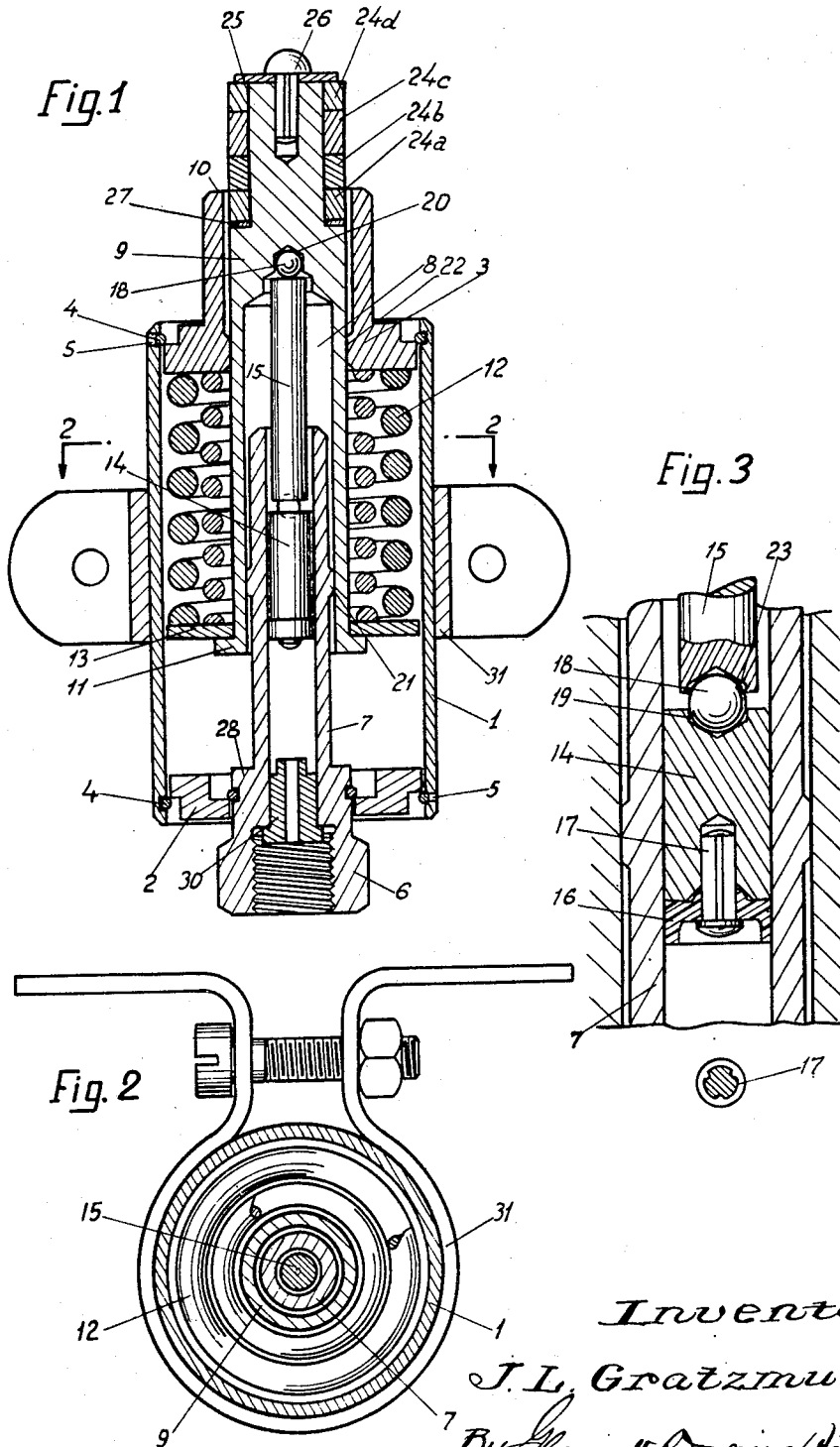


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FLUID PRESSURE INDICATOR

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FLUID PRESSURE INDICATOR

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This invention relates to fluid pressure indicators, particularly for high pressures, of the type comprising a ram cylinder to be fed with a fluid of which the pressure is to be indicated and an index member adapted to be axially displaced with respect to the cylinder of said ram by the piston of the latter against the action of elastic means.

One object of the invention is to provide a fluid pressure indicator of this type solely constituted by a few coaxial members held assembled together by mutual abutment means, under the mere action of said elastic means, at least one of said abutment means being removable to permit dismantling the whole assembly.

Another object of the invention is to provide a fluid pressure indicator of this type in which no movable member is liable to get jammed in operation.

For this purpose, said index member is slidably guided along two narrow annular areas spaced by a considerable axial distance, while the action of the pressure on said ram piston is transmitted to said index member by means of a rod which is out of contact with the wall of said ram cylinder and abuts against said piston and said index member through swivelling contacts.

Other objects and advantages of the invention will be apparent from the following detailed description, together with the accompanying drawing, submitted for purposes of illustration only and not intended to define the scope of the invention, reference being had for that purpose to the subjoined claims.

