C. FORTH.

PIPE COUPLING.

APPLICATION FILED OCT. 28, 1909.

1,035,564.

Patented Aug. 13, 1912.

2 SHEETS—SHEET 1.

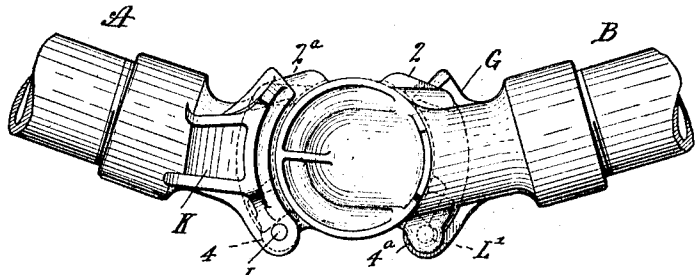

Fig. 1.

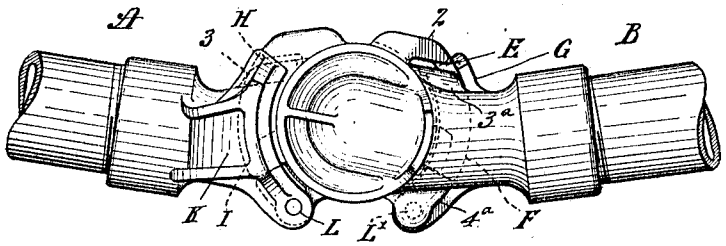

Fig. 2.

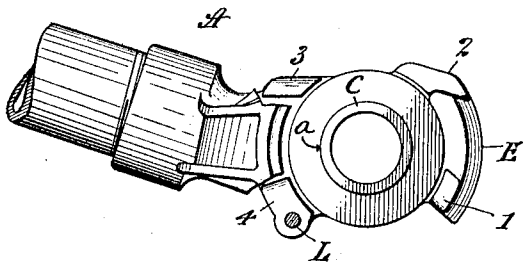

Fig. 3.

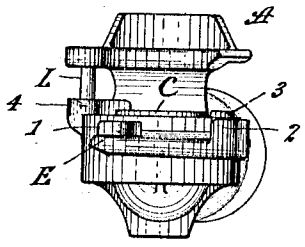

Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 5.

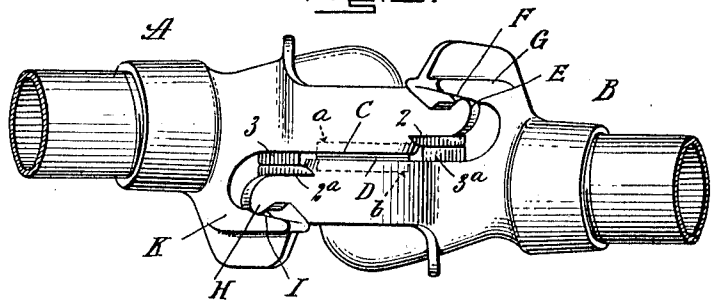
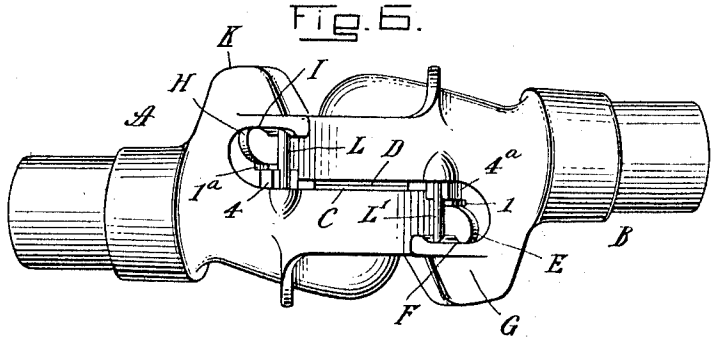


Fig. 6.



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CHARLES FORTH, OF BOSTON, MASSACHUSETTS.

