No. 859,936. PATENTED JULY 16, 1907.

E. E. GOLD.

GRAVITY HOSE COUPLING.

APPLICATION FILED MAR. 7, 1905.

FIG. 1.

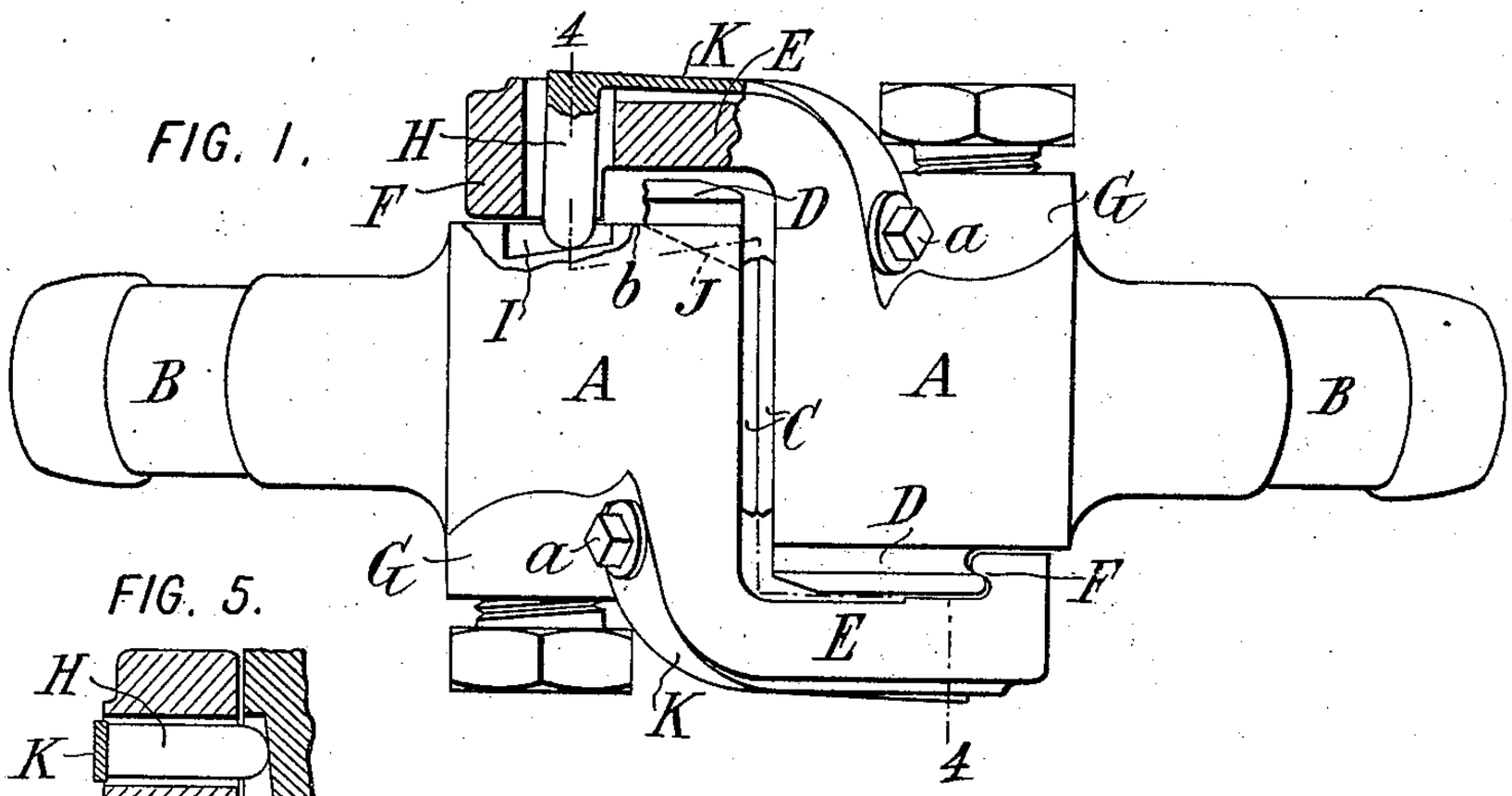


FIG. 5.

