thereby moving pipes M lengthwise in their bearing and opening valves *t*, to be hereinafter referred to.

The air-pipe couplers for the pipes L, M, and N are shown at R rigidly secured to the pipes. The couplers consist of a disk *r*, to which are rigidly attached the spring-fingers or clamping-jaws *r'*. In addition to these

parts each coupler has two locking-arms r^2 and r^3 , which interlock with similar arms r^3 and r^2 , respectively, on the opposite coupler. The clamping-jaws are of sufficient length and of such form as to project beyond the ends of the pipes and to snap over the edge of the disks r and hold the couplers in line while the locking mechanism is operated. The relative positions of the clamping-jaws and the locking-arms of each coupler are the same as illustrated in Fig. 2.

The movable yoke P is carried by the double frame S, secured to a slide S', which works in channels formed by the flanges s and s' , Fig. 1. The slide S' is secured to and moves with the head D by means of a bolt having a roller s^2 , which travels in a slot s^3 in the under side of the draw-head. The air-pipes are each provided with spiral ribs p , which work in the slots p' in the yoke P. The object of the spiral ribs p is to rotate the pipes L, M, and N when the movable yoke P is moved back and forth. This rotation of the pipes effects the locking and unlocking of the couplers R. In the normal position of the couplers the locking-arms r^2 and r^3 stand in the locked position, and when two cars are brought together and the piston of the draw-head is operated the yoke P is moved forward simultaneously with the head D, which forward movement of the yoke P rotates the pipes and couplers to the left, (when facing the couplers,) which brings the locking-arms to the unlocked position, so that the locking-arms of opposite couplers will clear each other when the couplers are clamped together by the clamping-jaws r' , and when the piston C returns to its normal position, carrying with it the head D, the yoke P is moved backward to its original position, and the pipes L, M, and N are rotated toward the right, causing the locking-arms r^2 and r^3 to engage and lock the couplers against separation.

The pipes L, M, and N are capable of lengthwise movement through the stationary yokes O and Q, and springs L', M', and N' are provided for forcing the pipes forward, and when the couplers of opposite pipes strike each other in coupling the cars they are moved backward a short distance, so that part of the spiral ribs of each of the pipes project beyond the inner side of the yoke P, as indicated in Fig. 1. The forward movement of pipes L, M, and N through the springs is limited by collars l , m , and n , rigidly secured to the pipes and which strike the stationary yokes O and Q.

In locking the air-pipe couplers the couplers on one car remain stationary, while the couplers on the opposite car are given a quarter-revolution by the movement of the yoke P. This quarter-revolution gives the full locking position.

The object of having the spiral ribs project to the rear of the yoke P after the pipes L, M, and N of adjacent cars are coupled is to provide for the automatic uncoupling of those

pipes should the adjacent cars become uncoupled at the draw-head. The separation of the cars will place a strain upon the pipes L, M, and N, and as they are each drawn forward in their yokes P the short lengths of the spiral ribs projecting to the rear of yoke P will produce one-eighth of a revolution of each of the pipes to the left, and this one-eighth revolution of opposite pipes will be the equivalent of a quarter-revolution of one of them, thus causing the unlocking of the locking-jaws r^2 and r^3 and permitting the separation of the opposite pipe-couplers.

Pipes L and N are for conveying the air-pressure from the locomotive to the air-brakes and for operating the air-signals. The pipe M is for conveying air-pressure to the piston-chamber of each of the draw-heads for unlocking the car-couplers. The pipes M at each coupler are provided with a valve-chamber T, within which is a valve t , held to its seat by a spring t' . From this valve-chamber extends a pipe which connects with the pipe V, leading to the piston-chamber, Fig. 1. The valve t is opened by the closed end of the pipe M striking the valve-stem t^2 when the pipe M is moved backward, as above explained. To permit the entrance of air from the pipe M to the valve-chamber T, ports m are provided in the pipe M. To prevent the escape of air from the pipe M, I provide a flexible chamber T', which is secured to the casting T by suitable bands or clips t^3 and to the pipe M by two similar clips t^4 . Surrounding the flexible chamber is the spiral spring M', one end of which is secured at the valve-chamber T and the other end is secured to a collar m' , which is rigidly secured to the pipe M. This spring has a strong left tension, which assists in revolving the pipe M to the left and also tends to push it forward, as before stated.