PIPE-COUPLING.

1,035,564. Specification of Letters Patent. Patented Aug. 13, 1912.

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To all whom it may concern:

Be it known that I, CHARLES FORTH, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pipe-Couplings, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to hose or pipe couplings embodying two hollow coupling heads provided respectively with interlocking parts, usually in the form of circumferential ribs and grooves, adapted by the relative movements of the heads to force the latter toward each other into interlocked engagement, the adjacent faces of the heads being usually provided with gaskets, which, as the heads approach each other, are forced into intimate contact and constitute a fluid-tight connection between the hollow heads.

Couplings of this type are universally employed in train pipe systems in connection with the air or steam pipes, and in practice, the coupling heads connected with the piping of adjacent cars hang down, when in coupled condition, between the cars. Under these conditions, in the event of the cars parting accidentally, or in the event of the failure to disconnect the heads when the cars are uncoupled, the separation of the cars will draw the coupling heads upwardly toward a horizontal position, with the result that the heads will rotate on each other in an unlocking movement and the strain of the separating cars being brought on the coupling heads, the interlocking parts will yield and the ribs will be drawn forcibly from the grooves. This automatic uncoupling, under the accidental and abnormal conditions described, is a desirable feature, and one which has for a long time been employed.

In practice, it has been found that when the cars assume relative angular positions to each other, as in rounding curves, or in passing onto switches, side strains are brought on the coupling heads, which strains act to rock the heads laterally on each other and compress the gaskets unevenly, and to such extent that the interlocking ribs and grooves become disengaged and the parts of the coupling separate. Furthermore, it has been found that under such conditions, even when unaccompanied by an accidental uncoupling action, the gaskets become worn and soon lose their flexibility, resulting in leaks and other objectionable conditions.

It is the aim of my invention to avoid these objectionable actions, while at the same time providing for the automatic disconnection of the coupling, as before, and the invention consists primarily in the provision of stop devices for positively limiting the approach of the coupling heads when in locked or coupled condition, which stop devices, when the heads are moved relatively, as in the uncoupling action, or as when the parts are drawn up toward a horizontal position when the cars accidentally separate, are adapted to become disengaged. As a result of this construction, the interlocking ribs and grooves are maintained in firm interlocked engagement, the coupling heads prevented from rocking laterally on each other, the gaskets relieved of strain, and at the same time provision made, as before, for the automatic uncoupling of the heads under abnormal or accidental conditions.

In the accompanying drawings:—Figure 1 is a side elevation of a hose coupling embodying my invention, and showing the coupling heads in interlocked engagement and the normal position they occupy between adjacent cars. Fig. 2 is a similar view showing the coupling heads drawn up toward a horizontal position, in which position the coöperating stops are disengaged from each other and the parts ready for automatic disconnection. Fig. 3 is an inside face view of one of the coupling heads. Fig. 4 is an edge view of the same. Fig. 5 is a top plan view of the coupling in the position represented in Fig. 1. Fig. 6 is a bottom plan view of the same.

Referring to the drawings:—A and B represent two hollow coupling heads provided, as usual, with longitudinal and transverse openings therethrough so arranged that when the heads are coupled face to face, a continuous passage-way is formed through them. The meeting faces of the two heads are flat and formed with seats

a and *b*, in which are mounted yielding gaskets C and D, which project slightly beyond the faces of the heads, so that when the heads are forced together in the coupling action, the adjacent ends of the gaskets will meet and be urged into intimate contact with each other, thereby forming a fluid-tight connection or passage between the two heads.

