

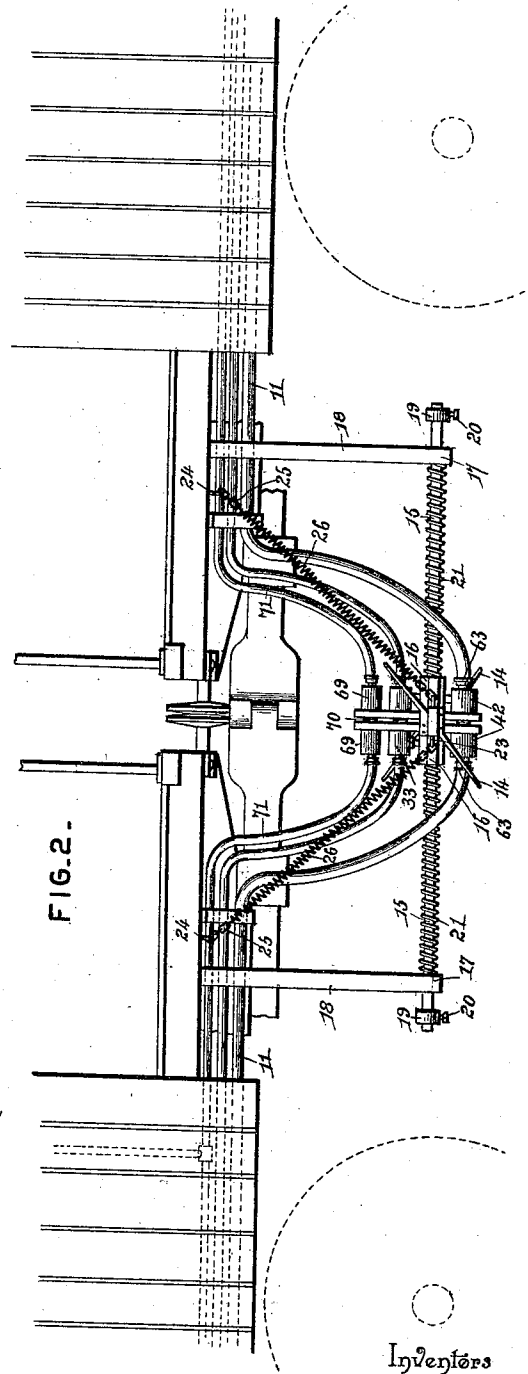
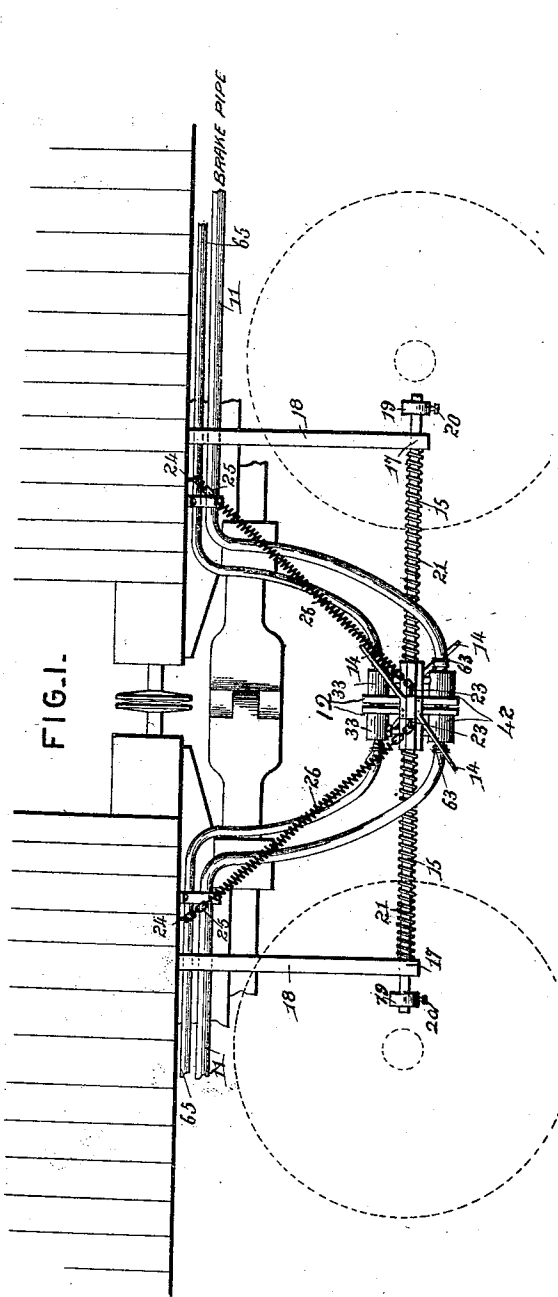
(No Model.)

