

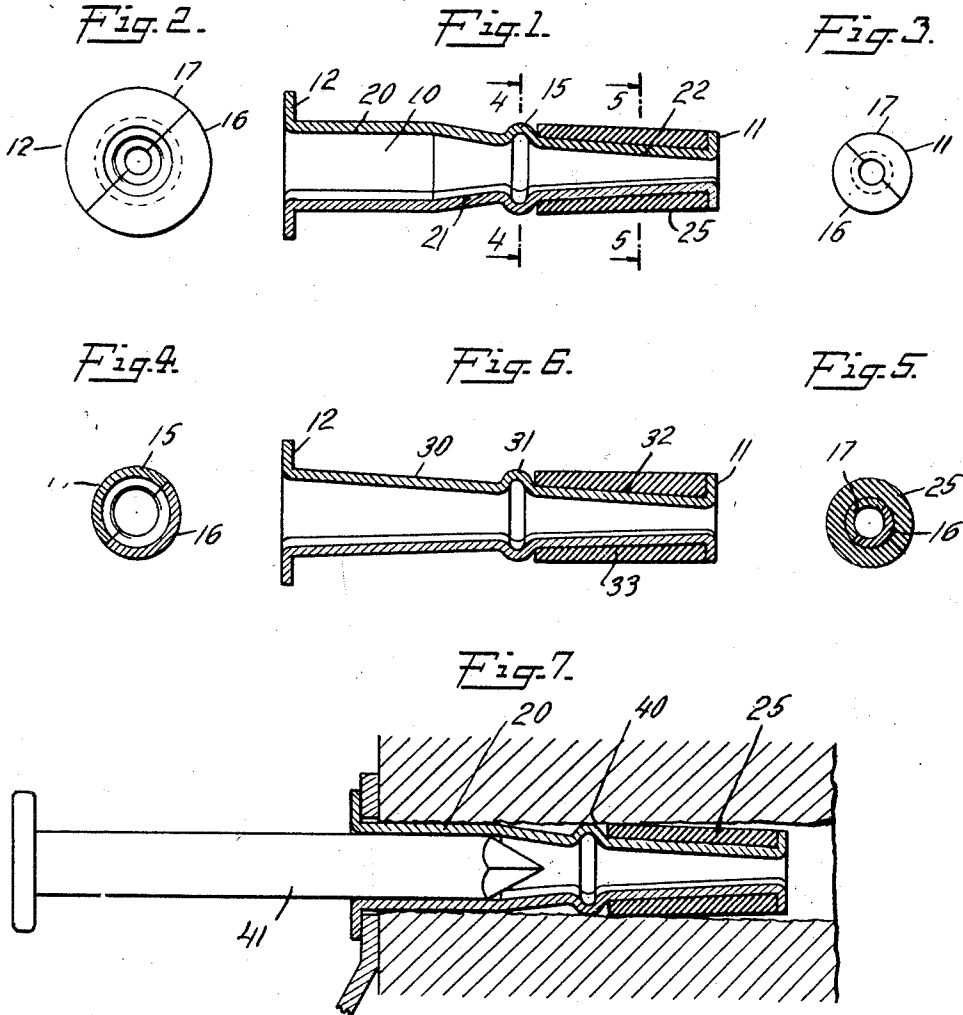
April 14, 1931.

C. C. TOMKINSON

1,800,968

EXPANSION SHIELD

Filed Jan. 17, 1928



INVENTOR
Charles C. Tomkinson
BY
Marshall & Hawley,
ATTORNEYS

UNITED STATES PATENT OFFICE

CHARLES C. TOMKINSON, OF PLAINFIELD, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO J. EDWARD OGDEN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

EXPANSION SHIELD

Application filed January 17, 1928. Serial No. 247,294.

This invention relates to expansion shields and particularly to shields of the "drive in" type.

The pressure caused by the expanding element in a drive in shield of the type specified in very great and in drive in shields having a soft metal sleeve mounted on the outer surface of a relatively hard shell the soft metal tends to flow longitudinally under the pressure of expansion due to the expanding element. In order to use to the full the gripping function obtained by the expansion of a soft metal sleeve it is essential that the sleeve be confined against longitudinal flowing or expansion so that the expansion of the shell will force the soft metal sleeve laterally. Furthermore, with a drive in expanding element it has been found that the vibration of this element, due to the blows thereon, tends to cause the soft metal to flow longitudinally.