The heads are formed respectively with parts adapted to be interlocked with each other so as to effect a firm connection between them. These parts consist as usual of a circumferential rib E on the head A, which is adapted to interlock with a circumferential groove F in the inner face of an overhanging arm G on the head B, which latter is likewise provided with a circumferential rib H adapted to interlock with a circumferential groove I in an overhanging arm K on the head A. The engaging faces of these ribs and grooves are slightly cammed or inclined so that when they are engaged with each other, and the heads moved relatively with a rotary motion, the heads will be forced toward each other and the parts held in interlocking engagement, the locking movement being limited by stop pins L, L′ on the respective heads adapted to be engaged by the ends of the respective ribs. In embodying my invention in a coupling of this type, I apply to each head a plurality of stop devices in the form of lugs, four in number in the present instance, and designated by the reference numerals 1, 2, 3, 4, on the head A, and 1^a, 2^a, 3^a, 4^a, on the head B, which stop devices are adapted to coöperate with each other in such manner that when the heads are interlocked as described, the stop lugs will limit the approach of the heads toward each other and thereby will hold the interlocking circumferential ribs and grooves in firm and rigid engagement.

As shown more particularly in Figs. 3 and 4, the stop lugs on each head are located at intervals around the face of the same and are of different heights, the lug 1 being the lowest, the lug 2 the next in height, the lug 3 next, and lug 4 highest. On the companion head B the several lugs are arranged in like manner and at intervals around the face of the same, and are likewise of different heights so as to coöperate with the lugs on head A, lugs 1, 2, 3, 4, on the latter cooperating respectively with lugs 4^a, 3^a, 2^a, 1^a, on the head B. Lugs 1 and 2 on head A are applied to the inner face of its circumferential rib so that they will engage respectively lugs 4^a and 3^a on the head B when the two heads are coupled together, the lugs 4^a and 3^a being applied to the face of head B opposite the overhanging arm thereon. Likewise lugs 3 and 4 on head A are applied to the face of the same beneath or opposite its overhanging arm, and in such position that they will be engaged by lugs 2^a and 1^a respectively on the inner face of the rib of head B, as shown more particularly in Figs. 5 and 6.

The form and relative positions of the several lugs on the two heads are such that they will not engage with each other in the manner described until the coupling action of the parts is nearly completed, the lugs in the first part of the coupling action being out of alinement and disengaged. As a result, when the heads are rotated in the reverse direction to uncouple, the stop lugs will disengage from each other. This permits the heads to be automatically uncoupled when they are straightened out in line to the position shown in Fig. 2, such action as would take place by the separation of the cars in the event of the connection between the cars being accidentally broken. In this position of the parts, the heads have rotated on each other far enough to cause all of the lugs to be out of line and disengaged from each other, and any strain on the heads, under these conditions, will act by the compression of the gaskets to cause the ribs to be forcibly drawn from the grooves and without injury to the parts.

With the parts coupled together, as shown in Fig. 1, which is the normal position the coupling occupies between adjacent cars, the lugs on the respective heads are in engagement with each other and thus act to prevent the two heads from approaching each other any closer, the ribs being held tightly in the grooves and the parts maintained in firm and fixed engagement. As a result, the heads cannot rock or tip on each other laterally under the side strains to which they are subjected when the cars round curves or pass onto switches, and consequently the gaskets are not subjected to uneven compression or wear such as otherwise would be the case, and if there were no means provided for holding the heads apart. Under these conditions, there is no liability of the coupling heads accidentally working apart when the cars assume angular relations to each other, as the tendency would be if the full strain came on the gaskets. Furthermore, by relieving the gaskets of strain and preventing the heads from approaching beyond a certain predetermined point, the gaskets are allowed to contact evenly and uniformly, and in this way insure a fluid-tight connection between the heads.

It will be observed that in the disposition of the lugs on the respective heads the lowest lugs 1 and 3 of the two pairs on head A are situated at the ends of the rib and groove where the parts are first engaged in the locking action; likewise the corre-

sponding lugs of head B. This affords plenty of room at these points to effect the primary engagement of the ribs and grooves without interference by the lugs.