3 Sheets—Sheet 1.

W. A. & B. S. H. HARRIS.
AUTOMATIC AIR BRAKE COUPLING.

No. 515,220.

Patented Feb. 20, 1894.



Witnesses

Jas. K. McLaughlin

W. S. Duval

By their Attorneys,

William A. Harris

Benj. S. H. Harris

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(No Model.)

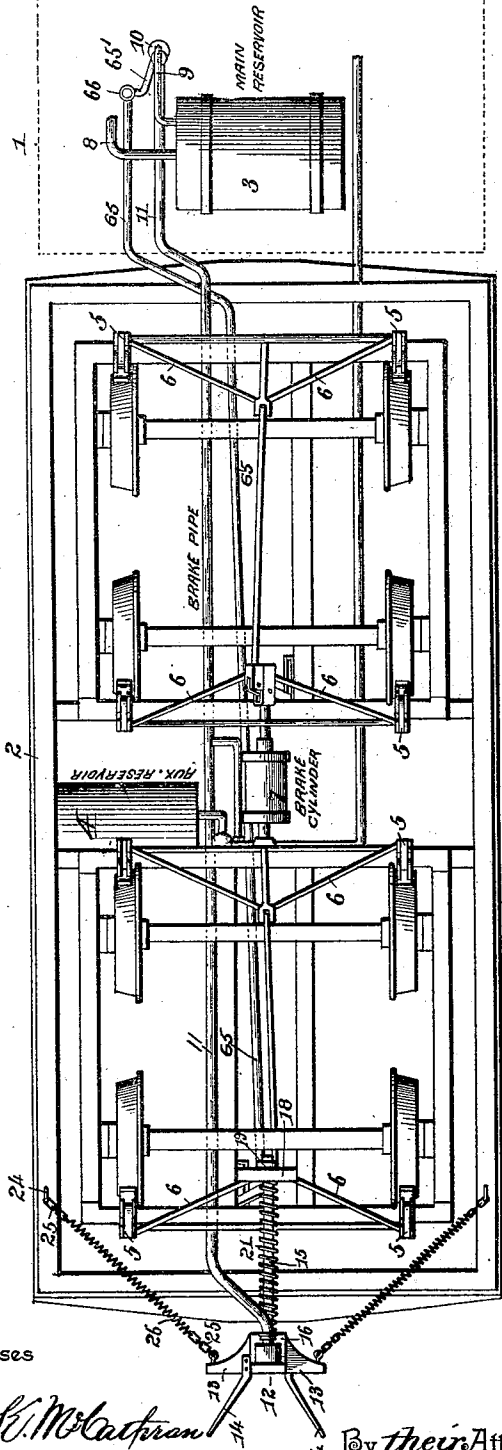
3 Sheets—Sheet 2.

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FIG. 3.



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FIG. 4.