FIG. 2.

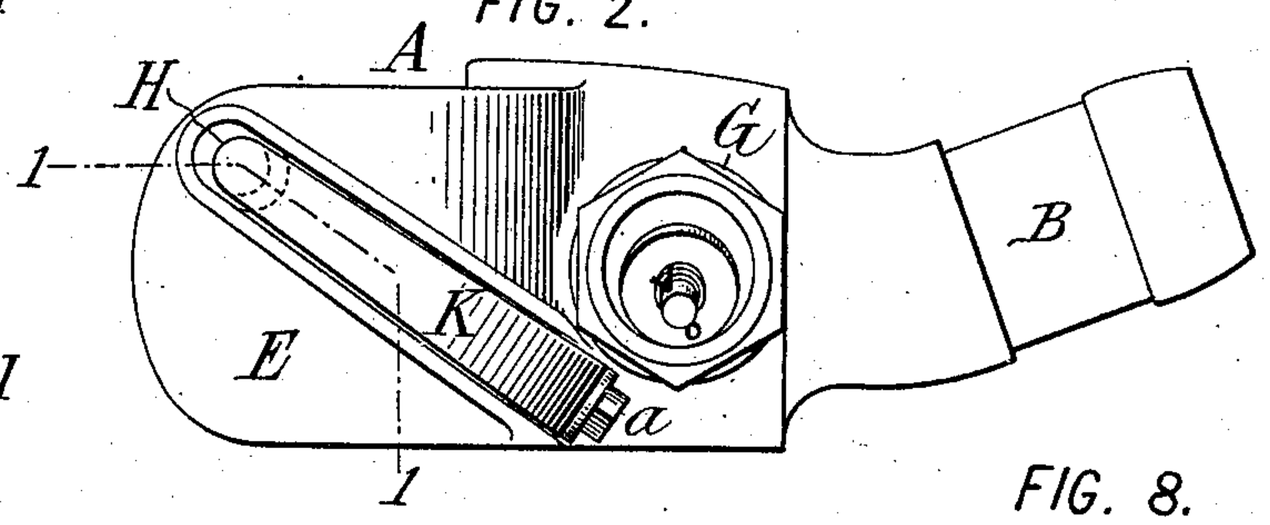


FIG. 6.

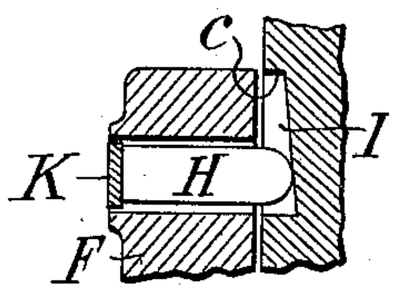


FIG. 3.

