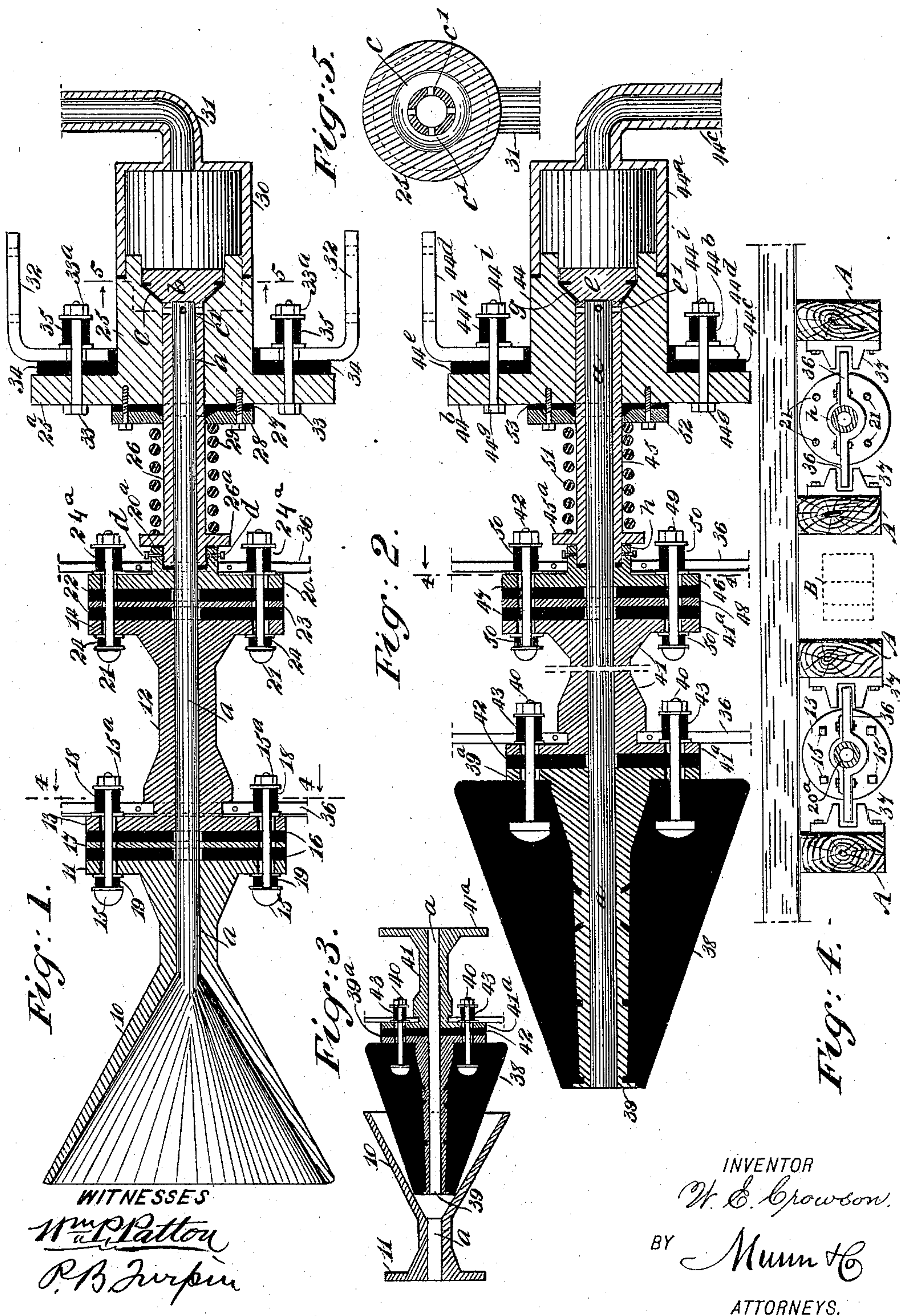


(No Model.)

W. E. CROWSON.
AUTOMATIC PIPE COUPLING DEVICE.

No. 571,216.

Patented Nov. 10, 1896.



UNITED STATES PATENT OFFICE.

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AUTOMATIC PIPE-COUPLING DEVICE.