The pipe connections under each car are illustrated in Fig. 8. In this figure the pipes L of each coupler are connected by a pipe L' and the pipes N by a pipe N', and these two pipes are connected by a cross-pipe L², having a cock L³, by means of which either branch L' or N' may be connected with the air-brakes. From the cock L³ extends a pipe L⁴, leading to the air-brake cylinder. The pipes M at each coupler are connected by piping M², from which extends a pipe M³ to one port of a four-way cock M⁴. From another port of this cock extends the pipe V, leading to the piston-chamber of the draw-head. From the other two ports of this cock extend pipes M⁵ to a three-way cock M⁶, having an exhaust-port α .

At the locomotive are located three cocks, two of which, one at the forward end of the locomotive and one at the rear end of the tender, are what may be termed "cross-over" cocks for crossing the connections from the pipes on the locomotive, on one of which is located the engineer's brake-controlling valve and on the other of which is located the air-signaling apparatus, and which two pipes connect, respectively, with the pipes L and N on the ad-

jacent car. The object of these cross-over cocks is to enable the proper connections to be made with the line of piping for the air-brakes and the line of piping for the air-signals; that is to say, if the line N and N' is used for conveying the air to the air-brakes in going in a certain direction the connection of that line of piping with its supply-pipe at the locomotive would have to be reversed when the locomotive is turned and brought around to the opposite end of the car to run in the opposite direction. For instance, if the locomotive were located at the left-hand end of Fig. 8 the pipe on the locomotive which connects with the pipe N would, in case the locomotive were reversed and connected at the right-hand end, connect with the pipe L. To obviate this, the cross-over cock is employed, which would reverse the connections between the pipes L and N on the car and the pipes on the locomotive leading to the air-brake valve and to the air-signal apparatus, respectively, without the necessity of reversing the cocks L³ at each car. The third cock at the locomotive is the main cock leading from the air-tank to the line of piping M. This is preferably a two-way cock with an exhaust-port and connects with a coupler at the forward end of the locomotive and with a coupler at the rear end of the tender, and the object of which is to direct the air from the tank in the proper direction for operating the couplers.

The cocks just referred to need not be shown, since they can be of any suitable construction.

The operation of the apparatus is as follows, assuming that Fig. 8 represents the piping of a car which is coupled to a locomotive at the right-hand end of that figure: To couple this car to a car at the left, it is necessary to admit air to the piston-chamber of the car-coupler located above the pipes L, M, and N at the left of Fig. 8. The piping L, M, and N at the right of this figure being connected to the locomotive and assuming that air is only supplied to the pipe M at the right, the air will enter through valve *t* in the valve-chamber T at the right through the piping M² to the valve M⁴, it being understood that valve *t* was opened when the locomotive coupled to the car by forcing pipe M backward. No air will pass out through the pipe M at the left of Fig. 8, since the valve in the chamber T at that point is closed. The cock M⁴ is now given a quarter-turn, so that communication will be opened between the pipe M³ and the pipe V. This will permit the air to flow to the piston-chamber of the draw-head at the left end of the car. The piston will now move forward, shifting the head D forward and moving the knuckles E' and E², Fig. 3, to the position shown in dotted lines. The piston is moved forward a distance sufficient to permit the latch F to drop into the slot *f*, which is the extreme forward position of the piston, when the cock M⁴ should be moved a step further to shut off communication be-