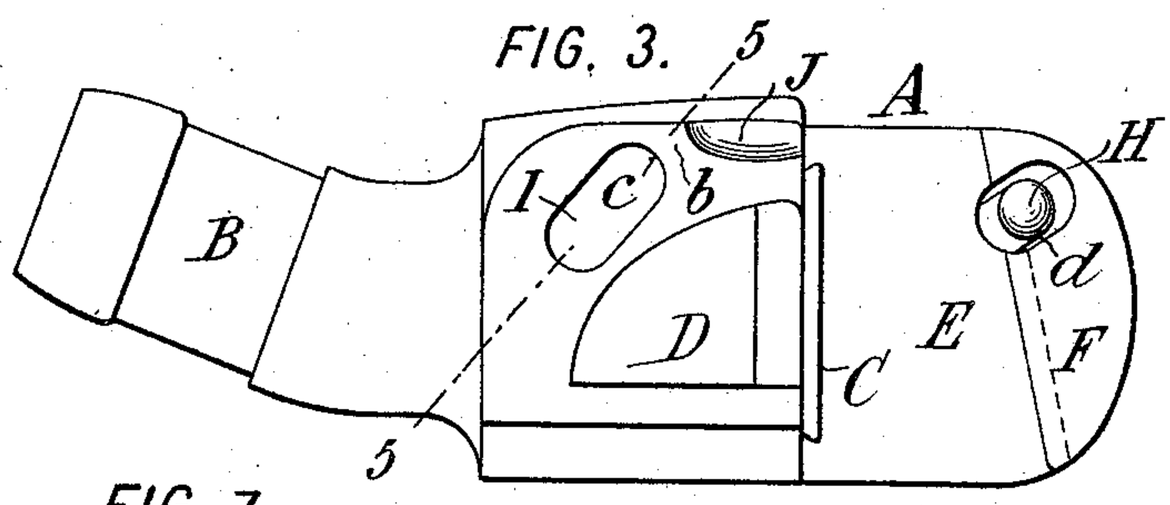


FIG. 8.

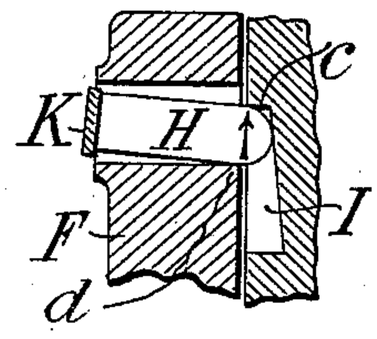


FIG. 9.

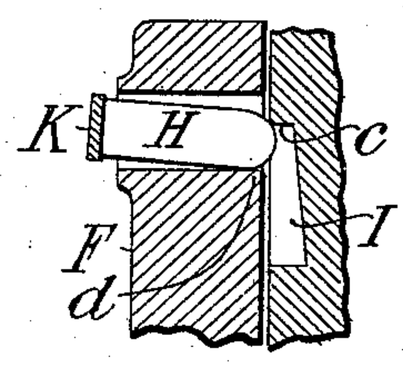


FIG. 7.

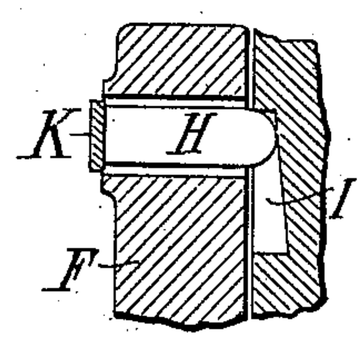
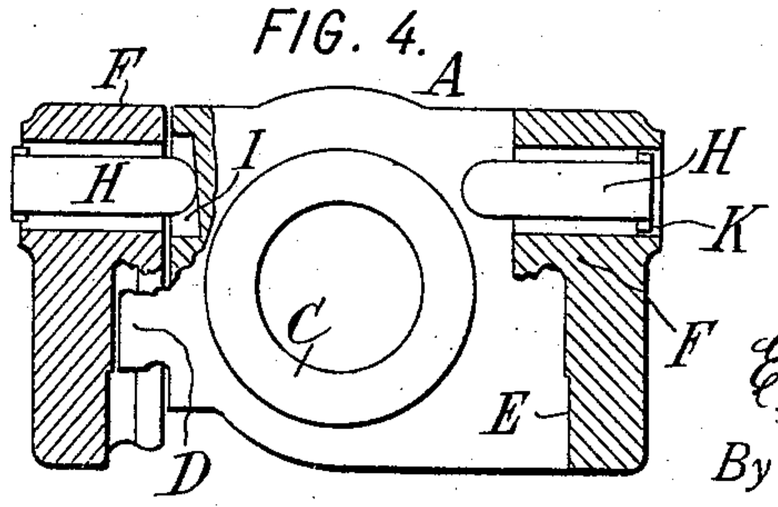


FIG. 4.