In these drawings:

Fig. 1 is an axial sectional view of an indicator according to the invention.

Fig. 2 is a section along line 2-2 of Fig. 1.

Fig. 3 is a partial section showing a detail of this indicator.

Referring to the drawings, there is shown at 1 a cylindrical casing opened at both ends, and at 2 and 3 respectively, a bottom member and a head member adapted to be engaged into said cylindrical casing to close its ends. Abutments preventing both bottom and head members from being expelled out of the cylindrical casing are preferably constituted as shown by piano wires 4. Holes 5 are provided opposite the grooves in which said piano wires 4 are mounted to permit expelling said wires out of said grooves when the apparatus is to be dismantled. The pressure fluid is fed through a union 6 integral with an inner cylinder 7 which is slidably and axially mounted through the bottom member 2 and which extends

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along a portion of the cylindrical casing 1. The inner cylinder 7 is slidably mounted, in turn, in the bore 8 of a revolution body 9 which constitutes a slidable index member, the position of which indicates the value of the pressure to be controlled. The slidable member 9 passes through the head member 3 which comprises, on its outer face, a cylindrical shouldering 10 the upper edge of which constitutes the reference line with respect to which the position of member 9 gives the pressure indication. Slidable member 9 is provided at its inner end with a flange 11. A spring (or a set of springs) 12 suitably calibrated is interposed between the inner face of the head member 3 and a washer 13 bearing upon said flange 11. The pressure of the fluid fed into cylinder 7 is transmitted to the sliding member 9 through a piston 14 and a rod 15, interposed between said piston and the bottom of bore 8. In the example shown, piston 14 is provided on its inner face with a packing 16 secured by means of a simple splined nail 17.

It is to be understood that the packing shown in the drawings is merely illustrative and may be substituted for by any other suitable packing device.

Rod 15 is preferably freely mounted between two balls 18 one of which is located in a housing 19 provided in the outer face of piston 14, while the other ball is located in a housing 20 provided in the bottom of bore 8.

As shown in detail in Fig. 3, housings 23 are also preferably provided in both end faces of rod 15. Thus, the latter is perfectly centered without being liable to come into contact either with cylinder 7 or with slidable member 9, except through balls 18.

Any risk of jamming is also prevented from taking place due to the mode of guiding of slidable member 9; in the example shown, this member is guided, on the one hand, through the wall of its bore, which rests against an annular shouldering 21 provided on the outer wall of cylinder 7 and, on the other hand, through its outer wall which slides against an inner annular shouldering 22 of the head member 3; the bearing areas 21 and 22 are thus located a considerable distance apart from one another, which ensures a perfect guiding without any risk of jamming of the slidable member 9.

The outer end of the slidable member 9 is provided with a set of rings 24a, 24b, 24c and 24d, e. g. differently colored, said rings being secured by means of a disc 25 and a splined nail 26, which facilitates their removal and setting. If the ap-

paratus is merely intended to indicate coarsely a few numbers of pressure ranges, it is sufficient to provide a set of a few colored rings to warn the user that the desired pressure range is reached. Moreover, to adapt the apparatus to the indication of other pressure ranges, washers such as 25 may be interposed under the above mentioned colored rings, which permits shifting the same axially to adapt the apparatus to any particular case. Said washers may also be used for adjusting the apparatus, e. g. for taking up mounting inaccuracies or the like.

It is to be understood that graduations may be provided on the outer end of the slidable member 9, so as to obtain, instead of a range pressure indication, an accurate measure of the pressure to be controlled.

To mount this device, it suffices to introduce into the cylindrical casing 1, through one of its ends, the successive telescopic members as shown in the drawings, to bring the head and bottom members towards each other by compressing springs 12, and to secure piano wires 4. Springs 12 are then capable of bringing the inner end of the slidable member 9 into pressure contact against flange 23 of the inner cylinder 7 and the apparatus is ready to work.

The pressure indicator according to the invention operates as follows:

When the pressure fluid is admitted into cylinder 7, piston 14 is pushed upwards, as shown in Fig. 1, while the bottom member 2 is pressed against its abutment 4. The upwards displacement of piston 14 is transmitted through rod 15 to the slidable member 9 which is in turn displaced upwards, as shown in Fig. 1, so that the rings 24d, 24c, 24b and 24a are successively exposed above the upper edge of shouldering 12 of the head member 3.

In the example shown, to prevent piston 14 from being expelled out through the open end of cylinder 7, when no pressure fluid is fed into the latter, a drilled plug 30 is forced into said open end.

This indicator assembly may be secured at any desired point by any suitable means such as an omega stirrup 31.

What I claim is:

1. A fluid pressure indicator constituted by a casing, at least one end face of which is removable, a ram cylinder to be held stationary with respect to one end face of said casing, innerly coaxial with the same, and adapted to be fed with a pressure fluid, a centrally apertured reference index member integral with the other end face of said casing and coaxial therewith, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the aperture of said reference index member, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, removable abutment means interposed between said removable end face and the corresponding end of said casing and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said removable end face against said removable abutment means.