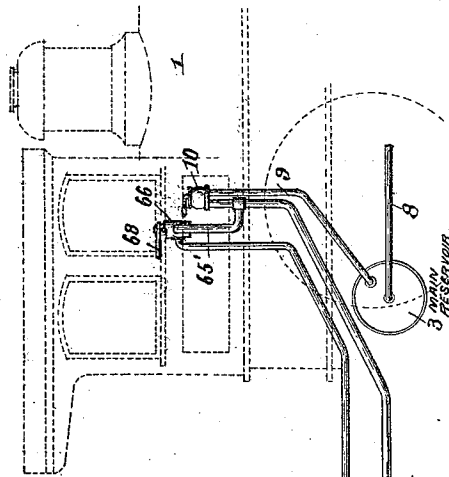
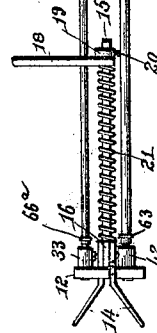
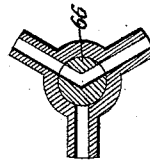


FIG. 10.



Inventors

(No Model.)

3 Sheets—Sheet 3.

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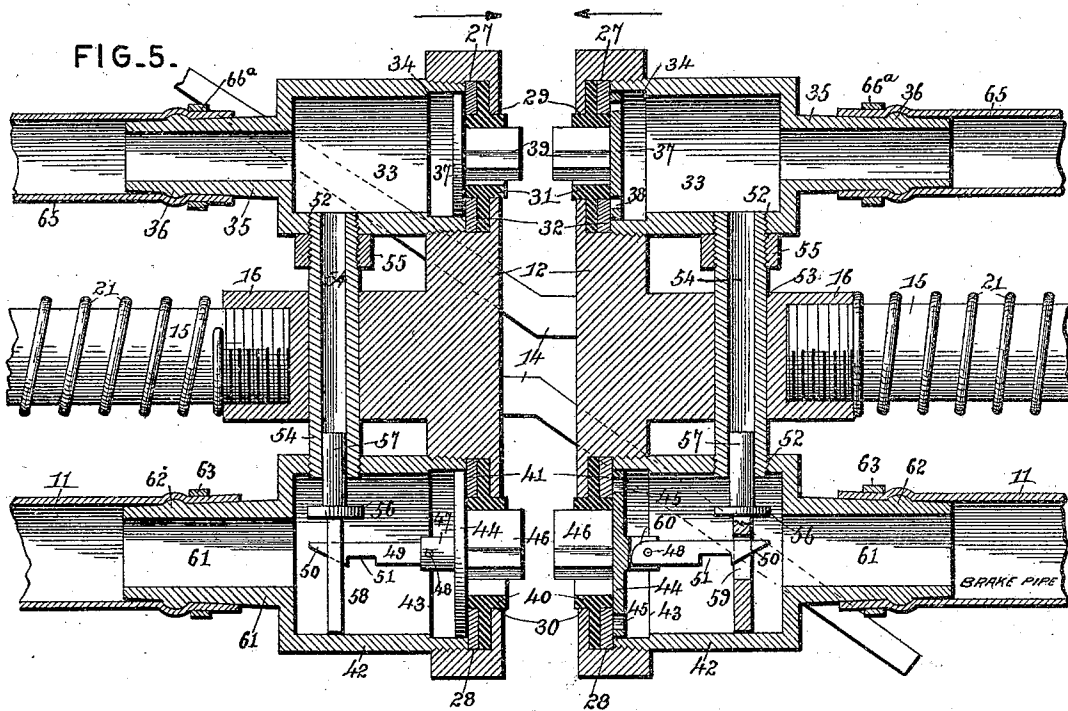


FIG. 8.

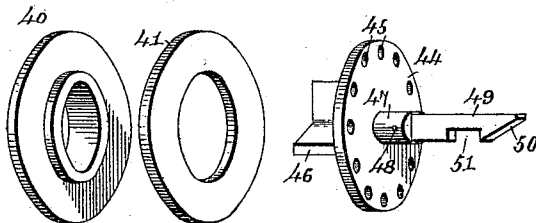


FIG. 9.