WITNESSES:

Fred Whitz

René Bruine

INVENTOR:

Edward E. Gold,

By Attorneys,

Arthur G. Fraser & Co

UNITED STATES PATENT OFFICE.

EDWARD E. GOLD, OF NEW YORK, N. Y.

GRAVITY HOSE-COUPLING.

No. 859,936. Specification of Letters Patent. Patented July 16, 1907.

Application filed March 7, 1905. Serial No. 249,144.

To all whom it may concern:

Be it known that I, EDWARD E. GOLD, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Gravity Hose-Couplings, of which the following is a specification.

This invention relates to direct port or straight port couplers especially adapted for coupling the steam hose of railway cars. Couplers of this type are characterized by a direct or substantially straight steam passage longitudinally through the coupling heads, the meeting faces of which are in a normally vertical plane substantially perpendicular to the general direction of the hose or pipe; the coupling heads are adapted to lock together by gravity, so that they couple by a downward movement and are uncoupled by an upward movement; to this end such couplers have on one side of each head a locking projection or lug, and on the opposite side an arm which projects longitudinally alongside of the opposite head and terminates in an inturned lug or hook having an undercut locking or wedging face adapted to engage with the projection on the opposite head. These features of construction are well understood, and couplers of this character are now in almost universal use for connecting the steam heating hose of railway cars. They are applicable also for air-brake and air-signal hose connections. With such direct port gravity couplers, the stability of the engagement of the respective heads when locked together is due partly to the weight of the heads which by their tendency to descend act to crowd the locking provisions into closer engagement, and partly to the friction of the locking faces which engage with a wedging movement. The drawing apart of the cars when uncoupled acts to strengthen the hose and thereby to throw up the couplers, and automatically uncouples them. This automatic uncoupling is assured by forming the necks of the coupling heads for the attachment of the hose thereto, to project upward at such an angle that the straightening out of the hose will tilt up the seating faces and thereby disengage the coupling provisions. It is practically necessary to make the couplers capable of automatic uncoupling, so that if, in uncoupling two cars, the trainman should omit to part the hose coupling, the latter may part itself by the straightening out of the hose, and without injury to the latter. Difficulty has been experienced with such couplers, because of the liability to uncouple accidentally under certain exceptional circumstances, as in rounding very sharp curves, or on reverse curves, where the hose is pulled out so nearly straight as to approach the direct pull which should produce automatic uncoupling.

My present invention aims to provide a construction of impositive lock for the coupler which shall coöperate with and supplement the ordinary gravity locking provisions in such manner as to effectually prevent accidental uncoupling without preventing the desired automatic uncoupling when the cars are drawn apart. This impositive lock is adapted to provide for variations in the angular extent to which the coupling heads shall lock together, which varies with the varying wear of their locking surfaces and the wear and compression of their yielding gaskets. My impositive lock comprises a spring-pressed part or latch applied to one coupling head and engaging a shoulder or recess formed upon or in the other head, these parts being preferably duplicated symmetrically on the two heads. The shoulder engaged by the spring latch is abrupt, and the recess is prolonged beyond it sufficiently to accommodate the varying degrees of angular engagement of the respective heads. The spring latch is constructed to oppose a maximum resistance to the uncoupling of the heads such as will resist a strong pull upon the hose, which resistance gives way suddenly when the pull increases beyond the maximum which can occur while the cars remain coupled, so that upon the uncoupling of the cars the latch is forced to let go and permit the hose coupler to uncouple. The impositive lock is characterized by the engagement of abrupt faces, one of which is made yielding by being connected with the spring member of the latch, the spring pressure being exerted in such direction as to resist the uncoupling movement by a direct pressure until the stress is so far overcome as to yield to a prescribed extent, and in so yielding to present one of the engaging faces at such angle to the other as to exert a wedge-like thrust tending to displace the movable member of the latch. Preferably such yielding also brings the movable member against an unyielding part by which it is reinforced and the spring protected from extreme strains. The latch forms an impositive lock which resists the unlocking effort cumulatively up to the point of maximum stress, at which it suddenly gives way and permits the uncoupling to be freely accomplished. Preferably also the bottom of the recess beyond the engaging shoulder is inclined, so that if the coupling heads engage angularly beyond the normal extent, the spring latch maintains a constant pressure against the inclined bottom of the recess, and in the initial uncoupling movement the incline first displaces the latch, so that this movement is yieldingly resisted before the abrupt faces can come into engagement.

