

Oct. 1, 1935.

H. R. DECKER

2,016,077

CASING PROTECTOR

Filed Nov. 13, 1928

3 Sheets-Sheet 1

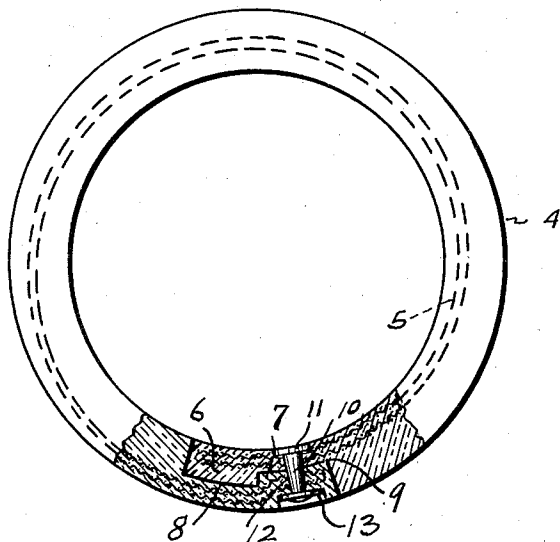


Fig. 2.

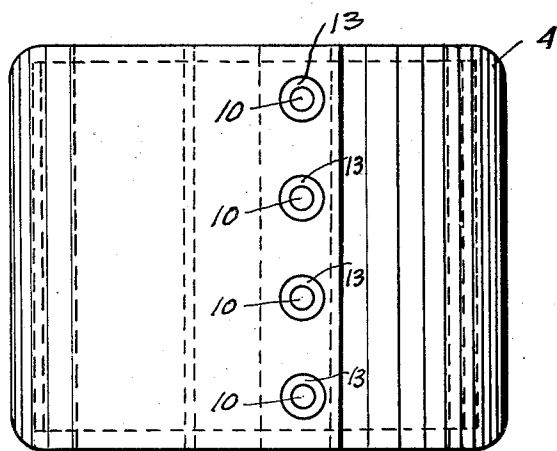


Fig. 3.

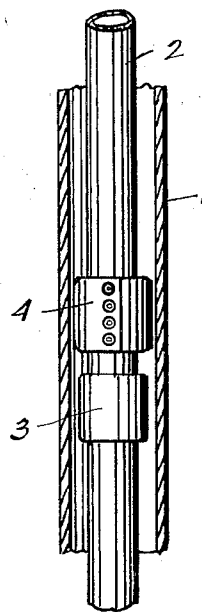


Fig. 1.

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3 Sheets-Sheet 2

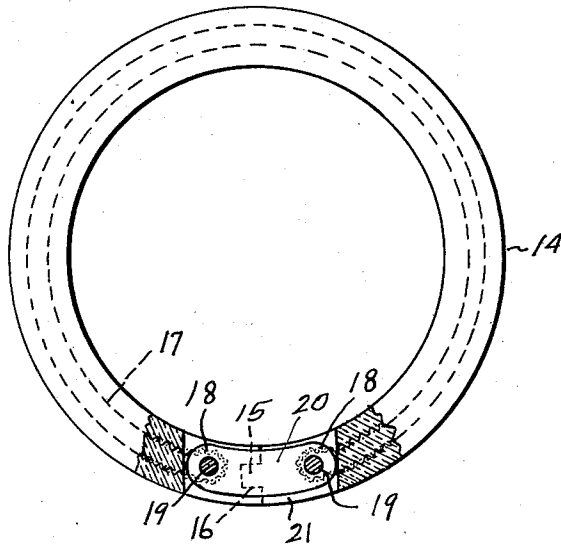


Fig. 5.

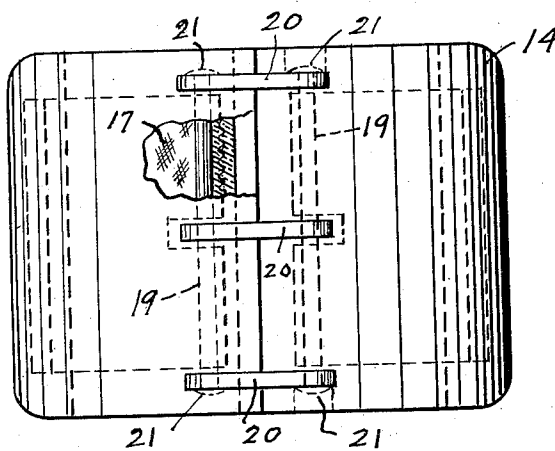


Fig. 6.

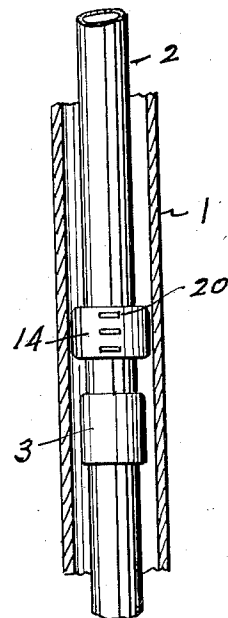


Fig. 4.