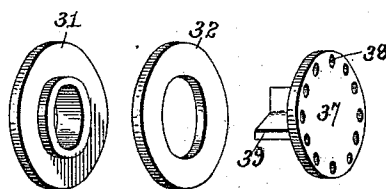


FIG. 6.

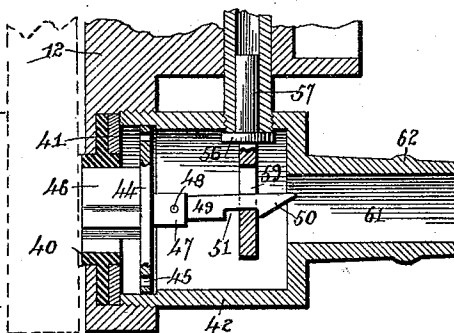
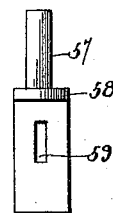


FIG. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM A. HARRIS AND BENJAMIN S. H. HARRIS, OF PELZER, SOUTH CAROLINA.

AUTOMATIC AIR-BRAKE COUPLING.

SPECIFICATION forming part of Letters Patent No. 515,220, dated February 20, 1894.

Application filed January 16, 1893. Serial No. 458,511. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM A. HARRIS and BENJAMIN S. H. HARRIS, citizens of the United States, residing at Pelzer, in the county of Anderson and State of South Carolina, have invented a new and useful Automatic Air-Brake Coupling and Uncoupling Apparatus, of which the following is a specification.

Our invention relates to improvements in that class of brakes operated by fluid, usually air, though as will hereinafter appear it will operate in connection with any fluid-operated brake-system. It has particular reference also to improvements in that class of air-brakes known as the "Westinghouse system," wherein the brakes are applied whenever air is exhausted from the train or brake-pipe.

Our present invention is an improvement upon a former one made by ourselves and which constitutes the subject of an application Serial No. 431,266, wherein certain fundamentals of the system are claimed broadly.

In both the former and present invention, the main objects are to provide means for automatically coupling and opening up communication between the air brake pipes of a series of coaches or cars composing a train, whereby a continuous passage of the fluid may instantly take place; to provide means for instantly and automatically applying the brakes of any car that may be accidentally uncoupled during the run or while the train is in motion, thereby preventing it from being precipitated down grades, &c.; and finally, to so construct the device as during the operation of shifting cars or making up a train the valves may be automatically closed in the brake or air-pipe of any car detached.

Referring to the drawings:—Figure 1 is a side elevation of the meeting ends of two freight cars, the same being provided with our improved brake mechanism. Fig. 2 is a similar view of two passenger coaches illustrating how the whistle or signal-pipe may also be embodied. Fig. 3 is a bottom plan view of a tender, the rear portion of the engine being shown in dotted lines and under which a brake mechanism constructed in accordance with our improvements is located. Fig. 4 is a side elevation of the rear portion

of the engine and the brake-mechanism illustrated in Fig. 3, the tender being omitted. Fig. 5 is a vertical longitudinal sectional view through two coupling heads, the same being in the act of contacting or coupling, but yet out of contact. Fig. 6 is a similar view of the lower portions of one of said heads, the parts being shown in the position they occupy when said heads have actually contacted. Fig. 7 is a detail of the locking piston. Fig. 8 is a detail of the valve employed in the lower chamber of a coupling-head, the parts composing the valve being separated. Fig. 9 is a similar view of the valve located in the upper chamber of the head, the parts composing the same likewise being separated. Fig. 10 is a detail in cross-section of the three-way cock or valve employed in connection with our improvements.

Like numerals of reference indicate like parts in all the figures of the drawings.

Referring particularly to Figs. 3 and 4 of the drawings, 1 designates the engine and 2 the usual tender. Under the engine there is located the main reservoir 3 and under the tender the auxiliary reservoir 4, it being understood that this auxiliary reservoir 4 is duplicated under each car or coach.