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To all whom it may concern:

Be it known that I, WILEY E. CROWSON, of Montgomery, in the county of Montgomery and State of Alabama, have invented a new and Improved Automatic Pipe-Coupling Device, of which the following is a full, clear, and exact description.

This invention relates to an improved automatic coupling for connecting air-pipes on cars and for like uses; and it has for its object to provide a pipe-coupling which will automatically join the ends of air-conducting pipes on a train of cars and maintain them securely connected in air-tight condition while the cars remain coupled together as a train.

A further object is to afford a pipe-coupling device of the indicated character which will automatically close the ends of the pipes on which the couplings are placed when the main sections of said couplings are detached by uncoupling the cars.

The invention consists, essentially, of two main coupling-sections having male and female coniform coupling-heads, the male head being elastic and both heads being respectively connected to an elongated body made up of portions joined in sequence and having intervening elastic joint-pieces which render the main sections measurably elastic in different directions laterally. The slightly-yielding main coupling-sections are respectively secured on the ends of the car-frames and are spring-pressed forwardly, they being sufficiently projected to adapt them for engagement with each other when said cars are coupled together by the usual means.

The invention also consists in providing each main coupling-section with an interior sealing-valve, which controls the passage of air through said main section, these valves being adapted for automatic closure when the joined main coupling-sections are detached by uncoupling the cars.

The invention also embraces novel details of construction and combinations of parts, as is hereinafter fully described, and indicated in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side view of one main section of the improved pipe-coupling. Fig. 2 is a longitudinal sectional view of the other main section of said coupling. Fig. 3 is a sectional side view of reduced size, showing the heads of the improved coupling device in connected condition. Fig. 4 is a transverse sectional view of a car-frame in part and two main sections of the improved pipe-coupling device loosely supported on said frame, the line of section being indicated at 4 4 in Figs. 1 and 2; and Fig. 5 is a transverse sectional view substantially on the line 5 5 in Fig. 1.

The improved pipe connection is especially well adapted for use on the pipes that supply air to brakes for cars and will be described as applied for such use, it being premised that the pipe-coupling device is also available to control air for signaling purposes on cars, and may also be utilized for the connection of steam-heating conduit-pipes on such conveyances.

Referring to the drawings, 10, in Figs. 1 and 3, represents the front end portion of a main coupling-section, technically termed the "female coupling-head," and, as shown, consists of a preferably metal coniform shell having a comparatively thin flaring wall, which at its outer end has sufficient diameter to adapt said head to readily receive the reversely-tapered head of the other main coupling-section, as indicated in Fig. 3 and hereinafter more fully explained.

The coupling-head 10 is made substantially cylindrical behind its flared portion and terminates in a radial flange 11.

An intermediate body-piece 12 is provided for the main coupling-section, (shown in Fig. 1,) which is essentially cylindrical, having a central bore *a*, that is equal in diameter with the central bore of the extension from the flaring coupling-head 10.

Radial flanges 13 14 respectively project from the body-piece 12 at its ends, and the forward flange 13 is perforated at spaced intervals for the reception of bolts, as shown in Figs. 1 and 4, the radial flange 11 being in a like manner perforated to permit the insertion of said clamping-bolts 15 through the flanges 11 13.

Preferably, two gum or other suitable slightly-yielding joint-washers 16 are fur-

nished, which are introduced between the flanges 11 13, the said washers being separated by a metal washer 17, and the three washers have spaced perforations produced in them for the reception of the bolts 15, the bolt-holes in the flanges 11 13 and metal washer 17 being so enlarged in diameter that the bolts may have side play in the perforations.

On the ends of the bolts 15, whereon nuts 15^a are screwed, washers are placed, and gum cushion-springs 18 are also strung on the bolts between said washers, other gum cushion-springs 19 being placed on the bolts, together with washers, and located under the heads of the bolts before the latter are passed through the joint-washers and flanges 11 13.

It will be seen that when the described parts are assembled and the nuts 15^a are properly adjusted the junction of the flaring head 10 with the body-piece 12 is effected in a manner which will permit a limited lateral flexure of the coupling-head on the body-piece in different directions.

