Dec. 3, 1957 G. F. LYTLE 2,815,240

SUCTION PADS WITH FLOATING SEALING RING

Filed Feb. 11, 1955

Fig. 1.

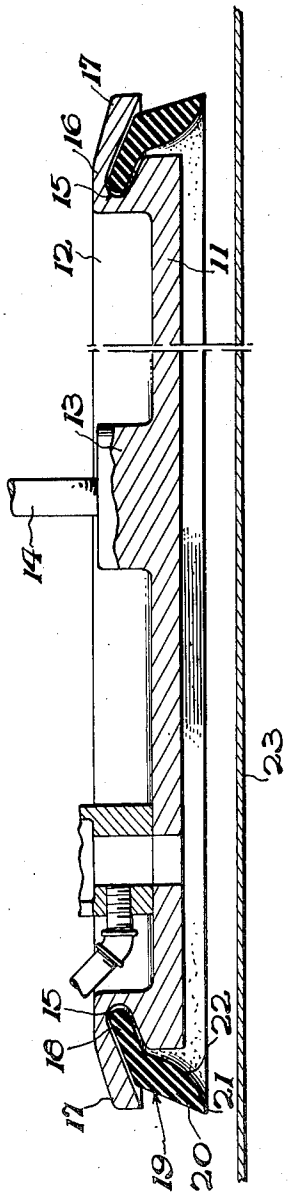


Fig. 2.

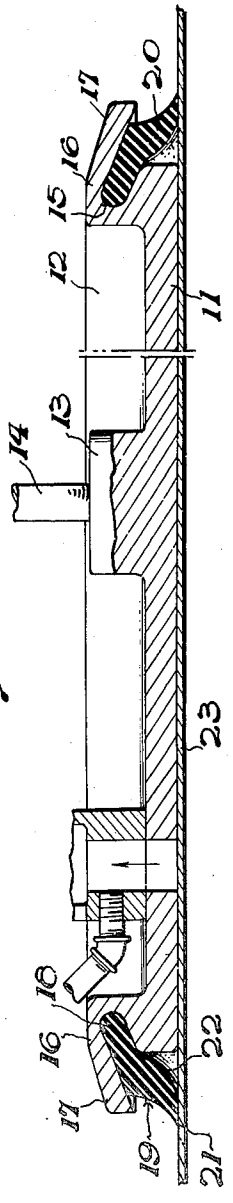
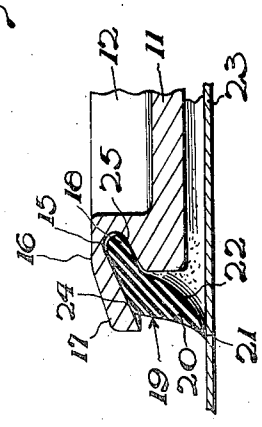


Fig. 3.



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SUCTION PADS WITH FLOATING SEALING RING

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Application February 11, 1955, Serial No. 487,521

1 Claim. (Cl. 294—64)

This invention relates to lifting devices and is more particularly concerned with lifting devices which employ suction or vacuum in securing the lift members to the material or objects to be lifted.

In co-pending application for patent of William T. Stanford, Serial No. 460,540, filed October 6, 1954, there is described a suction lifting device which includes a suction pad having a plate member, a separate platen member and a flexible air impervious annular skirt as a sealing ring for the suction pad. This annular skirt is secured in position by means of an inwardly directed annular flange between the plate and platen which are tightly secured together.

An object of the present invention is the provision of a suction pad of the type mentioned in which the plate and platen are fused or in one piece and the sealing ring is carried in an annular groove of this combination member.

Another object of the invention is the provision of means permitting the placement of the sealing ring in the groove referred to above in a loose manner and thereby render it easy to replace when it becomes worn.

Other objects and advantages of the invention will be apparent from the following description considered together with the accompanying drawing.

In the drawing:

Fig. 1 is a vertical sectional view of a suction pad of the type mentioned illustrating an embodiment of my invention, the pad being illustrated in a position free of the piece of material to be lifted.

Fig. 2 is a view similar to Fig. 1 with the suction pad against the piece of material to be lifted.

Fig. 3 is a fragmentary sectional view illustrating an intermediate position of the sealing ring to show the sweeping effect of its lower edge on the surface of the piece of material or object to be lifted.

Referring with more particularity to the drawing in which like numerals designate like parts, the embodiment illustrated comprises a circular plate **11** having an annular upwardly extending flange or rim portion **12** and a central hub section **13**, the latter being connected to a lifting rod or bar **14**.

The upper part of the rim portion **12** is provided with an annular groove **15** facing outwardly and downwardly, substantially as shown. The roof **16** over the groove **15** has an outwardly and downwardly directed extension flange **17** the inner face of **16—17** providing a back-up surface for the inner lip **18** of the seal **19** as will now appear.

Within the groove **15**, freely fits the inner lip **18** of a rubber seal member **19** which is loosely disposed, substantially as shown. The inner lip **18** is upwardly directed and of substantially the same shape as the groove **15**, except that it is somewhat narrower. The lower portion **20** of the sealing ring **19** is generally directed downward and slightly outward. It has a feathered tip **21** below the bottom edge of plate **11**. This feathered tip is formed by a rounded curvature **22** between the bottom and the inner wall.

As a result of this arrangement, the tip **21** is the first part of the sealing ring which touches the piece **23** that is to be lifted. As the tip comes in contact with the piece **23**, the sealing ring is rocked to the position shown in Fig. 3, which, notwithstanding the looseness of the inner lip **18** in the groove, effects a sealing of the space on the interior of the pad from the outside atmosphere because of the bridging effect produced between two contact points **24** and **25**. At the same time, the tip **21** moves outwardly under the increased pressure thereon and sweeps a portion of the surface of the piece **23** in contact therewith, thereby removing particles of dust, filings and any other loose particles of matter that might adversely affect the making of a tight seal. Eventually, the bottom of the plate **11** comes in contact with the piece **23** under the dead weight, as shown in Fig. 2, and a cleaned portion of the piece **23** is in contact with the sealing ring. When vacuum is applied to the interior of the pad, the lower portion **20** of the sealing ring is drawn tightly against the plate **11** and the piece **23**. The lip portion **18** is prevented from being pivoted out of the groove **15** by virtue of the extension part **17**. From the foregoing it will now be seen that the present invention provides a rubber seal member **19** whose inherent elasticity and flexibility enables it to be stretched to permit the lip **18** to enter the groove **15** for initial application and subsequently in the event that the ring needs to be renewed, it may be readily detached from the circular plate and groove by finger manipulation. Thus, the present invention not only reduces the number of parts over gripping units heretofore provided but at the same time makes it possible to readily renew a ring without the aid of tools.

I claim:

A two-piece suction lifting pad including a rigid circular plate having a substantially vertical peripheral face provided in its upper portion with an annular outwardly opening and downwardly inclined groove, a marginal extension flange on the upper portion of said peripheral face overlying the groove and projecting downwardly and beyond said groove to provide a sealing ring back-up wall, a soft elastic flexible sealing ring comprising a body having a plane outer wall and an arcuate inner wall merging at the lower end of the body into a thin object engaging edge, and an annular supporting and sealing lip extending inwardly from the top of the body freely and loosely fitting in said groove, whereby, upon the application suction to the area of the object surrounded by said ring, said sealing lip will rock in the groove and form a tight seal with the back-up wall and the groove, and, when suction is released the ring may be readily removed or replaced by manipulating the same with the fingers alternately to stretch and relax the same.

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