Sept. 7, 1937. C. H. SCHNORR 2,092,535

THREAD PROTECTOR

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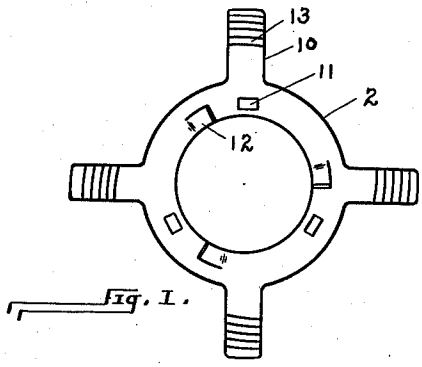


Fig. I.

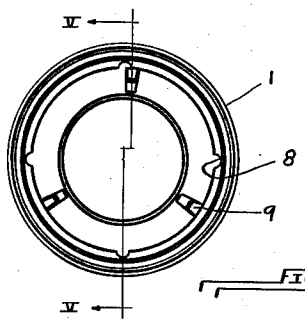


Fig. III.

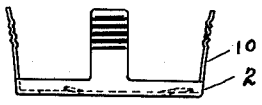


Fig. II.

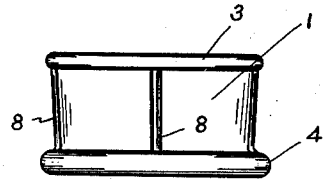


Fig. IV.

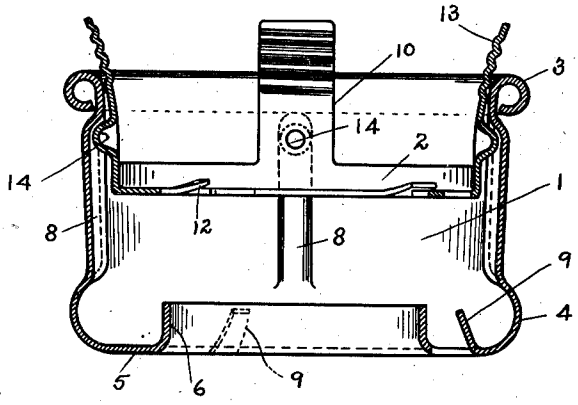


Fig. V.

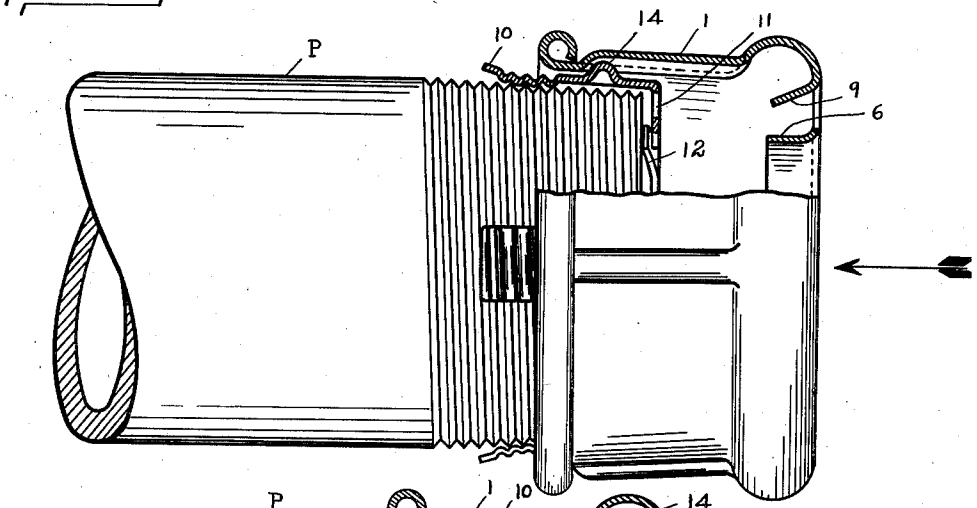
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THREAD PROTECTOR

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Fig. VI.



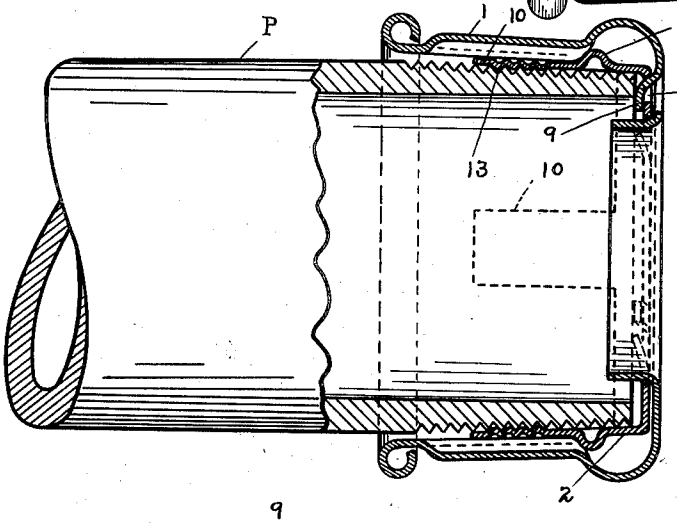


Fig. VII.

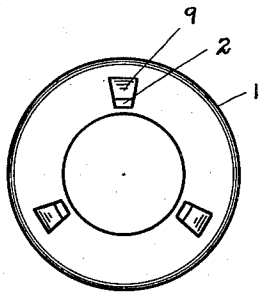


Fig. VIII.

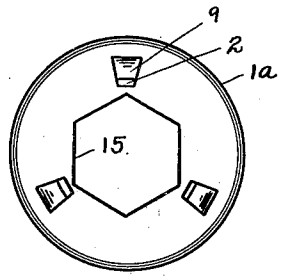


Fig. IX.

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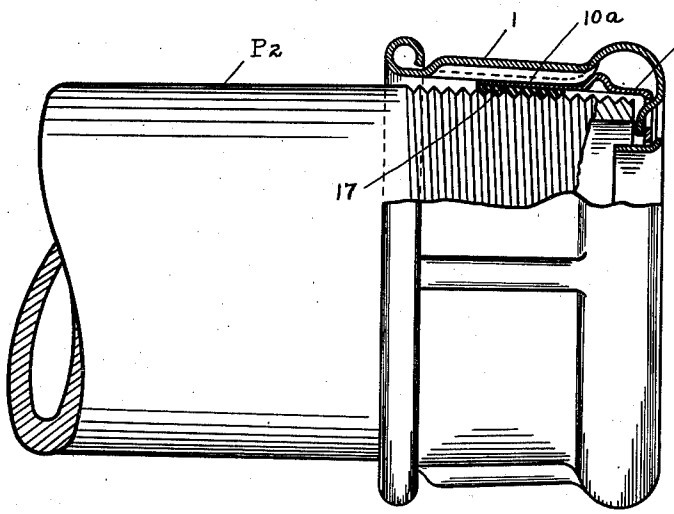


Fig. X.

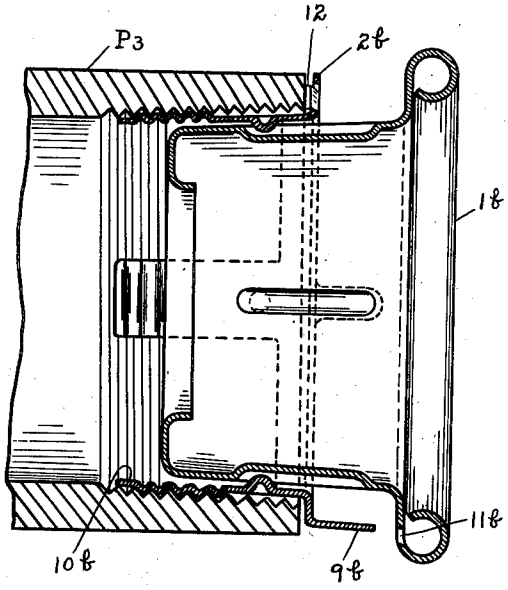


Fig. XI.

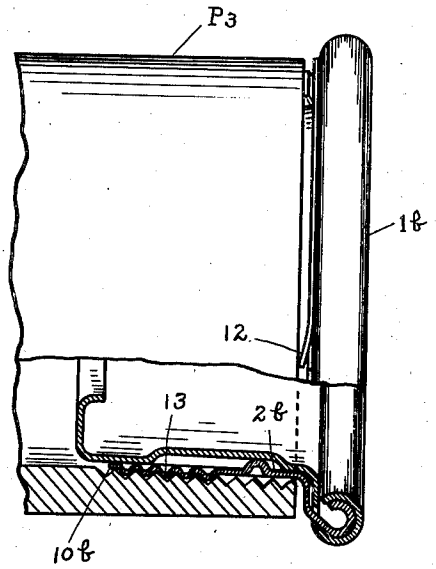


Fig. XII.

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UNITED STATES PATENT OFFICE

2,092,535

THREAD PROTECTOR

Charles H. Schnorr, New Kensington, Pa.

Application May 28, 1936, Serial No. 82,205

7 Claims. (Cl. 138—96)

This invention relates to thread-protectors for pipe, and consists in a structure that is cheap and efficient. The article as preferably constructed consists of two pieces, shaped from sheet steel.

In the accompanying drawings Fig. I is a view in plan of one of the two pieces in course of fabrication; Fig. II is a view in side elevation of the same piece when fully fabricated and ready for assembly with the companion piece; Figs. III and IV are views in end and side elevations of the fully fabricated second and companion piece; Fig. V is a view to larger scale, showing in approximately axial section the two pieces assembled and ready for application in service. The plane of section of the outer piece of Fig. V is indicated by the broken line V—V, Fig. III. Fig. VI shows partly in elevation and partly in section the assembled protector brought to position upon a length of pipe whose threaded end is to be protected; Fig. VII illustrates the protector after being driven home, to its ultimate protecting position upon the pipe-end. Fig. VIII is a view to smaller scale, showing in end elevation the assembly of Fig. VII. Fig. IX is a view otherwise corresponding to Fig. VIII, but illustrating a variation in detail. Fig. X is a view substantially corresponding in other respects to Fig. VII, but illustrating a variation that more particularly adapts the protector to a special use. Figs. XI and XII are views corresponding to Figs. VI and VII, and showing the protector of the invention adapted to serve in protecting an internally threaded pipe-end.

The thread-protector of the invention includes an essentially cylindrical shield member, which in the assembly overlies the threaded area upon the pipe, to afford the desired protection, and a thread-engaging member, with which the cylindrical shield member cooperates, to bring it to thread-engaging position, and which when the parts are assembled and applied to a pipe-length serves as an anchor for the shield member. The thread-engaging member advantageously is compound, and made up of a plurality of finger-like extensions upon an essentially annular body. The shield member is a compression member which, advancing upon the thread-engaging member, shifts it to and (the members interlocking) holds it in thread-engaging position. Both of the two members may be formed of sheet steel of proper quality extruded between dies. The possibility of forming either or both of them by spinning or by minor shaping from rolled tubular blanks will, however, be recognized.

Referring first to Figs. I–IV of the drawings, the shield member is indicated at 1 in Figs. III and IV, and the thread-engaging member at 2, in Figs. I and II. The shield member 1 is essentially cylindrical: the slight taper is such as to correspond to the normal taper of the threaded end of the pipe. At one end the member 1 is strengthened by a rolled bead 3; at the other end there is a rounded enlargement, continued in a web 5 that extends in the plane transverse to the axis of the member, and then an inturned rim 6. In Fig. V it will be seen that this shield member is approximately cup-shaped, with beaded rim 3, bulbous base 4, 5, and with a central bottom orifice that is edged by the flange 6. Additionally, the approximately cylindrical sides of the member 1 (the walls of the cup) are, through an intermediate portion of their extent, provided with longitudinally extending grooves 8; and from the web 5 tongues 9 are slit and bent inward. The numbers and the spacing are of no controlling importance; but, by way of example, it will be noted in Fig. III that there are four slots 8 equally spaced about the circumference of the cylindrical member, and three equally spaced tongues 9.

The thread-engaging member 2 is, in preferred procedure, first punched in the flat, as shown in Fig. I, and consists of an annulus, to which the numeral 2 is immediately applied, and a plurality of outward and radially extending fingers 10, here shown to be four in number and equally spaced about the circumference of the ring. These matters of number and spacing are not of primary importance; and departures from the illustration in these respects are obviously permissible. The annulus is punched through near its inner edge with orifices 11 that correspond in size, number, and position with the tongues 9 upon the shield member. From the annulus at its inner edge additionally tongues 12 are slit and bent inward (with respect to the ultimate assembly—cf. Fig. V). The fingers 10 are corrugated, as indicated at 13, with corrugations that in interval and in inclination are such as to correspond with the threads to be protected (as hereinafter will more clearly appear).