A circular clamping-block 20 is joined to the flange 14 by spaced bolts 21, two gum joint-washers 22 and an intermediate metal washer 23 being introduced between the flange 14 and head-block, these washers having spaced perforations to permit the through passage of the clamping-bolts 21, and on the latter gum cushion-springs 24 24^a are strung, along with washers therefor, in like manner to those on bolts 15, so that a measurably yielding but air-tight connection is effected between the body-piece 12 and clamping-block 20.

On the face of the clamping-block 20, that is rearward and opposite from its side that contacts with one of the gum washers 22, a circular flange 20^a is rearwardly projected, which flange is concentric with the bore *a*, that extends through the joint-washers 22 23 and also through the clamping-block.

Another portion of the composite main coupling-section shown in Fig. 1 consists of the tail-block 25, which is preferably made cylindrical in the body and has a circumferential flange 25^a projected from it at the forward end. The tail-block 25 is axially bored and at its rear end has formed a countersunk valve-seat which is concentric with the bore mentioned, the seat proper being preferably coniform.

A cylindric valve-stem 26 is fitted to slide neatly in the bore of the tail-block 25, and on the rear end of said stem a valve-head *b* is formed, which is fitted on the coniform valve-seat of the tail-block. To secure a tight joint between the valve-head and its seat without grinding the parts together, a leather or gum joint-washer *c* is secured on the valve-head, preferably as indicated, the said washer having an inwardly-extending flange at its rear end, which flange is forced into a circumferential groove in the valve-head, while the main portion of the joint-

washer is rendered coniform and lies in close contact with the coniform portion of the valve-head.

The valve-stem 26 is bored to form a continuation of the bore or air-passage *a* in the other previously-described portions of the main coupling-section, and the bore in the tail-block terminates where the valve-head *b* commences.

A suitable number of spaced perforations *c'* are produced in the wall of the valve-stem 26 near the valve-head *b*, so as to afford ample communication between the bore *a* of the valve-stem and the open space behind the valve-head when the latter is rearwardly moved off of its seat. A circumferential flange 26^a is formed on the valve-stem 26 near the front end of the latter, and the portion of the stem that projects forwardly of said flange is seated in the counterbore produced by the formation of the concentric flange 20^a on the clamping-block 20. A number of spaced set-screw bolts *d* are screwed into tapped perforations in the wall of the concentric flange 20^a and laterally press on the inserted end of the valve-stem 26, securing the block 20 and valve-stem together, and a gum joint is introduced between the end of the valve-stem and the bottom of the socket produced by the flange 20^a.

Between the forward end of the tail-block 25 and the flange 26^a there is an annular joint-washer 27, loosely mounted on the valve-stem 26, and on said stem in front of the joint-washer, which may be of gum or other slightly-yielding substance that will produce a tight joint, a binding-plate or washer 28 is strung. The inner surface of the binding-plate 28 is beveled on the edge of its bore to receive a coniform annular projection formed on the front face of the joint-washer 27, and the said plate and washer are clamped on the front end of the tail-block 25 by screw-bolts, thereby producing an air-tight joint between the valve-stem and tail-block.

A strong spiral spring 29 is placed on the valve-stem 26, having its ends respectively engaging the circumferential flange 26^a and binding-plate 28, which spring normally holds the valve-head *b* on its seat and thus closes the bore *a* at its rear end.

On the rear end of the tail-block 25 a cup-shaped and preferably cylindrical chamber 30 is secured by its forward end, the rear end wall of the chamber being tapped by a branch pipe 31, that is shown in part, but which in service is extended to join the main air-supply pipe for the air-brakes, (not shown,) the chamber 30 being provided to allow the valve-head *b* to freely move backward and open communication between the source of air supply and the bore *a* of the main coupling-section.

Two bracket-arms 32, which may be bent L shape or otherwise formed to suit the situation, are secured by one end portion of each arm oppositely on the circumferential flange

25^a of the tail-block 25 by clamping-bolts 33, that pass through said flange and also through an annular gum cushion-piece 34, introduced between the flange and arms, two washers 5 and a cylindric gum cushion-block 35 being also placed on each bolt after it is inserted through the parts mentioned, so that when the nuts 33^a of the clamping-bolts 33 are properly adjusted the arms 32 will be held at opposite points on the tail-block. The remaining ends of the bracket-arms 32 are secured on portions of the car-frame whereon the improvements are to be placed; preferably between longitudinal timbers A of said frame, 15 so that the main coupling-section will be held between said timbers at one side of a center space reserved for the car-coupling, the front or flared end 10 of the coupling-section being forwardly projected a suitable distance for the reception of the other coupling-section that is placed on a car which is to be coupled to the one having the female coupling-section.