The invention has for its salient object to provide a simple and practical shield of the type specified having superior gripping qualities.

Another object of the invention is to provide a shield comprising a shell having a soft metal sleeve mounted thereon and so constructed and arranged that the shell and sleeve will both be expanded to grip the inner surface of the wall opening and the sleeve will be held against longitudinal movement during the expansion of the shield and sleeve.

Further objects of the invention will appear from the following specification taken in connection with the drawings, which form a part of this application, and in which

Fig. 1 is a longitudinal sectional elevation of an expansion shield constructed in accordance with the invention;

Fig. 2 is an end elevation of the outer end of the shield;

Fig. 3 is an end elevation of the inner end of the shield;

Fig. 4 is a transverse sectional elevation taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a similar section taken substantially on line 5—5 of Fig. 1;

Fig. 6 is a view similar to Fig. 1 but illustrating a slightly different embodiment of the invention; and

Fig. 7 is a sectional elevation similar to Fig. 1 showing the shield disposed in a wall opening and a drive in expanding element positioned in the shield, the parts being shown prior to expansion thereof.

The invention briefly described consists of an expansion shield comprising a shell formed of relatively hard metal and having an annular ridge intermediate the ends thereof. The shell is longitudinally tapered and in one form of the invention is cylindrical for a portion of its length and is tapered at different angles on opposite sides of the ridge. In another form of the invention the shield is longitudinally tapered throughout its length. A sleeve of relatively soft metal is mounted on the inner portion of the shell and abuts at one end of the annular ridge and at the other end an annular flange formed on the inner end of the shield. When a drive in expanding member is driven into the shield the relatively hard metal shell is expanded, forcing the annular ridge into gripping engagement with the wall opening, and further movement of the expanding member into the shield forces the soft metal sleeve into firm gripping engagement with the wall opening. The soft metal sleeve is confined between the annular ridge and the annular flange at the inner end of the shield.

Further details of the invention will appear from the following description.

In the form of the invention illustrated in Figs. 1 to 5 inclusive the shield comprises a shell 10 of relatively hard metal having annular flanges 11 and 12 at the inner and outer ends thereof and having an annular outwardly extending ridge 15 intermediate the ends thereof. The shell may be formed of one piece or may comprise two sections 16 and 17 as shown in the drawings.

In Fig. 1 the shell is illustrated as having a cylindrical portion 20, a tapered portion 21 at one side of the ridge 15, and a tapered portion 22 at the other side of the ridge. It will be noted that the portion 21 is tapered at a steeper angle than the portion 22.

A sleeve 25 of relatively soft or ductile

metal is mounted on the portion 22 of the shell and abuts at one end the ridge 15 and at the opposite end the flange 11. It will be noted that the ridge 15 has a greater outside diameter than the diameter of the flange 11 and the ductile sleeve has its outer surface tapered from the diameter of the ridge to the diameter of the flange. Also, the outside diameter of the cylindrical portion 20 is substantially the same as the outside diameter of the ridge 15.

In Fig. 6 the shell is tapered throughout its length, one tapered portion 30 being disposed at one side of the annular ridge 31 and the other tapered portion 32 being disposed at the other side of the ridge 31. Both portions 30 and 32 are tapered on the same angle although it will be understood that they may be tapered at different angles if desired. In this embodiment of the invention the outside diameter of the ridge 31 is substantially the same as the diameter of the inner flange 11. A sleeve 33 of relatively soft or ductile metal is mounted on the portion 32 of the shell and abuts at its ends the ridge and the flange 11. The outer surface of the sleeve 33 is substantially cylindrical and the inner surface of the sleeve is tapered to correspond to the taper of the portion 32 of the shell.

In Fig. 7 the shield shown in Fig. 1 is illustrated as positioned in a wall opening 40. A drive-in expanding element or nail 41 is positioned in the cylindrical portion 20 of the shell and is about to enter the tapered portion 21. When the nail 41 is driven into the shield the shield sections will be expanded and the ridge 15 will be forced into firm gripping engagement with the wall opening 40. The travel of the nail or expanding element 41 into the tapered portion 22 will cause this portion of the shell to expand and to force laterally the soft metal sleeve 25, thus forcing the sleeve into firm and secure gripping engagement with the wall opening. Any longitudinal movement or flowing of the sleeve will be effectively prevented by the ridge 15 and the flange 11.