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3 Sheets-Sheet 3

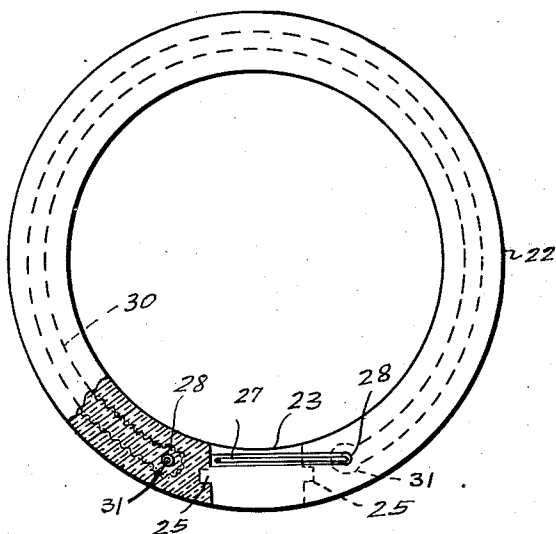


Fig. 8.

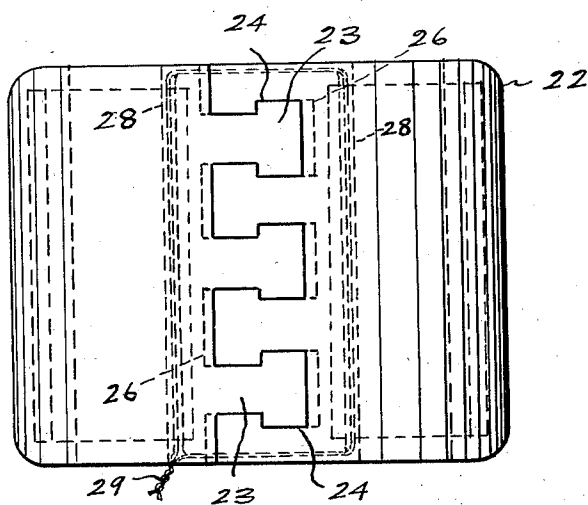


Fig. 9.

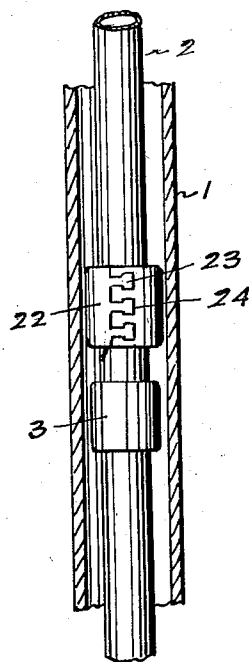


Fig. 7.

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## UNITED STATES PATENT OFFICE

2,016,077

## CASING PROTECTOR

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Application November 13, 1928, Serial No. 319,062

2 Claims. (Cl. 308—4)

This invention relates to new and useful improvements in a casing protector.

One object of the invention is to provide a casing protector of the character described specially designed for application to a drill stem for the purpose of preventing the drill stem and the joints connecting the sections thereof from coming into frictional contact with the casing during drilling operations.

Another object of the invention is to provide a casing protector which may be readily mounted on a drill stem either when the sections thereof are connected together and without separating said sections or which may be mounted on the drill stem sections before they are made up into the stem, proper, and which when mounted, on the stem, will be retained in proper position thereon.

A still further object of the invention is to provide a casing protector which may be opened at one side and applied around the stem and then easily secured around the stem so as to clamp the stem in such manner as to prevent the endwise movement of the protector on the stem.

The invention also comprehends the provision of a protector of the character described which is very strong and durable and which is at the same time of very simple construction so that it may be cheaply and easily manufactured and readily applied to the stem.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification, and illustrated in the accompanying drawings, wherein:

Figure 1 shows a fragmentary cross sectional view of a well casing showing a drill stem therein, equipped with a preferred form of the protector.

Figure 2 shows an end view of the protector partly in section.

Figure 3 shows a side elevation thereof.

Figure 4 shows a fragmentary cross sectional view of a well casing showing a drill stem therein, with another form of the protector thereon.

Figure 5 shows an end view of this type of protector partly in section.

Figure 6 shows a side view thereof, partly in section.

Figure 7 shows a fragmentary cross sectional view of a well casing showing the drill stem therein equipped with still another form of the protector.

Figure 8 shows an end view of this type of protector partly in section, and

Figure 9 shows a side elevation thereof.

Referring now more particularly to the drawings wherein like numerals of reference designate similar parts in each of the figures the numeral 1 designates the casing adapted to be set in a well bore and the numeral 2 designates the drill stem whose sections are connected by joints as 3.

