

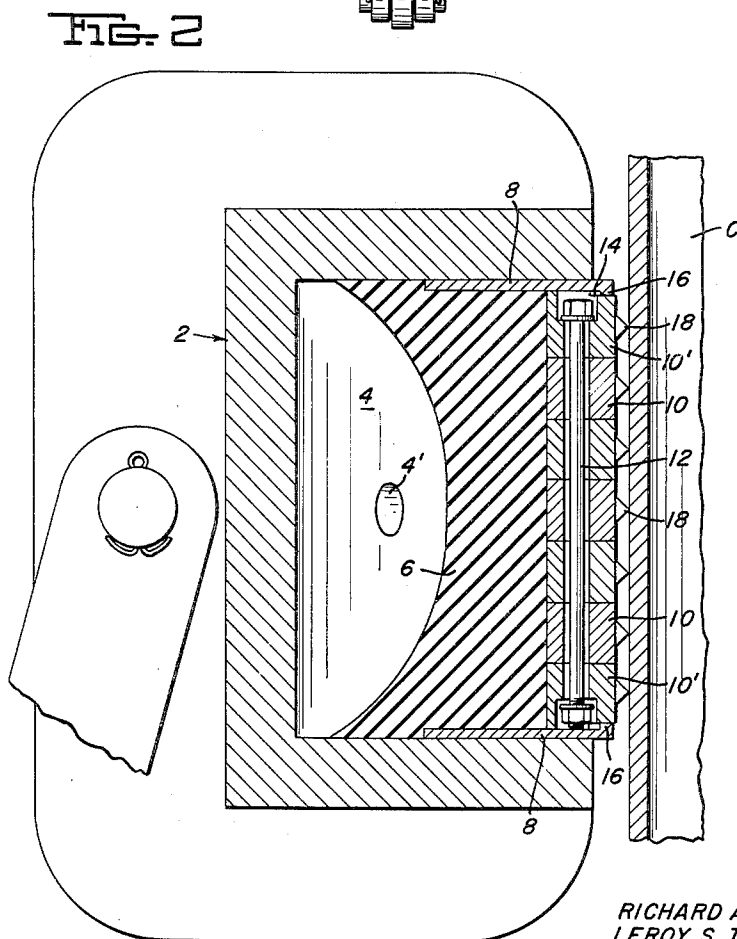
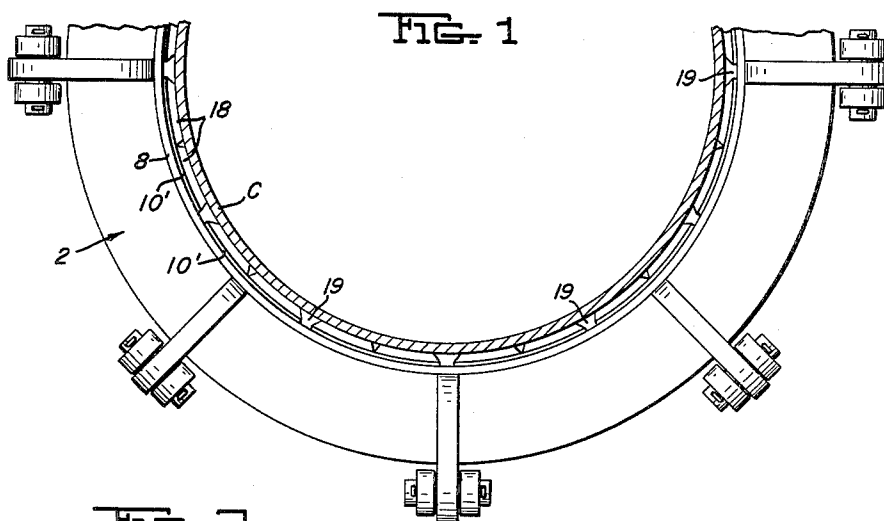
Jan. 2, 1962