tween pipes M³ and V, thus shutting off the supply of air to the piston-chamber, but without opening communication between pipe V and the exhaust-port *x* of cock M⁶. As the car-coupler strikes the car-coupler of the opposite car the head D is forced backward, tripping the latch F and opening the relief-valve I, at which time the cock M⁴ should be returned to the position shown in Fig. 8, thus opening communication from pipe V to exhaust-port *x* of cock M⁶. This permits the spring J to force the piston C to its normal position, at the same time closing the coupler, which is the position illustrated in full lines, Fig. 3. The forward-and-backward movement of the piston also operates the pipes L, M, and N, as before stated, resulting in the coupling of those pipes with the corresponding pipes of the opposite car, and during this operation the valve *t* in the chamber T at the left of Fig. 8 is opened and the air from the piping M² passes on to the piping M² of the opposite car, which has just been coupled up. The same operation is repeated on the next car in coupling to a third car, and so on. The cock M⁴ is preferably located, in the case of a box-car, underneath the car-body within reach of the brakeman on the ground, and the cock M⁶ is designed to provide means for operating the couplers from the top of the car. It may be stated here that in the case of a passenger or flat car the cock M⁴ may be omitted entirely and the cock M⁶ only be placed, one on each end, on diagonally opposite corners of the car. If it should be considered desirable to provide for operating this coupler from all four corners of a car, the two cocks M⁴ and M⁶ will be connected at each end, as in Fig. 8, and further service may be obtained by placing the cock M⁴ at the top of a box-car and interposing two cocks M⁶ at each lower corner. In using the cocks M⁶ in conjunction with the cock M⁴ both are allowed to remain in the position shown in Fig. 8, and to operate the coupler the ports in cock M⁶, opening communication between the piping M³, are operated, so that the air will flow through the pipe M³, the upper pipe M⁵, through the cock M⁶, through the lower pipe M⁵, through the cock M⁴, and into the pipe V.

The cock L³ (illustrated in Fig. 8) shows the communication between the pipes L' and N' open and the air to the air-brake cut off. To establish communication between the pipe N' and the pipe L⁴, the cock is adjusted so that the ports leading from N' to L⁴ are in communication between these pipes and the pipe L' shut off, and this will permit the use of the piping L' for the air-signals and N' for the air-brakes. To employ the piping L' for the brakes, these connections are reversed. If it should be desired to use both lines L' and N' for the air-brakes, the cock is given a half turn from the position shown in Fig. 8, which will open communication between the pipes L', N', and L⁴.

What I claim is—

1. In an automatic car-coupler, the combination with the draw-head and a coupler carried thereby, of a movable head for locking the coupler in its operative position and adapted to move said coupler to its inoperative or uncoupled position, a piston operated by suitable pressure for moving said head out of locking position, and a spring for returning said head to its normal position, substantially as set forth.

2. In an automatic car-coupler, the combination with the draw-head carrying a pivoted coupler having a curved arm, of a reciprocating head in the path of movement of said arm for holding the coupler in locking position, a piston operated by suitable pressure for moving said head out of locking position and thereby swinging said coupler out of locking position, and a spring for returning said head to its normal position, substantially as set forth.

3. In an automatic car-coupler, the combination with the draw-head carrying a pivoted coupler having a curved arm, and a reciprocating head in the path of movement of said arm for holding the coupler in locking position, a piston operated by suitable pressure for moving said head out of locking position and thereby swinging said coupler out of locking position, a spring for returning said head to its normal position, and an automatic relief-valve in the piston for reducing the pressure behind the piston, substantially as set forth.

4. In an automatic car-coupler, the combination with the draw-head carrying a pivoted coupler having a curved arm, of a reciprocating head in the path of movement of said arm for holding the coupler in locking position, a piston operated by suitable pressure for moving said head out of locking position and thereby swinging said coupler out of locking position, a valve in the piston, means for opening said valve on the backward stroke of the piston, and a spring for returning said head to its normal position, substantially as set forth.

5. In an automatic air-pipe coupler, the combination with the pipe, of clamping-jaws adapted to engage with an opposing coupler, locking-jaws for locking opposing couplers when held by the clamping-jaws, and means for automatically operating said locking-jaws by the bringing together of the two couplers, substantially as set forth.

6. In an automatic air-pipe coupler, the combination with the pipe, of clamping-jaws adapted to engage with an opposing coupler, rotary locking-jaws for locking opposing couplers when held by the clamping-jaws, and means for automatically rotating said locking-jaws by the bringing together of the two couplers, substantially as set forth.