5 designates the brake-shoes, 6 the levers for operating the same, and 7 the brake cylinder containing a piston which is connected with and operates the brake levers, in the usual way.

8 designates the pipe for supplying air to the main reservoir and which, as is well known, leads from the air-pump usually located at the side of the engine and not herein shown. A pipe 9 leads from the main reservoir 3 up into the locomotive cab and is connected with the brake pipe 11, through the usual engineer's valve 10.

Thus far we have described the ordinary construction of Westinghouse brake, and we will now proceed to detail our invention.

Referring more particularly to Figs. 3 and 5 of the drawings—12 designates a coupling-head, the same when viewed in elevation being flat or plane upon its outer face and oblong and provided at opposite sides with horizontal wings or flanges 13 extending at right angles thereto. At the diagonally-opposite

angles formed by these flanges in connection with the edges of the heads inclined guide-arms 14 are located, the same flaring or diverging toward their outer ends, and those of one head projecting laterally as well as upward and downward, oppositely to those of a companion or abutting head, also that the arms of each will serve to engage the head of the other and thus the two heads be guided together accurately upon the approach of two cars. These heads extend slightly in advance of the couplers which are located thereabove, and are yieldingly pressed outward through the medium of cylindrical bars 15, whose outer ends are threaded or otherwise secured in sockets 16 with which the rear faces of the heads are provided, the opposite ends of said bars passing loosely through openings 17 formed in the lower ends of pendent hangers or supporting rods 18, whose upper ends are secured firmly to the under side of the car or coach. Collars 19 are secured by clamp screws 20 upon the rear ends of the bars 15 immediately in rear of the hangers 18, and coiled springs 21 are interposed between said hangers and the sockets or rear faces of the coupling-heads. These springs are under constant compression, and thus serve to normally and yieldingly press the heads toward the outer ends of the cars, such tendency being limited by the stop-collars 19 heretofore described. At the same time it will be seen that the heads are capable of oscillating sufficiently by reason of their loose passage through the hangers and are free to reciprocate when sufficient pressure is brought to bear against their outer faces to overcome the tensile strength of their springs 21. Screw eyes 23 extend from the opposite sides of the heads and in these are connected the end links of a spring-chain, whose opposite end is likewise connected to staples or screw eyes 24 secured to the under side of the car. These spring chains consist of end links 25 and intermediate coiled spring-sections 26, so that while they are sufficient to support the couplers in their proper positions, yet they are capable of yielding and permitting of the swing necessary to an adjustment of the couplers each to the other.

As each head 12 is but a duplication of the other, a description of one in detail will be sufficient for a proper understanding of our invention. Referring therefore more particularly to Sheet 3 of the drawings, it will be seen that the rear face of each head 12 is provided above and below its socket 16 with an annular recess 27 and 28 respectively, each of which has its outer portion or half internally threaded. The recess 27 and the recess 28 have their bottoms provided with reduced orifices 29 and 30 respectively. In the recess 27 there is seated a gasket 31, shown in detail in Fig. 9. This gasket is T-shaped when viewed in cross-section so that its outer flange or annular portion extends slightly beyond the outer face of the coupling-head. En-

circling the inner end of the annular flange is a ring or washer 32, shown in detail in Fig. 9, which has its rear face about flush or in the same plane as the said rear end of gasket. A hollow cylinder 33, is threaded exteriorly, at its open forward end, and screwed into the recess, 27, and is also rabbeted internally at said end, thus providing a circular shoulder 34. The said cylinder, 33, is furthermore provided at its rear end with a nipple 35, whose exterior is slightly reduced toward its rear end and in advance of said end is provided with a superficial annular binding rib 36.

