This invention relates to stager pumps and more particularly to cups therefor having body portions which act as guides for the sucker rods. Heretofore in common practice the cups of the pump lingers have had to lift the entire column of liquid in wells and due to the great and ever increasing depths of oil wells in particular it has not proved profitable in many conditions to undertake the pumping operation—particularly due to the short life of the cups and to the great wear on the pump cylinders caused by the very great pressures at the bottom of the liquid column being lifted. Moreover, with the greater length of rod strings with the consequent increase in their weight, added to the weight of the production being lifted the kicks in rods and tubing, the crookedness of the wells themselves, etc. are all accentuated with resultant excessive wear on the tubing, the rods and the couplings. By my invention I greatly relieve these conditions in most cases and eliminate them entirely in many situations.

The invention may be readily understood by those skilled in the art from the following description together with the accompanying drawings in which:

Fig. I is an elevational view of my cup guide.
Fig. II is a section along line 2—2 of Fig. I.
Fig. III is a section along line 3—3 of Fig. I.
Fig. IV is a section similar to that of Fig. III, but with a sucker rod in place.
Fig. V is a top plan view of Fig. I.
Fig. VI is a modified form of Fig. V.
Fig. VII is a side elevation of the top end section of Fig. I.
Fig. VIII is an elevation of the metal clip for my cup-guide, while Fig. IX is a section along 9—9 of Fig. VIII.
Fig. X is a cut-away view of a well casing showing the upstroke of a sucker rod equipped with my cup-guides.
Fig. XI is a view similar to Fig. X but showing a downstroke of the sucker rod.
Fig. XII shows a further modified form of my cup guide similar to the cup-guides of Fig. XI.

Proceeding now with the more detailed description wherein like references indicate similar parts, 10 is a spring metal clip provided with perforations 11 for facilitating the bonding thereto of an oil resistant rubber body or guide portion 12, which latter has an axial opening 13 of slightly smaller bore than the diameter of the sucker rod 14 to be received and gripped by the action of the spring clip as more particularly shown in Fig. IV. The flared back edges 15 of the clip serve to provide space for the perforations 11 as well as providing additional bonding area for the rubber and supporting the same when the guide is pressed onto the rod through slot 16 of the body of the cup-guide. The upper end of the cup-guide has an unflared outwardly and upwardly flared cup 17 of greater diameter than the body portion thereof. This upper flared or cup portion is cut or slotted as shown in Figs. I, V, VI, VII, X, XI and XII as at 18. This provides a lip segment or tab 19 which may be held aside to more readily permit the cup-guide to be assembled or pressed onto the rod, but which will return to normal position when at rest as shown in Figs. I, V, VI and VII or when in the upstroke position as shown in Fig. X. On the down stroke position as shown in Fig. XI, segment 20 will rise to more readily permit the passage upwardly of the well fluid through slot 16. Flared portion 17 forming the cup is normally of such outside diameter as to engage the well tubing under pressure of the fluid above it on the up stroke and thin and soft enough as to be displaced inwardly by the fluid when on the down stroke as in Fig. II, permitting it to pass downwardly with only sufficient resistance to cushion or snub the fall of the rods 21 together with their couplings 22 and appurtenances through tubing 23.

I prefer to make the body portion 12 of my cup-guide of larger diameter than the diameter of the couplings 22 of the rod string with which they are being used as in this way the metal to metal contact of the reciprocating rod with the tubing is eliminated and since the rubber is lubricated by the well fluids a minimum of friction results during the pumping operation.

The operation is as follows: The cup-guide having been molded by a conventional method and cut at 18 in its upper cup portion, segment 20 is pulled aside and the cup-guide pressed onto rod 21 through slot 16. The spring clips now being under tension will securely anchor the cup-guide on the rod until same is removed by pressure applied to the cup-guide in reverse to that above stated. The lower extension of the rod now is equipped with the conventional extensions including pump plunger and the usual sealing cups and additions made to the rod string as the assembly is lowered into pumping position in the well.

Depth of the well, condition of the tubing and the rod string, crookedness of the well bore, kinks in tubing and rods, etc. viscosity and specific gravity of liquids being lifted are factors indicat-
ing the proper number and spacing of my cup-guides.