7. In an automatic air-pipe coupler, the combination with the pipe, of clamping-jaws adapted to engage with an opposing coupler,

locking-jaws for locking opposite couplers when held by the clamping-jaws, spiral ribs on said pipe, a movable yoke having slots in which said ribs work, and a suitable motor for reciprocating said yoke to rotate the pipe by means of the spiral ribs, whereby the pipe-coupler is rotated to move the locking-jaws into and out of locking position, substantially as set forth.

8. In an automatic air-pipe coupler, the combination with a pipe capable of slight lengthwise movement, of clamping-jaws adapted to engage with an opposing coupler, locking-jaws for locking opposing couplers when held by the clamping-jaws, means for operating said locking-jaws, and a valve controlled by the lengthwise movement of the pipe for opening or shutting off communication between said pipe and a similar pipe at the other end of the car, substantially as set forth.

9. In an automatic air-pipe coupler, the combination with a pipe capable of slight lengthwise movement, of clamping-jaws adapted to engage with an opposing coupler, locking-jaws for locking opposing couplers when held by the clamping-jaws, means for operating said locking-jaws, a valve-chamber into which the inner end of said pipe projects, a valve in said chamber controlled by the lengthwise movement of said pipe for opening or shutting off communication between said pipe and a similar pipe at the other end of the car, and a flexible chamber connected with said pipe and the valve-chamber to prevent the escape of air, substantially as set forth.

10. In a system of air-piping for railroad-cars, the combination with a set of three air-pipes at each end of the car provided at their free ends with automatic couplers, two stationary yokes for supporting each set of pipes, spiral ribs on said pipes, a reciprocating yoke for each set having slots in which said ribs work, by the movement of which yoke the pipes are rotated to place the couplers into locking and unlocking position, piping connecting the air-pipes at one end of the car with those at the other end, two pipes of each set being directly connected by piping, and a valve at both ends of the car controlled by the lengthwise movements of the third pipe of each set for controlling communication between them, substantially as set forth.

11. In a system of air-piping for railroad-cars, the combination with a set of three air-pipes at each end of the car provided at their free ends with automatic couplers, two stationary yokes for supporting each set of pipes, spiral ribs on said pipes, a reciprocating yoke for each set having slots in which said ribs work, by the movement of which yoke the pipes are rotated to place the couplers into locking and unlocking position, piping connecting the air-pipes at one end of the car with those at the other end, two pipes of each set being directly connected by piping,

a connection between said piping containing a cock, controlling the supply of air to the air-brake cylinder, whereby either or both said lines of piping may be employed for the air-brakes, and a valve at both ends of the car controlled by the lengthwise movements of the third pipe of each set for controlling communication between them, substantially as set forth.

12. In a combined automatic car and air-pipe coupler, the combination with the car-coupler and the air-pipes, of means operated by a piston in the draw-head for controlling the locking and unlocking of the car-coupler, a connection from one of the air-pipes leading to said piston-chamber, couplings for the air-pipes, and means moving with said piston for operating the said couplings to move them into and out of locking position, substantially as set forth.

13. In a combined automatic car and air-pipe coupler, the combination with the draw-head carrying a pivoted coupler having a curved arm, of a reciprocating head in the path of movement of said arm for holding the coupler in locking position, a piston operated by air-pressure for moving said head out of locking position and thereby swinging said

coupler out of locking position, a spring for returning said head to its normal position, a set of air-pipes carried by said draw-head, a movable yoke secured to and moving with the reciprocating head, pipe-couplers carried by said pipes, and means for converting the reciprocating motion of said yoke into a rotary motion of said pipes to move said pipe-couplers into and out of locking position, substantially as set forth.

14. In a combined automatic car and air-pipe coupler, the combination with the car-coupler, of air-pipes in proximity thereto, coupling devices carried by the free ends of said pipes, means for rotating said pipes to move the air-pipe couplers into and out of locking position, and means whereby when the car-couplers of adjoining cars separate and the air-pipe couplers are placed under strain said pipes will be caused to rotate and unlock their couplers, substantially as set forth.

This specification signed and witnessed this 18th day of July, 1896.

CLINTON L. BANCROFT.

Witnesses:

H. MARTIN WILLIAMS,
S. L. MOSER.