The nature of my invention being now understood, I will proceed to describe in detail its preferred embodiment with reference to the accompanying drawings, wherein

Figure 1 is a bottom view of a pair of Gold straight-port couplers intercoupled, showing the application of my invention thereto, the respective couplers being partly broken away and in section on the oblique plane 1—1 of Fig. 2; Figs. 2 and 3 are side views of the respective coupling heads separated, showing my invention

as applied thereto; Fig. 4 is a vertical transverse section in three planes denoted approximately by the dotted line 4—4 in Fig. 1; Fig. 5 is a fragmentary oblique section on the line 5—5 in Fig. 3; Figs. 6 to 9 are fragmentary views answering to Fig. 5 but showing the parts in other positions.

Referring to the drawings, let A A designate the respective coupling heads, each of which is provided as usual with a tubular upturned neck B for the attachment of the hose, a seat or gasket C for making a steam-tight joint with the abutting head, and with the usual locking provisions comprising a locking projection or lug D (Fig. 3) on one side, and a forwardly projecting locking arm E on the other side having an inturned lug or locking projection F. The engaging faces of the lugs D and F are made to overhang so as to hook together, as indicated in Fig. 1. In the Gold couplers, each head is also provided with a boss G on one side having a threaded hole into which to screw a drainage trap. All of the parts thus far referred to, and their operation in coupling and uncoupling, are so well understood that further description is unnecessary.

The impositive lock to which my present invention is directed, comprises a spring-pressed latch H applied to one coupling head and engaging a shoulder or recess with which the other head is provided. This latch may be variously constructed. In the preferred construction shown it is in the form of a cylindrical bolt passing horizontally through a hole in the locking arm E, and connected at its outer end to a leaf-spring K which extends along the outer side of the arm E, preferably obliquely, and is fastened at its opposite end to the coupling head by a screw or rivet *a*. The engaging end of the latch H is preferably rounded in approximately spherical form, and projects far enough beyond the inner face of the arm E or its locking projection F to engage a recess I formed in the side of the opposite coupling head. For symmetry, each head is preferably provided with a latch H and recess I. To facilitate coupling, the approach to the recess I is formed as a rising incline J which serves to press back the latch as the couplers come together, until it rides up on a level face *b*, and then drops into the recess I just as the gaskets C C come together. During the uncoupling movement, the latch H abuts against the abrupt shoulder *c* at the margin of the recess I, and resists the continuation of the uncoupling movement, so that it prevents the disengagement of the gravity locking surfaces until the pull in the uncoupling direction has become sufficient to overcome its resistance, whereupon the latch suddenly gives way and permits the couplers to uncouple.

The impositive latch is auxiliary to the normal locking means, so that a pull on the hose which shall uncouple the couplers must be sufficient to overcome not only the weight and friction tending to hold the gravity locking provisions in engagement, but also the resistance offered by the impositive lock or latch H; and the latter is made to offer just enough resistance to hold the couplers in engagement against any pull on the hose short of that which occurs when the cars are uncoupled, and thus prevents accidental uncoupling, while it readily yields to that straightening of the hose which occurs when the cars become uncoupled, and thereby permits automatic uncoupling. This result according to my invention is not closely dependent upon the strength of the spring, as to which it would be difficult to secure that uniformity of action which is important in carrying out the purpose of this invention.