As above indicated, on the down stroke and with the standing valve closed in the bottom of the working barrel the upper cup portions 17 will retract inwardly and permit the down passage of the cup-guide through the fluid. The segment 23 will rise permitting passage of fluid through slot 15. The cup portion 17 being cut as at 18 more readily permits the distortion inwardly of cup, while its expansion beyond normal size is limited by contact with the tubing. On the upstroke segment 20 is seated by the natural tendency of the rubber to return to normal position and is held in seated position by weight of fluid above it. As is here shown, in Fig. VI, the angle of the cut at 18 to form segment 20 is such as to give a gripping seat or wedging action toward the center of the guide and about the rod on the upstroke, which tends to secure the segment into normal position during the working stroke. And as shown, at 19, in Fig. XII the cut portion may be cut on the opposite side of slot 16 to provide a more readily flexing valve like segment 20 which would offer less resistance to the well fluid as it was deflected upward to permit a more free by-pass of fluid on the down stroke.

In practice the cup extension length and hardness will best be varied according to the fluid head it is expected to lift on the working stroke.

It will readily be understood by those skilled in the art that by a proper spacing of my cup-guides along the rod string any portion of the load on the cups of the pump may be relieved and since the body of the guide is larger than the coupling the rod string and tubing may be held free from contact throughout any part or all their length as desired.

With the friction and lifting loads relieved from the cups of the pump they will in any event last much longer and pulling rods, changing cups and well servicing operations will be minimized and all working parts be longer lasting and more fluid lifted by reason of fewer shut downs.

What I claim is:

1. In an oil well equipment, a combined rod guide and liquid supporting member for use on a sucker rod within a well casing, comprising a rubber body having a longitudinal bore therethrough, said body having an annular upper portion of enlarged diameter to seal outwardly against said casing and forming an upwardly facing liquid supporting cup, said body having a substantially C-shaped lower portion including a radially extending opening extending the full length of said C-shaped portion and communicating with said bore, and said upper portion having a slit disposed diagonally with respect to the axis of said bore and extending through the annular periphery of the cup into the bore adjacent said opening, a portion of the cup continuous to the slit comprising a tab capable of flexing open to permit upward passage of liquid therepast and of reseating at the slit to prevent downward passage of liquid.

2. In oil well equipment, a combined rod guide and liquid supporting member for use on a sucker rod within a well casing, comprising a rubber body having a longitudinal bore therethrough, said body having an annular upper portion of enlarged diameter to seal outwardly against said casing and forming an upwardly facing liquid supporting cup, said body having a substantially C-shaped lower portion including a radially extending opening extending the full length of said C-shaped portion and communicating with said bore, and said upper portion having a slit disposed diagonally with respect to the axis of said bore and extending through the annular periphery of the cup into the bore adjacent said opening, and a C-shaped spring clip embedded in the body and coaxial with said bore, the radially extending opening in the clip registering with the radial opening in the body.

3. In a combination as set forth in claim 2, a portion of the cup contiguous with the slit comprising a tab capable of flexing open to permit upward passage of liquid therepast and of reseating at the slit to prevent downward passage of liquid.

4. In a combination as set forth in claim 2, the radially extending opening of the body being narrower than the diameter of the rod, and the body being capable of flexing open at said slit and radial opening during flexing of the body on the sucker rod.

5. In oil well equipment, a combined rod guide and liquid supporting member for use on a sucker rod within the casing of a well, comprising a rubber body having a smaller lower guide portion and having a larger upwardly facing annular cup portion, adapted to contact the casing, said body having an axial bore therethrough and having a radially extending opening communicating with said bore along the full length of said body and adapted to permit flexing open of the body to receive the rod in the bore, the portion of the opening located in said cup portion being diagonally upwardly enlarged with respect to the axis of the bore, and a flexible tab normally seating in said diagonally enlarged portion of the opening and secured to the cup adjacent one side of said opening, said tab preventing downward passage of the liquid past the cup but flexing open to permit upward passage of the liquid therepast.

6. In a combination as set forth in claim 5, a spring clip embedded in the body around the bore to clamp the body tightly on the rod.

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