July 15, 1947. F. M. GIST 2,424,027

CASING CENTERING DEVICE

Filed April 16, 1945

Fig. 1.

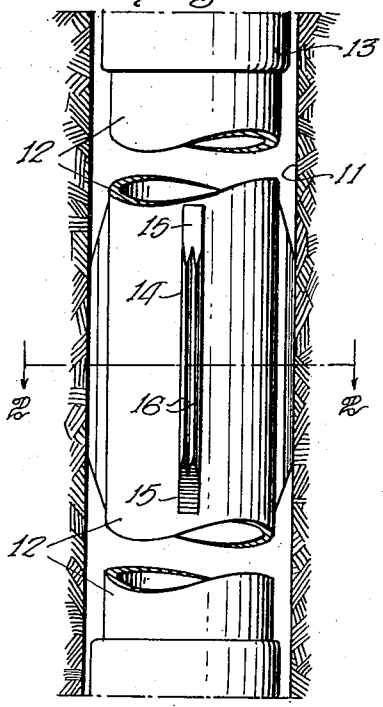


Fig. 2.

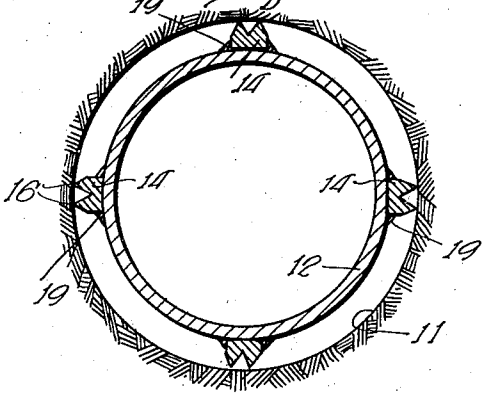


Fig. 6.

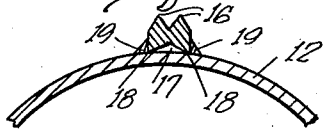


Fig. 4.

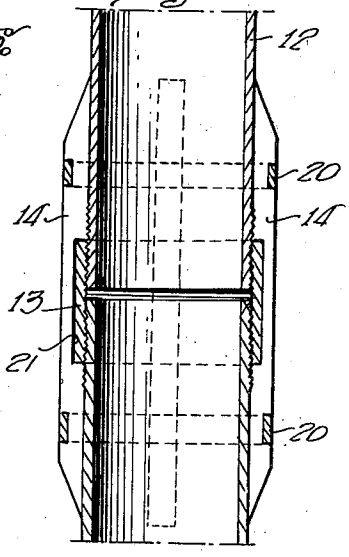


Fig. 3.

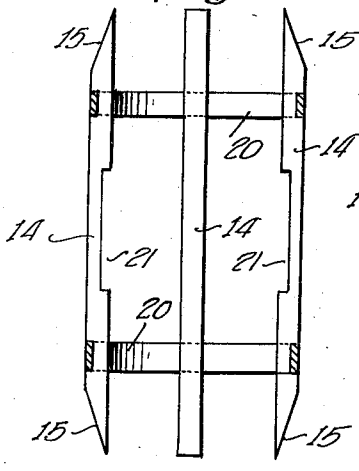


Fig. 5.

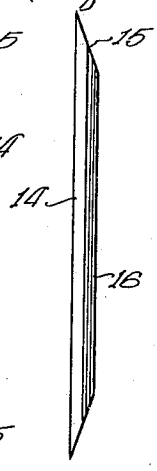
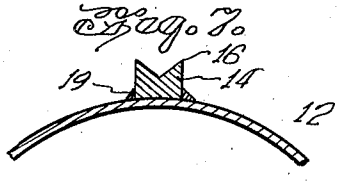


Fig. 7.



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CASING CENTERING DEVICE

Fred Morgan Gist, Monahans, Tex.

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1 Claim. (Cl. 166—4)

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This invention relates to centering devices for oil well casing and more specifically to devices of this character which are attached to the casing while it is above ground in order to space the casing away from the well bore or formation when and as it is lowered into position.

The need for such a novel device is readily appreciated by those skilled in the oil well drilling and well cementing arts, since it is highly important that a proper space be provided about the pipe to secure uniformity in the thickness of cement thereabout when introduced between the casing and the well bore by any of the well known methods of well cementing.