A characteristic of my invention is the provision of the abrupt shoulder *c* which is engaged by the latch H. This, in connection with the shape of the latch, causes the latter to oppose the desired resistance against the uncoupling stress, and finally to give way suddenly to permit uncoupling. The latch H opposes itself an abrupt face to the shoulder *c*, as shown in Fig. 7, where these faces are shown in contact. One of these relatively abrupt faces is spring-mounted by reason of the mounting of the latch H on the spring K. As the uncoupling pressure is applied, the shoulder *c* forces the latch H into an inclined position, as shown in Fig. 8, against the stress of the spring, which resists this movement in a direct line with the pressure, that is to say in the direction of the arrow in Fig. 8. This is due to a twisting or torsional stress applied to the spring. If the uncoupling stress were to relax on reaching the position shown in Fig. 8, the stress of the spring acting in the direction of the arrow, would restore the parts to the position shown in Fig. 7, thus coöperating with the gravitating effect as the hose is slackened. If on the contrary the uncoupling stress increases, the latch H is first thrust solidly against the abutment *d*formed by the margin of the hole in the arm E through which the latch works, thereby limiting the flexure of the spring in order to avoid injury to the latter; the latch H is thus brought into a slightly inclined position, so that the angle between the abutting faces becomes less abrupt; thereupon if the uncoupling stress is sufficiently increased the latch H is forced back in the manner indicated in Fig. 9, until it frees itself from the shoulder *c*, and the resistance which it has thus far opposed to the uncoupling movement suddenly gives way, and the uncoupling movement being no longer opposed, is quickly completed by the relative disengagement of the gravity locking surfaces, and the coup lers fall apart.

Steam couplers in practical use are intercoupled indiscriminately, and in the coupling movement lock together to a greater or less distance according to the varying extent to which their gravity locking surfaces may have become worn, and to the varying extent to which their seats C, or their gaskets or packing rings, may have become worn or flattened by heat and pressure. To provide for this varying extent of engagement, I make the recess I elongated as shown, so that it will accommodate the latch H in its varying positions due to varying degrees of engagement of the heads. Thus Fig. 5 may be taken to represent the degree of engagement with comparatively new heads having normal seats and gaskets; while Fig. 6 may be taken to indicate the relative engagement when the heads are somewhat worn, or more particularly when their gaskets have become softened and flattened by heat and pressure. In the former case the latch H remains adjacent to the shoulder *c*, so that it becomes operative at almost the beginning of the uncoupling movement; in the latter case a portion of the uncoupling movement occurs before the respective faces come into engagement. The former condition is preferable, but the latter is also effective,

since the engagement of the latch H with the shoulder *c* takes place long before the disengagement of the normal coupling surfaces; this extent of movement might occur during the normal running of a train while crossing a reverse curve, and would be apt for an instant to separate the seating faces so as to permit a brief leakage of steam, but this would be instantly stopped upon the resumption of normal conditions upon a nearly straight track, since the gravity action of the couplings, assisted by the hose, restores the heads to their original tight engagement.

It is preferable to make the bottom of the recess I slightly inclined, as best shown in Figs. 5 to 9. The incline is so slight that the horizontal pressure of the spring latch is not translated into a downward thrust such as would tend to close the coupling heads more tightly together. Thus the auxiliary impositive lock does not affect the normal action of the usual gravity locking provisions. The slight incline is, however, sufficient to nearly or substantially overcome the effect of friction between the latch and recess during the downward or coupling movement, so that the latch does not oppose the coupling movement after entering the recess. On the other hand the incline is effective in addition to the friction to oppose the upward or unlocking movement. This movement is thus opposed gently, and sufficiently to prevent any mere jolting from starting this engagement of the couplers, while it affords no serious opposition to the beginning of the uncoupling movement when a pull upon the hose occurs. Upon such pull the first effect is to take up the lost motion due to the varying conditions of wear of the coupling heads, or the varying thickness of their gaskets (two examples of which are shown in Figs. 5 and 6), and bring the spring latch into contact with the abrupt shoulder *c*, as shown in Fig. 7, whereupon the full resistance of the latch to uncoupling is encountered, as already described. It will be understood that the inclined bottom of the recess is effective only when by reason of wear or compression of the gaskets the couplers engage to a materially greater extent than the normal engagement of new couplers having new gaskets.