A further means of support for the coupling-section which has been described consists in furnishing two pairs of transverse metal carrier-arms 36, which are clamped on the body-piece 12 and concentric flange 20^a, as shown, or at other suitable points, the ends of said arms projecting laterally to have a loose engagement with channels in the supporting bracket-boxes 37, that are secured on the sides of the longitudinal car-frame timbers A, as shown in Fig. 4, the said boxes having sufficient length to adapt them for reliable support of the arms 36 when the coupling-section is longitudinally reciprocated in service.

The male coupling-section shown in Fig. 2 has its coupling-head 38 at the front end 40 formed of gum or an admixture of gum with other materials; and converges from rear to front in coniform shape, the gum portion or coupling-head proper being annular and secured on an interior tubular shank 39. There is a circumferential flange 39^a formed on the rear end of the shank 39, and the rear end of the head-piece 38 seats against said flange and is thereto bolted, the heads of the clamping-bolts 40 being embedded in the material 45 of the coupling-head and their bodies sufficiently projected therefrom to loosely pass through perforations in the flange 39^a. A body-piece 41 (shown reduced in length in Fig. 2) is in complete form shaped substantially like the body-piece 12 of the other main coupling-section, and has a like radial flange 41^a on its forward end that is perforated to receive the clamping-bolts 40, a gum joint-washer 42 being placed between the flange 39^a and flange 41^a, through which the bolts 40 pass. 60 On the projecting ends of the clamping-bolts 40 washers and an intervening gum cushion-block 43 are strung on each bolt, so that the nuts of the bolts, when properly adjusted, 65 will hold the male coupling-head and its supporting-shank securely on the body-piece 41

and permit a limited lateral yielding of the coupling-head in different directions.

It will be seen that the remaining portions of the main coupling-section shown in Fig. 2 70 are similar in construction to corresponding parts of the main coupling-section shown in Fig. 1 and already described, the male coupling-section having a tail-block 44, a central and longitudinally-slidable valve-stem 45, on 75 the rear end of which is the valve-head *e*, provided with a joint-piece *g*. The stem 45 is centrally bored, as at *a*, has spaced perforations *e'* near the head *e*, and at its front end is secured in the recess formed by the circular flange *h* of the clamping-block 46, which 80 flange is bolted in a yielding manner on the flange 41^a of body-piece 41. Two gum washers 47 and an intervening metal washer 48 are introduced, so that the bolts 49, which 85 pass through the flanges and washers mentioned, hold them together, the said bolts having the gum cushion-blocks 50, provided to coact with the joint-washers 47 and permit a limited lateral flexure of the body-piece on 90 the valve-stem 45. In a like manner to the coiled spring 29 the similar spring 51 is mounted on the valve-stem 45, pressing one end against the flange 45^a thereon and at its other end engaging with the clamping-plate 52, that 95 holds the gum joint-washer 53 on the front end of the tail-block 44 by means of set-screw bolts. The tail-block 44 is provided with a rearwardly-projecting chamber 44^a and a circumferential flange 44^b at its front end, the 100 chamber having a branch pipe 44^c, extending to a source of air supply under pressure when in service. From the flange 44^b bracket-arms 44^d project to be bolted on stringers of the car-frame, and a gum washer or cushion-piece 105 44^e, similar to the cushion-piece 34, is introduced between the ends of the arms and the flange 44^b, these parts being held in slightly-yielding contact by bolts 44^f, having the washers and gum cushion-blocks 44^h mounted on 110 their projecting ends and held in place by the nuts 44ⁱ of the bolts, whereby the rear portion of the male coupling-section is sustained on the car-frame, so as to yield slightly in different directions, and thus avoid strain of 115 the parts and adapt the device for effective operation.