R. A. ROSANOFF ET AL
FRICTION GRIPPING DEVICE

3,015,142

Filed Nov. 14, 1958

2 Sheets-Sheet 1



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FIG. 3

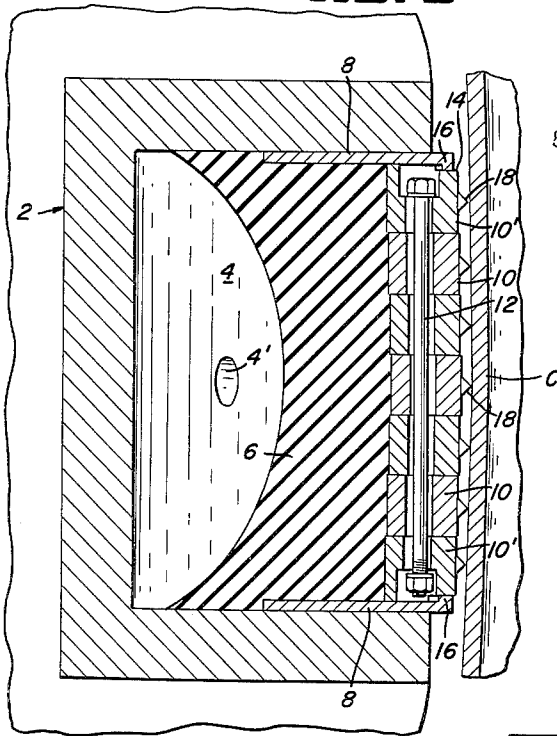


FIG. 4

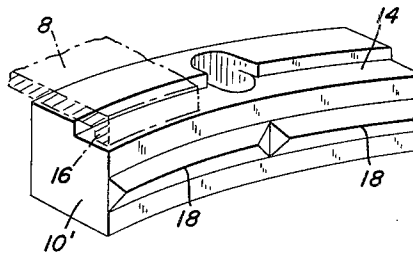


FIG. 5

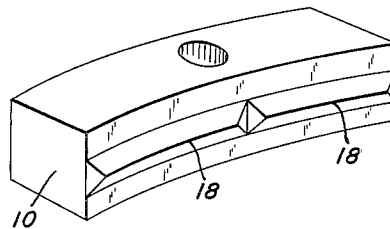
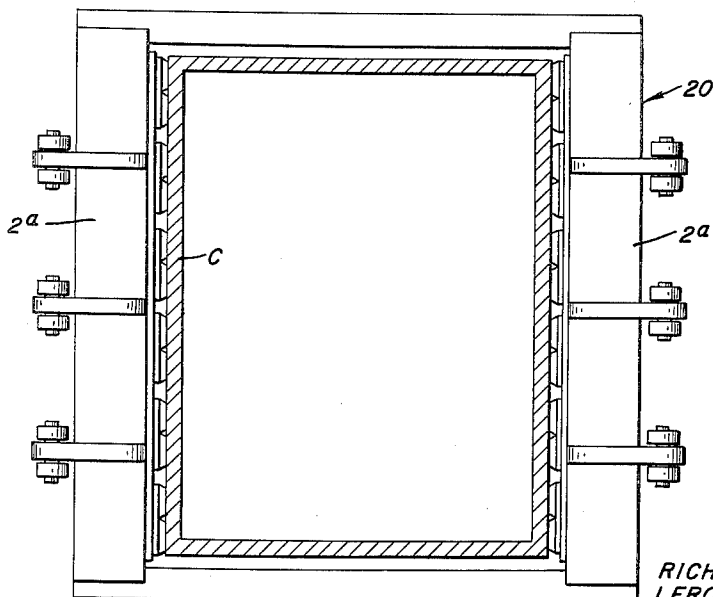


FIG. 6



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3,015,142

FRICITION GRIPPING DEVICE

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Filed Nov. 14, 1958, Ser. No. 773,885

1 Claim. (Cl. 24-263)

The present invention relates to an improved friction gripping device for elongated articles such as columns, pipes and the like.

The invention is especially suitable for use in a pushing and pulling apparatus such as is described in United States Patent No. 2,830,788 for "climbing" the columns or caissons slidably inserted through wells in a decked barge to lift the barge above water level so it may serve as a dock.

It is the primary object of the present invention to improve upon the gripping means shown and described by the above patent by providing a friction gripping device having an articulated gripping face which readily conforms to the curved surface of an elongated article deflected under stress.

This and other objects will become more apparent after referring to the following specification and attached drawings, in which:

FIGURE 1 is a partial plan view;

FIGURE 2 is a vertical sectional view;

FIGURE 3 is a view similar to FIGURE 2 showing a column under stress being gripped by the device of the invention;

FIGURE 4 is an enlarged perspective view of a top or bottom shoe of the device of the invention.

FIGURE 5 is a view similar to FIGURE 4 of an intermediate shoe; and

FIGURE 6 is a plan view of a modified embodiment of the invention.