The article of Fig. I, fabricated as described, is next shaped between dies to the cupped form shown in Fig. II. The annulus becomes the centrally ported bottom and the side walls of a shallow cup, and from the rim of the cup rise the outwardly flaring fingers 10. The two cup-like members are of such relative sizes that the base of the cup 2 will enter the mouth of cup 1, and the flaring fingers 10 will rest upon the rim

of cup 1 (cf. Fig. V). When the members have been assembled in the position just indicated, and the member 2 turned until the orifices 11 are longitudinally aligned with the tongues 9 upon member 1, bosses 14 are raised at the bases of fingers 10 which bosses, entering grooves 8, serve both to secure the assembled members against separation, and to guide the members in telescopic movement. Fig. V shows the complete thread-protector, as it is initially assembled and marketed, ready to be applied to a pipe-end.

In making application the thread-protector is placed upon the threaded end of a pipe length P, as illustrated in Fig. VI. The in-turned tongues 12 upon member 2 bear upon the end of the pipe. A mallet blow is then delivered upon the outer end of member 1. But for the resilience of tongues 12 the member 2 is restrained by its abutment upon the pipe-end from displacement longitudinally upon the pipe. Member 1, however, telescopes upon member 2 and advances from right to left until it too abuts upon the pipe-end (with the base web of member 2 between). In this advance the basal flange 6 of member 1 telescopes in the basal orifice in member 2; the tongues 9 passing through orifices 11 and striking the pipe-end are bent aside, locking the members together; and the flaring fingers are compressed by the advance of member 1 upon them and their corrugated faces are closed upon the threads upon the pipe. This swinging of the fingers 10 is radial, that is to say, the directions of swing are inward and in planes that are radial with respect to the common axis of the assembly and of the pipe-end. The resilience of the tongues 12 is effective so to cushion the advance of member 2 that the protector comes to rest with the corrugations upon fingers 10 in mesh with the threads upon the pipe. The provision of tongues 12 avoids the unsurmountable difficulty that, otherwise, in making application the thread-protector would have to be adjusted circumferentially and with precision; so that, when driven home in firm abutment upon the pipe-end, the corrugations would be in mesh with the pipe threads. The applied protector is illustrated in Fig. VII.

It is manifest that in spacing and position the corrugations 13 upon the fingers 10 are such that when, under the compressive impulse of the advancing annulus 1, the fingers are swung to ultimate position, the assembled fingers form a threaded facing of interrupted continuity upon the shield member 1, and that this facing is in mesh with the threads of the pipe P that the structure protects. The two members of the protector are now locked together, and the integrated whole is secure in its thread-protecting position. It can be removed only by being unscrewed from its position upon the threaded pipe-end.

Removal of the thread-protector, after it has once been applied, is effected by means of a wrench engaging the outer cylindrical surface. Figs. VIII and IX serve to illustrate a modification in detail, that may be adopted to facilitate removal. The protector as seen in Fig. VIII is that already described, in which the orifice in the base of the cup-shaped shield member 1 is circular. Fig. IX shows this orifice modified to polygonal shape, as indicated at 15. Such a shape manifestly will afford purchase for a correspondingly shaped stud of a wrench for unscrewing the protector from the pipe-end.

The protector of Figs. I–IX is adequate in application to such pipe, for example, as the rolled steel pipe commonly used for conducting natural gas and petroleum. There are cases where, because of the material of which the pipe is made or because of the fineness or the delicacy of the thread, a further refinement in the structure of the protector is desirable. Such refinement is illustrated in Fig. X. In this case the fingers 10*a* of the inner and thread-engaging member 2*a* are not corrugated. Instead, they are provided with facings 17 of plastic and preferably resilient material, typically rubber. In making application in the manner described, this plastic facing is shaped under compression to the threaded surface of the pipe P_2. The extent and the consistency of the facing 17 are such that the applied protector can be removed only by screwing it off, as in the case first described. And, since no accommodation is in this case involved because of a fixed space interval between rigid corrugations upon the fingers and the bottom of the cup-shaped member, the cushioning and space-accommodating tongues (tongues 12, Fig. VI) of the thread-engaging member are not necessary. No such tongues are found in the member 2*a* of Fig. X.

These extensions or the thread-engaging faces thereof may even be formed of soft metal such that, under the stress of application, it will shape itself to the threads upon the pipe.