In drilling wells, particularly deep wells, the bore usually follows a more or less sinuous course and the casing 1, of course, must follow the course of the bore so that the drill stem which works through the casing, in drilling, is not maintained concentric with the casing but at the bends or curves rubs against the interior wall thereof and often the connecting joints 3 of the stem wear holes through the casing thus permitting outside water to leak through into the well. The protector hereindescribed has been provided for the purpose of preventing this contact of the stem and its joints with the casing and preventing the wearing of holes through the casing by said joints. The type of protector 4 shown in Figures 1, 2 and 3 is composed of an open ring preferably formed of rubber or similar material which is reinforced throughout with fabric reinforcement as 5. In applying this protector to the stem it may be opened and applied without removing the couplings 3 from the ends of the stem sections, or without breaking up the stem. The abutting ends of the protector 4 overlap and are provided with the vertical tenons 6, 7 each tenon fitting into its opposing groove 8, 9 of the respective overlapping ends. The inside overlapping end 35 has the pins or rivets 10 having the inside heads 11 which are embedded in the material of the protector and the outside overlapping end is provided with holes as 12 arranged to register with the rivets 10 so that when the said ends are brought in to interengaging relation in the position shown in Figure 2 the rivets 10 will project through the corresponding holes 12 and through washers 13 which are countersunk into the outside overlapping end of the protector. The free ends of the rivets 10 will project through said washers and when the protector is assembled around the drill stem these projecting ends may be riveted against said washers 13 by a hammer or other suitable implement so as to form the protector into a continuous protecting sleeve around the stem.

In moulding the protector the rivets 10 and washers 13 are moulded into the material so that these parts for securing the protector onto

the pipe will be in proper position for a quick and easy assembly of the protector onto the stem. In riveting the outer ends of the rivets 10 their inner ends will rest securely against the drill stem 2, so that the riveting operation may be effectively carried out.

In form shown in Figures 4, 5 and 6 the protector 14 is also of the open type with the abutting free ends provided one with a lengthwise tenon 15 adapted to fit into a corresponding groove 16 in the other free end. This type of protector is also reinforced throughout with fabric as 17 said fabric being formed into loops 18, 18 near the free ends of the protector and within these loops are the bearings for the securing rods 19, 19. The free ends of the protector may be secured together by links as 20, preferably formed of metal. These links are fitted into the slots as 21, which are provided in the material of the protector when the same is moulded. One of the rods 19 may be inserted through the corresponding ends of the links 20 and the heads 21, 21 formed thereon by riveting the same. In applying this form of protector to the stem it is sprung open and fitted around the stem and the other rod 19 is then inserted in place through bearings in the other ends of said links and the heads 21, 21 then formed thereon to secure the protector in place.

In the form shown in Figures 7, 8 and 9 the free ends of the protector 22 are provided with the fingers 23 which are dovetailed in form and these fingers are formed to interlock, that is, the fingers of each end fit into opposing dovetailed mortises 24 of the other end. The free ends of the fingers are formed with tenons 25 which fit into opposing grooves 26 when said free ends of the protector 22 are interlocked together. In order to secure these interlocking fingers in interlocked relation, a tie wire 27 is inserted through the bearings 28, 28 and the free ends 29 of this tie are then secured together in any approved manner. This type of protector is also provided with fabric reinforcement 30 which is formed into the loops 31, 31 through which the bearings 28 pass.

As hereinbefore stated each form of the protector shown is of the open ring type so that in applying the protector to the drill stem it may be sprung open and fitted around the stem and clamped tightly therearound and the free ends then interlocked and secured together as stated, and the protector will be thereby held against endwise movement on the stem.

In practice, a protector should be placed at each end of the stem adjacent the coupling thereof and as the stem is rotated the protectors will ride against the inside wall of the casing and thus hold the stem and the couplings thereof out of contact with the casing thus reducing the friction and preventing the stem couplings from wearing through the casing, during drilling operation. In order for the protectors to be effective for this purpose the outside diameter of each protector is somewhat greater than the outside diameter of the couplings of the drill stem.

Preferred forms of the invention have been described and shown and their more important purposes have been mentioned, but it is obvious that mechanical changes and adaptations may be made without departing from the principle of the invention and I reserve the right to make such changes and adaptations as may be comprehended within the principle of the invention.

What I claim is:

1. A well casing protector comprising a ring of resilient material open at one side, and adapted to be sprung open and fitted around a drill stem between the couplings thereof, the ends of said ring overlapping, and formed to interlock and rivets fitted through said overlapping ends.

2. A well casing protector comprising a ring of resilient material open at one side and adapted to be sprung open and fitted around a drill stem between the couplings thereof and having a greater outside diameter than that of a coupling, and rivets securing the free ends of the ring together.

HARRY R. DECKER.