I do not in this application claim broadly the application to a straight port gravity coupler of an impositive spring latch or one adapted to resist but not prevent the uncoupling movement, this being claimed in my application No. 162,898, filed June 24, 1903.

I claim as my invention the following defined novel features substantially as hereinbefore specified, namely:—

1. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side having gravity locking provisions, combined with an impositive lock comprising abrupt locking faces on the respective heads adapted to resist uncoupling when the hose connections are pulled so nearly straight as to become effective to disengage the gravity locking provisions, and adapted to yield to an extreme pull by an initial movement occurring substantially in the line of the thrust whereby to permit automatic uncoupling while preventing accidental uncoupling.

2. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side having gravity locking provisions, combined with an impositive lock comprising locking faces adapted by their abutment to resist uncoupling, one of said faces formed on a yielding part adapted to yield to an extreme pull in substantially the direction of the thrust exerted against it by the other face and said faces meeting in a plane sufficiently abrupt to cause the initial yielding movement to occur in said direction, to permit automatic uncoupling.

3. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side having gravity locking provisions, combined with an impositive lock comprising abrupt locking faces adapted by their abutment to resist uncoupling, one of said faces formed on a yielding part comprising a leaf-spring adapted to yield in substantially the direction of the thrust exerted against it by the other face by a torsional stress of said spring.

4. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side having gravity locking provisions, combined with an impositive lock comprising abrupt locking faces adapted by their abutment to resist uncoupling, one of said faces formed on a yielding part adapted to yield to an extreme pull in substantially the direction thereof, and an unyielding part arranged to reinforce said yielding part when the latter has been displaced to the prescribed extent, to protect it from excessive strain.

5. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side having gravity locking provisions, combined with an impositive lock comprising abrupt locking faces adapted by their abutment to resist uncoupling, one of said faces formed on a yielding part adapted to yield to an extreme pull in substantially the direction of the thrust exerted against it by the other face by an oblique displacement, whereby to present the yielding face with less abruptness but still at an acute angle to the other face, to facilitate their disengagement.

6. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side, combined with an impositive lock comprising a spring latch on one head engaging a shoulder on the other, said latch having a leaf-spring and adapted to yield to the uncoupling effort first by a torsional stress of said spring, and then by a simple flexure thereof.

7. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the opposite side having gravity locking provisions, combined with an impositive lock comprising a spring latch on one side engaging a shoulder on the other, said latch consisting of a bolt mounted on a leaf-spring, the bolt movable in a socket and adapted to yield to the uncoupling effort by a torsional stress of the spring until it abuts against the wall of the socket, and thereupon to complete its disengaging movement by a recession against the direct stress of the spring.

8. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the other side, combined with an impositive lock comprising a spring latch on one head, and a recess in the other head having an abrupt shoulder, said recess elongated to provide for the abnormal engagement of the coupler heads due to wear of the locking surfaces, or wear or compression of the gaskets.

9. A direct-port gravity coupling comprising heads having each a locking arm on one side and a locking projection on the other side, combined with an impositive lock comprising a spring latch on one head, and a recess in the other head having an abrupt shoulder, said recess elongated to provide for abnormal engagement of the heads, and its bottom inclined at a slight angle such that the thrust of the latch is substantially ineffective to force the heads downward, and is effective to oppose the upward or unlocking movement of the heads.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD E. GOLD.

Witnesses:
ARTHUR C. FRASER,
FRED WHITE.