Heretofore it has been proposed to provide spacers of the spring compression type, which have inherent defects and deficiencies among which are methods of securing a spring material to the ordinary casing by welding which due to the difference in composition of metals, results in overheating or burning and hence weakening of the casing in critical zones where it is to be subjected to highest formation and hydrostatic pressures, as well as to chemical action of acids, salts, etc., in bringing in of the well and production practices. Also, these springs may depress under pressure against the well bore until the casing joints rest against the wall of the bore, thus defeating any useful purpose. Also, the action of the springs in compressing and expanding as the casing is lowered and as they ride or rub against the well bore in varying degrees at various points, provide perfect entrapments for stones and pebbles, or packing of other formation particles between the springs and the outer wall of the casing which causes the springs frequently to break and fall into the well bore or wedge and bind the pipe, all of which removes or disturbs the filter cake so essential to protecting the walls of the well bore in rotary drilling. I correct these defects by providing a centering device which is rigidly secured to the casing parallel to its axis and with a reduced or minimum surface contacting the well bore, so formed as to offer only a minimum of engagement with and resistance to the walls of the bore as the casing is lowered.

It is essential to successful performance that casing centering devices be rigidly secured to the casing and be of uniform dimensions at all times and extend beyond the casing wall further than the thickness of the coupling uniting the joints or sections of casing so that positive provision of adequate space is provided for the flow of cement to the desired and predetermined thickness all about the pipe.

It is also essential that the cement adhere to the firm formation surface and the casing to effect a positive seal therebetween to provide against blowing or channelling of openings about the casing. In this way only is the purpose of cementing fully accomplished and the sealing of the various zones perfected. By rotating the casing as it nears bottom a scraping or removing of the filter cake from the walls of the well bore is accomplished over the zones where it is desired that positive engagement by the cement, with both casing and bore be effected. This filter cake thus removed may be washed or circulated from the well bore by the pumps.

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My invention provides a simple, novel and successful device in both preferred and modified forms for positively spacing or centering a casing in a well bore as desired and predetermined, which may readily be understood from the following description together with the accompanying drawings in which:

Figure 1 is an elevation of a casing inside a well bore, with spacing device.

Figure 2 is a cross-section along line 2—2 of Figure 1.

Figure 3 shows a modified form of my device.

Figure 4 shows a modified form of my device secured to a casing, overspanning a coupling.

Figure 5 is a side elevation of centering device shown in Figures 1 and 2.

Figure 6 shows another modified form of the device, and

Figure 7 is similar to Figure 6, but shows more in detail the back surface of device 14 concaved to fit the curved surface of the casing.

In the several drawings, like references indicate similar parts wherein 11 is a well bore, 12 is a casing, 13 is a coupling, 14 being my centering device. As shown in Figures 1, 3 and 4 my device has tapered or beveled end portions 15 adapted to fit snugly against casing 12 in order to offer a minimum of resistance to lowering and raising of the casing. Also, it will be noted that centering device 14 is provided with shaped extensions 16 for engaging the well bore as the casing moves into position, and while I have shown two extensions 16, I may provide one or more as desired.

My device may be formed or cut away, as shown at 17 in Figure 6, so that bearing contact with the casing is had along the outer edges 18 of device 14.

Now in a preferred form of my invention the device 14 may be attached while the casing is on the rack by a welder while the drilling operation is being carried on by the regular crew. Thus the casing is ready to be rolled into position and handled in the usual routine manner and with equal facility as with ordinary casing.

The forming of the device on the back as at 17 may be carried into a curve so the entire device bears against the casing as shown in Figure 2, or the back of the device may be left flat or straight so it bears only along a center line against

the casing while the welds 19 provide additional bearings at its edges in addition to securing it to the casing.

In the modification shown in Figures 3 and 4 a plurality of my devices are secured together at two points by bands 20, which are long enough to extend around the casing and their ends secured by suitable means such as welding, riveting, clamping or crimping.

By applying sufficient tension to the bands 20 my centering device may be secured rigidly to the casing without welding them thereto. One method of providing this desired tension is to draw the bands taut with their ends adjacent and welding them together, whereupon, as the heat of weld is dissipated the bands will shrink and grip the devices securely to the casing. Skilled welders will readily understand the preheating of the bands required as the welding operation progresses in order to provide the shrink or set necessary to secure the devices to the casing so as to prevent their moving therealong as the casing is handled. In Figures 3 and 4 it will be noted a section 21 may be cut away in the back side of device 14 for the purpose of receiving coupling 13 joining two sections of casing by the devices is prevented.

In the various forms shown it will be noted I have provided a device that will rigidly space the casing away from the well bore with a minimum of resistance and one that will remain definitely spaced on the casing while the latter is being manipulated and handled. It will be understood that my centering device may be attached or made as an integral part of the casing at the locus of casing manufacture or at any other desirable place before introduction of the casing into the well. Other modifications will occur to those skilled in the art, and all such are intended to be included as fall within the scope of the following claim.

What I claim is:

An article of manufacture comprising a well casing having rigid projections spaced about its periphery extending beyond the diameter of the casing couplings, said projections being longitudinally ribbed and the projections having a tapered end which terminates within the coupling diameter.

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