37 designates a circular valve disk, shown in detail in Fig. 9, and the same is provided near its periphery with a series of perforations or escape holes 38, and upon its front face with a winged stem 39. This valve is seated for movement between the inner face of the washer 32 and rubber gasket 29, and the internal shoulder 34 of the chamber of cylinder 33, and therefore its stem 39 being of greater length than the depth of the gasket, will, when the valve is closed against said gasket, extend at its outer end beyond the face of the coupling and gasket. The rear portion of the wall of the recess 28, like its companion 27, is also internally threaded and seated in said recess is a rubber gasket 40, T-shaped in cross-section, and therefore having its central annular portion extending at its outer end beyond the face of the coupling head 12. A washer or ring 41 encircles the inner end of the said annular portion of the gasket and its inner face or surface is about flush with the inner edge of said annular portion of the gasket.

42 designates the lower hollow cylinder corresponding in form, though not in size, with the upper one 33, and it is externally threaded at its front end and takes into the recess 28, the inner end of said cylinder bearing upon the washer 41 and maintaining it and the rubber gasket in position, thus performing the same function in this regard as does the cylinder 33 with relation to the rubber gasket and washer 31 and 32. The cylinder is provided near its front end with an internal annular shoulder 43, and mounted for movement between said shoulder, and the washer and gasket, is a circular valve-disk 44, having near its periphery a series of escape-holes adapted to close against the washer and provided on its outer face with a winged valve-stem 46, which is greater in length than the depth of the gasket and is thus adapted when the valve is closed against the gasket to protrude at its front end beyond the face of the coupler. The rear face of the valve 44 is provided with a bifurcated stud 47, and between the bifurcations thereof there is pivoted as at 48, a gravity-latch 49, having a rear inclined undercut-face 50, and a locking-notch 51, all as clearly shown in Figs. 5, 6 and 8 of the drawings.

The under side of the shell 33 and the up-

per side of the shell 42 are provided with threaded perforations 52 vertically aligning with each other and with an intermediate opening 53 formed in the socket or rearward extension of the coupling-head. In these perforations is threaded the opposite ends of an intermediate connecting tube 54 which passes through the perforation 53 and a jam-nut 55 is threaded upon the exterior of said tube near its upper end and is adapted to bind against the underside of the upper cylinder 53.

56 designates a valve, which is a circular disk, and is located in the lower cylinder 43, and has formed upon its upper side a cylindrical stem 57, and upon its under-side a depending keeper 58, having an oblong opening 59 adapted to receive the beveled end of the latch 49. This latch 49, as shown in Fig. 5, can never fall below the horizontal, though it may be elevated above the same, and to permit of and limit the movement the rear end of the latch is rounded upon its upper side as shown at 60, so that its lower edge will abut against the rear face of the valve-disk to which it is secured. The rear end of the lower cylinder 42 is provided with an external reduced nipple 61, which near its ends is provided with a superficial binding rib 62, and over this nipple there is stretched or sprung the end of a brake pipe 11, illustrated in Figs. 3 and 4, the same being held in position, in this instance, by means of a ring 63, which is located in rear of the rib 62, encircles the nipple, and serves to bind the pipe against said rib.

Reference is now had to Figs. 3 and 4 of the drawings, and particularly to the latter. Extending alongside the brake or train pipe, 11, is a flexible pipe 65, which connects with the vertical portion of the latter and also with the upper cylinder or chamber 33 of the coupling head 12. This pipe serves for transmission of air pressure for operating the device that holds or locks the valve 44 of said brake-pipe in open position, and in consequence of this function, as well as for convenience of reference, we designate it the supplemental pressure pipe. As shown in Fig. 5, it is connected with the nipple 35 of cylinder 33 by means of a band 66^a located in front of a shoulder 36, and, as shown in Fig. 4, it is connected with the brake pipe 11 by lateral branch 65'. A three-way cock 66, shown in detail in Fig. 10, having a handle 68, and which is arranged at the junction of parts 65 and 65' to control the air inlet and exhaust.