From the foregoing description, it will be seen that the several stop lugs applied and disposed in the manner described, afford rigid supports for the two heads at several points distributed about the transverse openings therein, and serve when in engagement, to hold the heads separated to such extent that the interlocking parts will be maintained in fixed and firm engagement, while the gaskets will be allowed to contact with sufficient force to form a liquid-tight connection between the heads. These gaskets are thus relieved of all strain and are not therefore subjected to injurious or uneven wear. Furthermore, while under these conditions, there will be no liability or risk of the heads separating from each other when the cars assume angular relations, at the same time, when the heads are drawn out to the position shown in Fig. 2, such action as would occur in case of the accidental disconnection of the cars, the stop lugs become disengaged, and further strain on the heads will act to cause the ribs and grooves to be forcibly disengaged and will effect the automatic disconnection of the coupling, and without injury to the parts of the same or the pipes connected thereto.

While in the accompanying drawings I have illustrated my invention in the form which I prefer to adopt, and which in practice has been found to answer to a satisfactory degree the ends to be attained, I wish to be understood that the invention is not to be limited to any particular form or details, except in so far as such are specified in the claims.

Having thus described my invention, what I claim is:—

1. In an automatically separating side port pipe coupling, the combination of two coupling heads provided with interlocking parts adapted by the relative coupling movements of the heads to connect them together, means on the respective heads adapted when the heads are in one coupled position to become active and hold the said parts interlocked while preventing the heads from approaching each other, said means adapted when the heads are moved relatively to each other in an uncoupling direction, to become inactive while the parts are still interlocked; whereby, when the heads are in one full coupled position, they will be held rigidly together, and when in another coupled position they will be permitted to be automatically uncoupled.

2. In an automatically separating side port pipe coupling, the combination of two coupling heads provided respectively with interlocking parts, of unyielding stop devices normally out of engagement with each other when the heads are in one coupled position, and adapted when the heads are in another coupled position to engage with each other, and acting when so engaged to prevent the heads from approaching each other; whereby the heads, when the stop devices are out of engagement, are still coupled together, but may be automatically separated facewise by forcible strain.

3. In an automatically separating side port pipe coupling, the combination of two coupling heads provided respectively with interlocking parts adapted, by the relative coupling movements of the heads, to connect them, and formed to yield when in one coupled position to permit the automatic forcible separation of the coupling heads facewise, unyielding stop devices disengaged from each other when the heads are in said yieldingly coupled position, and adapted when the heads are in another coupled position to engage with each other and prevent the parts from yielding.

4. In an automatically separating side port pipe coupling, the combination with two coupling heads provided with interlocking parts adapted when interlocked with each other to couple the heads in normal angularly related positions, said heads being adapted when subjected to endwise strain to move toward a horizontal position, of means for holding the said heads with the interlocking parts engaged, while preventing the further approach of the heads toward each other when the heads are in an angularly related position, and adapted when the heads are straightened out, to automatically release the interlocking parts while the latter are still engaged; whereby the heads when the interlocking parts are released will be permitted to forcibly separate facewise.

5. In an automatically separating side port pipe coupling, the combination with two coupling heads provided each with a locking lug and overhanging keeper adapted to interlock with each other in a circumferential direction and draw the heads toward each other in a coupled condition, of yielding gaskets projecting from the meeting faces of the heads and adapted to abut as the heads approach, and unyielding stop lugs carried by the respective heads in position to engage behind the locking lugs and hold them in the keepers when the heads are in one coupled position, whereby the further approach of the heads toward each other will be prevented, and adapted when the heads are moved in an uncoupling direction, to disengage the locking lugs while the latter are still engaged with the keepers.

6. In a side port coupling, the combina-

tion of two coupling heads provided each with a locking lug and a keeper adapted to interlock with each other in a circumferential direction to couple the heads together, each of said heads being provided with a plurality of stop devices, those on one head being adapted to coöperate with those on the other in holding the heads against further approach when the lugs and keepers are interlocked, and the stop devices on a head being of different heights.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES FORTH.

Witnesses:
FRANK G. PARKER,
JOHN BUCKLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."