2. A fluid pressure indicator according to claim 1 in which said transmitting means are constituted by swivel contacts provided on said piston and, on the bottom of the bore of said movable index member, by a rod abutting at both ends against said swivel contacts and adapted to be

held out of contact with the inner wall of said ram cylinder.

3. A fluid pressure indicator according to claim 1 in which said transmitting means are constituted by two balls, freely housed in recesses axially provided in the face of said piston opposite to that which is acted upon by said fluid pressure and in the bottom face of the bore of said movable index member and by a rod provided at both ends with similar axial recesses engaged on said balls, said rod having such a diameter as to remain out of contact with the inner wall of said ram cylinder.

4. A fluid pressure indicator constituted by a casing, both end faces of which are removable, a ram cylinder to be held stationary with respect to one end face of said casing, coaxial with the same, and adapted to be fed with a pressure fluid, a centrally apertured reference index member integral with the other end face of said casing and coaxial with the same, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the aperture of said reference index member, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, removable abutment means interposed between each one of said removable end faces and the corresponding end of said casing and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said removable end faces each against the corresponding removable abutment means.

5. A fluid pressure indicator constituted by a casing both end faces of which are removable and centrally apertured, a ram cylinder mounted with a loose fit in the aperture of one of said end faces coaxial with the same and adapted to be fed with the pressure fluid, a centrally apertured reference index member integral with the other end of said end faces and coaxial with the same, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the aperture of said reference index member, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, removable abutment means interposed between each one of said removable end faces and the corresponding end of said casing and between said ram cylinder and the corresponding end face and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said removable end faces and ram cylinder each against the corresponding abutment means.

6. A fluid pressure indicator constituted by a casing both end faces of which are removable and centrally apertured, a ram cylinder mounted with a loose fit in said casing through the aperture of one of said end faces, coaxial with the same and adapted to be fed with a pressure fluid, a centrally apertured reference index member integral with the other end of said end faces and coaxial with the same, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the apertures of said other end face and reference index member, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, a ring mounted with a loose fit on the inner end of said movable index member, removable abutment means interposed between said removable end faces and the

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corresponding ends of said casing, between said ram cylinder and the corresponding end face and between said ring and the inner end of said movable index member and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said ring, removable end faces and ram cylinder each against the corresponding removable abutment means.

7. A fluid pressure indicator constituted by a casing at least one end face of which is removable, a ram cylinder to be held stationary with respect to one end face of said casing, innerly coaxial with the same, and adapted to be fed with a pressure fluid, a centrally apertured reference index member integral with the other end face of said casing and coaxial therewith, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the aperture of said reference index member through two bearing areas in said member spaced a considerable distance apart from each other with a clearance permitting a suitable angular mutual orientation, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, removable abutment means interposed between said removable end face and the corresponding end of said casing and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said removable end face against said removable abutment means.

8. A fluid pressure indicator constituted by a casing having one integral end face and one removable end face, a ram cylinder to be held stationary with respect to said integral end face, innerly coaxial with the same and adapted to be fed with a pressure fluid, a centrally apertured reference index member integral with said removable end face and coaxial therewith, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the aperture of said reference index member, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, removable abutment means interposed between said removable end face and the corresponding end of said casing and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said removable end face against said removable abutment means.

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9. A pressure fluid indicator constituted by a casing having one integral end face and one removable end face, a ram cylinder to be held stationary with respect to said removable end face, innerly coaxial with the same and adapted to be fed with a pressure fluid, a centrally apertured reference index member made in one piece with said integral end face and coaxial therewith, a bored movable index member coaxial with said ram cylinder and slidably mounted thereon and in the aperture of said reference index member, means to transmit the displacements of the piston of said ram under the action of said fluid pressure to said movable index member, removable abutment means interposed between said removable end face and the corresponding end of said casing and elastic means interposed between said reference and movable index members to act upon the latter against the action of said pressure and to press said removable end face against said removable abutment means.

10. A fluid pressure indicator according to claim 1 in which said movable index member is provided at its outer end with a set of variously colored rings successively appearing out of said reference index member as the pressure fed into said ram cylinder increases.

11. A fluid pressure indicator according to claim 1 in which said removable abutment means are constituted by a piano wire housed in a peripheral groove in one of the two members between which are interposed said removable abutment means.

12. A fluid pressure indicator according to claim 5 in which each one of said removable abutment means is constituted by a piano wire housed in a peripheral groove in one of the two members between which is interposed said removable abutment means.

13. A fluid pressure indicator according to claim 6 in which each one of said removable abutment means is constituted by a piano wire housed in a peripheral groove in one of the two members between which is interposed said removable abutment means.

14. A fluid pressure indicator according to claim 1 in which said movable index member carries at one end a graduating member and in which a set of washers, the number of which is variable at will, is interposed between said graduating member and said movable index member.

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No references cited.