It will be obvious from the foregoing description that by closing communication between the two sections of pipe 65 the fluid will be prevented from entering the chamber 33 of the coupling-head, and on the other hand by opening up communication between the branches or sections of the pipe 65 fluid-pressure will be equalized between this pipe and the brake pipe 11, and finally it will be seen that by opening up communication between the main section of the pipe 65 and ex-

terior atmosphere the fluid within said pipe 65 may be discharged therefrom and the pipe emptied of excessive fluid.

In Fig. 2 of the drawings we have illustrated a coupling-head having three cylinders instead of two, the extra cylinder being designated as 69, and the said cylinder 69 is provided with the gasket and valve-connection 70 similar to that of the upper shell 33 shown in Fig. 5. These shells 69 are employed in passenger coaches and serve to connect the signal-pipe 71 which leads to the cab of the engine and through which the conductor of the train communicates with the engineer. As two heads, as we have described in detail, approach they are guided into accurate alignment and contact by the arms 14, before mentioned and the outer ends of their valve stems 46 and 39 abutting serve to force the said valve-stems inward and the disks 37 and 44 away from their seats, whereby the fluid passes through the perforations in the disks and a communication is established between the abutting-heads and the pipes leading to and from the same. Thus it will be seen that we have provided for an automatic coupling of fluid-operated brake-pipes, requiring no attention or manual labor for establishing the same.

Under ordinary circumstances, as when the train is running, the three-way valve or cock 66 is closed, so that there is no air pressure in pipe 65, but only in brake-pipe 11, wherein it operates to hold the valves 56 elevated, as shown in Fig. 6, thus holding the slotted keepers 58 engaged with the shoulders of the valve latches 49, the latter being forced back through the slot in said keepers 58 when the coupling-heads 12 of two cars meet. Thus, so long as sufficient pressure is maintained in the cylinders 42, the valves will be held in raised position (Fig. 6), and so long as the valves 44 locked against closing upon their seats and cutting off communication between the several sections of the pipes 11 located under the coaches. Thus it will be seen that if at any time an accidental uncoupling of one or more coaches should occur the valves 44 would be prevented from closing and hence an automatic discharge of the fluid-pressure would take place through the orifice 30 of the coupling-heads, which, as will be readily understood, will immediately apply the brakes and arrest the movement of all the cars. Thus it will be seen that we have provided for an automatic application of the brakes immediately upon the accidental disconnection of any of the cars. When, however, the engineer is making up his train and it is undesirable to have the brakes automatically applied at each disconnection of a car or coach, he operates the three-way valve or cock 67 so as to throw into communication the sections of the pipe 65 with the brake-pipe 11, so that an equalization of fluid-pressure is exerted in the pipe 65 with that of the pipe 11. The stems 57 of the valves 56 fit loosely and hence slide freely

in the tubes 54, so that the valves drop easily and quickly by their own gravity, when air pressure is relieved in the brake-pipe 11. This result is, however, accelerated and rendered positive by the pressure in pipe 65, which acts downward in the tube 54. When the valves 56 fall, their slotted keepers 59 are unlocked from the latches 49, thus permitting the valve 44 to close the moment that it is liberated or a disconnection of the coupling-heads occurs. In this manner the valve 44 prevents escape of air from the brake-pipe 11, and hence the brakes are prevented from automatically operating and the cars or coaches are free to be rolled about and shifted from one track to the other at the will of the engineer and as is ordinarily the case in making up trains.

When it is desired to re-establish the automatic relation of the parts, the three-way valve 66 is operated so as to allow air to escape from pipe 65 into the atmosphere, thereby allowing the air pressure in brake-pipe 11 to lift the valve to its elevated position (Fig. 6).

From the foregoing description in connection with the accompanying drawings it will be seen that we have provided or constructed a coupling-head adapted to accurately and positively couple automatically at the contact of two heads and to immediately establish communication between the brake-pipes of the several cars; furthermore, that we have constructed the same whereby the "Westinghouse" system of fluid-pressure brakes may so operate as to remove the automatic function which we provide and permit of an unimpeded shifting of cars in making and unmaking trains; and finally, for a ready change of parts whereby the system is adapted for the ordinary run and for the special use in making and unmaking trains.