Although certain specific embodiments of the invention have been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. An expansion shield comprising a longitudinally tapered, laterally expansible shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portions of the shell on both sides of the ridge, and a sleeve of rela-

tively soft metal encircling the shell and abutting said ridge.

2. An expansion shield comprising a longitudinally tapered, laterally expansible shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portions of the shell on both sides of the ridge, and a laterally extending flange at the inner end thereof, and a sleeve of relatively soft metal encircling the shell and abutting said ridge.

3. An expansion shield comprising a longitudinally tapered shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portions of the shell on both sides of the ridge, and a laterally extending flange at the inner end thereof, and a sleeve of relatively soft metal encircling the shell and abutting said ridge and said flange.

4. An expansion shield comprising a longitudinally tapered, laterally expansible shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portions of the shell on both sides of the ridge, and a laterally extending flange at the inner end thereof, and a sleeve of relatively soft metal encircling the shell and abutting said ridge, the outside diameter of the ridge being greater than the diameter of the flange.

5. An expansion shield comprising a longitudinally tapered, laterally expansible shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portion of the shell and a laterally extending flange at the inner end thereof, and a sleeve of relatively soft metal encircling the shell and abutting said ridge, the outside diameter of the ridge being greater than the diameter of the flange, and the outer surface of the sleeve being tapered from the ridge toward the flange.

6. An expansion shield comprising a longitudinally tapered, laterally expansible shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portion of the shell and a sleeve of relatively soft metal encircling the shell and abutting said ridge, said sleeve being tapered in thickness from end to end and in a direction opposite to the taper of the shell.

7. An expansion shield comprising a longitudinally tapered, laterally expansible shell of relatively hard metal having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portion of the shell and a sleeve of relatively soft metal encircling the shell and abutting said ridge, said shell being tapered

at different angles on opposite sides of said ridge.

8. An expansion shield comprising a laterally expansible shell of relatively hard metal having a cylindrical portion, a longitudinally tapered portion, and an annular outwardly extending ridge intermediate the ends of the shell and projecting laterally beyond the adjacent portions of the shell, said cylindrical portion adjoining said tapered portion, and a sleeve of relatively soft metal encircling said shell.

9. An expansion shield comprising a laterally expansible shell of relatively hard metal having a cylindrical portion, a longitudinally tapered portion adjoining said cylindrical portion, an annular outwardly extending ridge projecting laterally beyond the adjacent portions of the shell, a second tapered portion at the inner end of the shell, and a sleeve of relatively soft metal encircling said second tapered portion.

10. An expansion shield comprising a shell of relatively hard metal having a tapered inner portion, a laterally extending flange at the inner end of the shield and an annular outwardly extending ridge intermediate the ends of the shell and at the outer end of the tapered portion, said ridge projecting laterally beyond the adjacent portions of the shell and a sleeve of ductile metal encircling the tapered portion of the shell and abutting said ridge and said flange.

11. An expansion shield comprising a laterally expansible shell of relatively hard metal having a portion tapered inwardly in a direction from the outer toward the inner end of the shield, an annular, laterally extending ridge adjoining the inner end of the tapered portion, and a sleeve of ductile metal encircling the shell and disposed inwardly of the ridge.

12. An expansion shield comprising a longitudinally tapered laterally expansible shell having an annular outwardly extending ridge intermediate the ends thereof, projecting laterally beyond the adjacent portions of the shell, and a sleeve encircling the shell and abutting said ridge, said sleeve being tapered in thickness from end to end and in a direction opposite to the taper of the shell.

13. An expansion shield comprising a longitudinally tapered, laterally expansible shell having an annular outwardly extending ridge intermediate the ends thereof projecting laterally beyond the adjacent portions of the shell on both sides of the ridge, and a sleeve encircling the shell and abutting said ridge.

In witness whereof, I have hereunto set my hand this 5th day of January, 1928.

CHARLES C. TOMKINSON.