The protectors of Figs. I—X are designed for pipe that is exteriorly threaded. Figs. XI and XII show the invention embodied in a protector for an interiorly threaded pipe-end P_3. In this case the shield member 1*b* telescopes within the thread-engaging member 2*b* and compresses the fingers 10*b* outwardly to engagement with the pipe threads. The adaptations in shape are obvious. The fingers 10*b* upon the member 2*b* are initially inwardly converging, not outwardly diverging, in their extent. Both these particular groupings I characterize by the inclusive term "radiating". In order to abut upon the pipe-end and so to be held stationary while the compression member telescopes within it, the basal flange of the thread-engaging member (to which the numeral 2*b* is immediately applied) is outwardly, not inwardly, turned. And the cup to which the shield member 1*b* is approximately shaped is driven bottom foremost within, not rim foremost around, the member 2*b*. The space-accommodating tongues 12 are formed in the outwardly turned flange of member 2*b*; the tongues 9*b* and the orifices 11*b* that cooperate to lock immovably together the telescoped members are conveniently arranged in reverse, as a comparative glance at Figs. VI and XI will show.

With the qualification that the swinging of the fingers is outward, not inward, the application of the protector of Figs. XI and XII is effected in the manner already described in connection with the protector of Figs. VI and VII; and removal is effected in like manner, by unscrewing.

The thread-protector of the invention will ordinarily be used once and then discarded; it is, however, capable of being used again, when once it has been unscrewed from a pipe-end, by being screwed as an integer upon another threaded pipe-end.

I claim as my invention:

1. A thread-protector for pipe including an essentially cylindrical shield member and a thread-engaging member, the thread-engaging member being adapted to abut upon a pipe-end and by

such abutment to be held against longitudinal displacement upon the pipe-end and being movable radially to thread-engaging position in response to longitudinal movement of the shield member relatively to a pipe-end to which application is made.

2. A thread-protector for pipe including an essentially cylindrical shield member and an essentially annular thread-engaging member, the thread-engaging member being adapted to abut upon a pipe-end and by such abutment to be held against longitudinal displacement upon the pipe-end and being provided with a radially movable extension, the shield member being adapted to advance telescopically upon the thread-engaging member and adapted in such advance by engagement with the said extension to move the same radially to thread-engaging position.

3. The structure of claim 2, the extension upon the thread-engaging member being provided with thread-engaging corrugation and a resilient spacing member being provided sustaining the abutment of the thread-engaging member upon the pipe-end.

4. A thread-protector for pipe including an essentially cylindrical shield member and an essentially annular thread-engaging member provided with a radially movable extension, the extension being provided with thread-engaging corrugation, and the thread-engaging member being provided with a resilient tongue through which it is adapted immediately to make abutment upon a pipe-end, the shield member being adapted to advance telescopically upon the thread-engaging member when the latter is in abutment upon a pipe-end and in such advance, by engagement with the said extension, to swing the same radially to thread-engaging position; and in such advance, by abutment upon the thread-engaging member, to shift it also against the tension of said resilient tongue.

5. A thread-protector for pipe including an essentially cylindrical shield member and an essentially annular thread-engaging member, the thread-engaging member being provided with a plurality of normally radiating and radially movable extensions, and the thread-engaging member being adapted to abut upon a pipe-end, the shield member being adapted to advance telescopically upon the thread-engaging member and in such advance, engaging said extensions, to move them radially to thread-engaging positions.

6. A thread-protector for pipe including an essentially cylindrical shield member and an essentially annular thread-engaging member, the thread-engaging member being provided with a radially movable extension, and being adapted to abut upon a pipe-end, the shield member being adapted to advance telescopically upon the thread-engaging member and in such advance engaging the said extension to shift it radially to thread-engaging position, and means rendered effective by such advance of the shield member telescopically upon the thread-engaging member for securing said parts against relative movement under rotative stress.

7. A protector for a threaded pipe-end or the like, said protector including a member adapted to encompass said pipe-end, and a thread-engaging member adjustable telescopically with respect to said pipe-encompassing member and adapted to abut upon the pipe-end and by such abutment to be held against displacement longitudinally of the pipe end, said two members engaging one another on a surface inclined with respect to the line of telescopic adjustment for effecting (in response to such adjustment) the radial movement of said thread-engaging member into thread-engaging position, and means rendered effective by the advance of the pipe-encompassing member telescopically upon the thread-engaging member for securing the two members against relative movement under rotative stress.

CHARLES H. SCHNORR.