It will be understood that the invention may be applied to other systems than the "Westinghouse," we having simply shown the same in connection with the latter system, in that it was considered as being best known to those conversant with railroads and their rolling stock.

Various changes and modifications of our invention may be made without departing from the spirit thereof, and though we have shown and described particular details for accomplishing the same, we would have it understood that we do not limit the invention to such, but hold that we may vary the same to any extent and to any degree within the knowledge of the skilled mechanic or persons conversant with this class of apparatus without departing from the scope of our invention.

Having described our invention, what we claim is—

1. In an air-brake coupling, the valved coupling head, its rigidly attached bar 15, and a spring and stop-collar applied thereto, a fixed hanger 18 depending from the car, and pro-

vided with an opening through which the said bar slides, and the flexible supports 26, diverging upward and rearward from the coupling head, all combined substantially as shown and described.

2. In an air brake coupling, the combination with the valved coupling head, a bar 15 rigidly attached thereto, a spring 21 and stop applied to the bar, and a rigid hanger depending from the car, of the elastic supports 26 for said coupling head, the same consisting of springs arranged divergently relative to the head, whereby they resist the forward thrust of the spring 15, and by such coaction serve to hold the coupling head in the required projected position prior to its engagement with another, as specified.

3. In an air brake coupling, the combination, with the coupling head having an orifice and aligned rear cylinder 42, the slidable disk valve 44, adapted to close the orifice, a latch pivoted to the rear side of the valve, a slotted and vertically-movable keeper which engages the latch when elevated, a valve 56 and guide stem 57 connected with said keeper, the brake pipe and supplemental pressure pipe, and a passage 54 which connects them and serves also as a guide for the valve stem, as shown and described.

4. In an air brake coupling, the combination, with the coupling head having an orifice, a slidable valve 44 arranged therein, the brake pipe and cylinder 42, the supplemental pressure pipe and passage communicating with the brake-pipe, the valve 56, guide stem 57, and slotted keeper, of the latch 49, having its free end beveled, and pivoted to the rear face of valve 44, and having its pivot end rounded on the upper side and projected on the lower side to contact with the valve, whereby it is adapted for self-support in horizontal position and to be elevated for engagement with or disengagement from the keeper, as shown and described.

5. In an air-brake system, the combination with a coupling-head having a chamber the bottom of which is provided with an orifice, hollow cylinder attached to the rear side of said coupling head, a brake-pipe connected with the cylinder, and a valve mounted in the orifice and provided with a stem extending beyond the face of the head and at its rear end with a latch, of a tube rising from the cylinder, a valve rod mounted in the tube and within the cylinder provided with a head, which in turn is provided with a depending keeper having an opening through which said latch extends, of a pipe leading to the upper end of the tube, and communications between the source of fluid supply for the brake-pipe and that of the pipe leading to the tube, substantially as specified.

6. In a brake-system, the combination with a brake-head having upper and lower recesses, each provided with an orifice, valve seats mounted in the recesses, hollow cylinders screwed into the orifices, valves mounted

in the said cylinders and provided with stems projecting through and beyond the orifices, of a tube leading from the upper to the lower shell, a valve rod mounted in the lower end
5 of the tube, and having a head extending in the lower cylinder, a recessed keeper depending from the head, a pivoted latch extending from the rear side of the valve of the lower cylinder and provided with a beveled
10 end, and a notch for engaging the lower edge of the recess of the keeper, of an air storage tank, or reservoir, a brake-pipe leading there-

from to the lower cylinder, supplemental pressure pipe leading from a suitable source of supply to the upper cylinder, substantially 15 as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

WILLIAM A. HARRIS.

BENJAMIN S. H. HARRIS.

Witnesses:

J. H. SIGGERS,

E. G. SIGGERS.