The forward part of the male coupling-section is supported on the longitudinal frame-timbers of the car by means similar to the 120 devices provided for a like purpose that engage the female coupling-section, there being two pairs of transverse carrier-arms 36 clamped on the body-piece 41 and clamping-block 46 of the male coupling-section and 125 having their ends loosely engaged with channeled bracket-boxes 37, attached oppositely in pairs on the longitudinal timbers A of the car-frame, so that the male coupling-section will be maintained in a level condition and 130 be allowed to slightly yield in different directions, as may be necessary while in use.

To adapt the improved coupling-sections for use on cars, a male and a female section are provided for each end of the car and are respectively located one at each side of the central car-coupling B, (indicated by dotted lines in Fig. 4,) and the branch pipes 31 and 44^c of the coupling-sections are connected to a source of air supply.

It will be evident that if the pipe-coupling heads are sufficiently projected from the ends of two cars, which are being moved toward each other to be coupled together by couplings B, the male coupling-head on one car will be opposite the female coupling-head on the other car and these parts will freely engage each other, as indicated in Fig. 3. The impinge of the measurably-elastic male coupling-head 38 on the flaring wall of the other coupling-head 10 will cause the male coupling-head to receive compression at the front end, and this will produce such a bearing contact of parts as will insure an air-tight joint between the coupling-heads thus connected. The pressure of the male and female coupling-heads on each other causes a compression of the springs 29 51 on the valve-stems of the coupling-sections, produced by the rearward sliding movement of said valve-stems, which unseats their valve-heads and opens a direct passage *a* through the joined coupling-sections of the coupled cars.

The air-tight coupled condition of the coupling-sections on two cars will be maintained so long as the cars remain coupled, and when they are detached the act of drawing the cars apart will permit the male and female coupling-sections to resume normal adjustment, so that the valve-heads on the valve-stems 26 45 will force said heads against their seats in the tail-blocks 25 44 and close the air-passage *a*, thus sealing the air supply on each car.

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

1. A pipe-coupling, comprising a coniform male and a female coupling-head, a body portion for each coupling-head supported and adapted to slide, the said body portion and coupling-head being connected by an elastic joint, a valve connected with the body portion of each coupling-head moving therewith and controlling the passage of air through the coupling, the connected coupling-head, body portion and valve being spring-pressed, substantially as described.

2. A pipe-coupling, comprising a coniform male and a female coupling-head, a body portion for each coupling-head having a slightly-flexible connection therewith, a tail-

block for each body portion adapted for connection to a source of air or steam supply and provided with a valve-seat, a spring-pressed valve-stem slidable in the said tail-block, and with which the said body portion has a slightly-flexible connection, the said valve-stem being provided with a valve-head normally engaging the seat in said tail-block, substantially as described.

3. A pipe-coupling, comprising a longitudinally-perforated coniform male and female coupling-head, a perforated body portion for each coupling-head having a slightly-flexible connection therewith, a perforated tail-block for each body portion, a hollow valve-stem fitted to slide in the bore of the said tail-block and with which the said body portion has a slightly-flexible connection, the said hollow stem being provided with a valve-head on its rear end, a valve-seat formed at the rear end of the tail-block and adapted to be engaged by the said valve-head, a spiral spring on each valve-stem normally pressing the valve-head on its seat, a chamber on each tail-block, and means for connecting each chamber with a source of air or steam supply, substantially as set forth.

4. In a pipe-coupling of the described construction, the combination with the slightly-flexible body portion of one of the main coupling-sections, of the tapered coniform coupling-head of elastic material, a tubular shank on which the said elastic head is secured, the said shank being provided at its rear end with a circumferential flange, and bolts for holding said coupling-head on the body portion, the heads of the said bolts being embedded in the material of the coupling-head and the bodies of the said bolts being adapted to pass loosely through perforations in the circumferential flange on the rear end of the tubular shank, substantially as set forth.

5. In a pipe-coupling of the described construction, the combination with the body portion of one of the main coupling-sections, the said body portion having a radial flange at its end, of the flaring coniform coupling-head terminating at its rear end in a radial flange, yielding washers arranged between the flanges on the head and the body portion of the coupling, bolts adapted to pass loosely through perforations formed in the said flanges, and elastic cushions arranged on the said bolts, as and for the purpose specified.

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Witnesses:

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