Referring more particularly to the drawings reference numeral 2 designates generally a housing having a continuous annular fluid chamber 4 therein. The fluid chamber is open on its inner side and contains a contractible wall or ring 6 of rubber or similar material which forms the inner wall of the chamber. Retainer plates 8, 8 are bonded to the top and bottom of the wall 6 and project inwardly of the housing therefrom.

A plurality of rows of segmental metal gripping blocks or shoes 10 are aligned along the inner face of the wall 6 between the projecting portions of the retainer plates 8, 8. The shoes in each row are held together loosely by means of a bolt 12 which extends through oversized holes in the bodies of the shoes. The end shoes 10' in each row are cut-away in one outer corner as at 14 to form a shoulder which engages a shoulder 16 formed on the projecting end of each of the retaining plates 8, 8 for positively retaining each row of shoes between the retainer plates and limiting the inwardly movement of the end shoes 10' in each row.

Each of the shoes 10 and 10' is provided with a toothed outer face 18 adapted to engage a column C or other elongated article received in the gripping housing.

The corresponding shoes 10 or 10' in adjacent rows are spaced apart as shown in FIGURE 1 at 19 so that the shoes can move radially inwardly without binding. As best shown in FIGURES 1, 4 and 5 there are twelve rows of segmental shoes and each shoe has a circular extent of less than 30 degrees so as to provide the spaces 19.

In operation, to grip a column C around which housing 2 has been disposed, fluid, which may be liquid or gas, is admitted under pressure to chamber 4 through a port 4'. The fluid pressure causes the inner wall 6 to contract

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and move slightly laterally and inwardly away from the outer wall of the housing. Such movement of the wall 6 causes radial movement of the shoes 10 and 10' so that the shoes, by means of toothed faces 18, take a firm grip on the periphery of column C.

As is well known, a cylindrical column or other elongated shell-like member will deflect radially under the application of a radial and longitudinal load. The degree of the curve is dependent upon the amount of load applied and the size of the column. When prior art gripping devices, such as is disclosed by the above mentioned Patent No. 2,830,788, are used such curving reduces the effectiveness of the gripping device inasmuch as only a relatively small portion of the gripping surface of the gripping device can engage the periphery of the curved column. This condition occurs because the rigid metal gripping shoes of the gripping device cannot conform to the curved surface of the column under load. Although a resilient collar without rigid gripping shoes could conform to the curved surface of the column, a column under load cannot be supported by a resilient collar alone. The segmental gripping shoe arrangement of our invention overcomes this difficulty since the rows of shoes 10 and 10' from an articulated gripping surface backed up by the contractible wall 6. The articulated gripping surface thus formed permits the toothed shoes 10 and 10' to follow the deflection curve of column C, as shown in FIGURE 3, as well as any irregularities that may exist on the outer surface of column C.

Reference numeral 20 designates, generally a modified embodiment of our invention which is suitable for use in handling columns or other elongated members which are rectangular in cross section. In this embodiment the housing 2a is similar in cross section to the embodiment shown in FIGURES 2 and 3 but is rectangular in shape instead of circular and is provided with a fluid chamber containing a contractible wall on opposite sides of the housing. Rows of gripping shoes disposed between retaining plates are provided on each of the two opposite sides of the housing 2a arranged in a manner similar to that shown in FIGURE 2.

While one embodiment of our invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claim.

We claim:

A friction gripping device comprising a chamber for fluid adapted to be disposed circumferentially around an elongated member, said chamber having an open inner side adjacent said member, a contractible wall slidable laterally in said chamber closing said open inner side, end plates bonded to the top and bottom of said wall, respectively, and projecting outwardly of said open inner side of said chamber, a plurality of independent rigid gripping shoes mounted between and confined by said end plates and movable with said wall, said shoes being arranged in substantially parallel spaced vertical rows disposed circumferentially along said inner wall, the adjacent shoes in each vertical row being separate and movable relative to each other, a bolt extending through oversized holes in the shoes in each row whereby said shoes are retained loosely in substantial axial alignment, said end plates each having a shoulder formed on the projecting portion thereof, and the end shoes in each row adjacent said end plates each being cut away at an outer corner thereof forming a shoulder thereon adapted to engage the shoulder on the end plate adjacent thereto to thereby limit the movement of said end shoes outwardly of said chamber.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,015,142

January 2, 1962

Richard A. Rosanoff et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 24, for "from" read -- form --.

Signed and sealed this 1st day of May 1962.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents