Dec. 4, 1956 S. M. MOBERG 2,772,909

BAG SEAL

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Fig. 3.

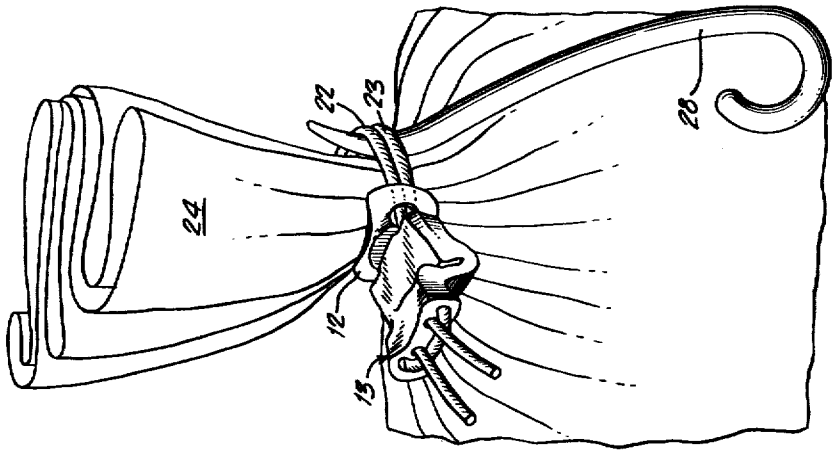


Fig. 2.

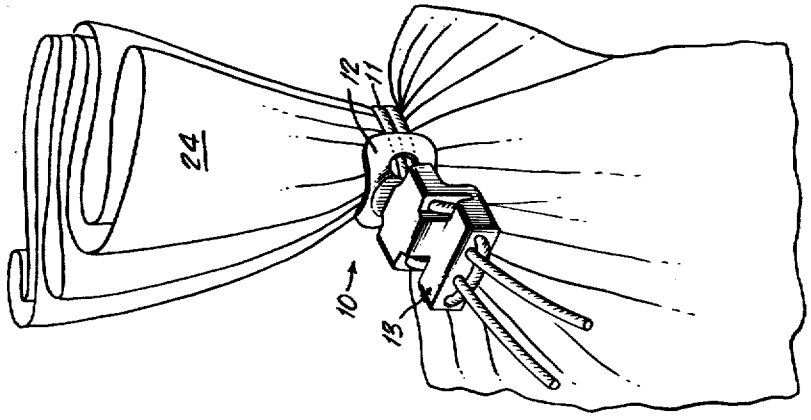
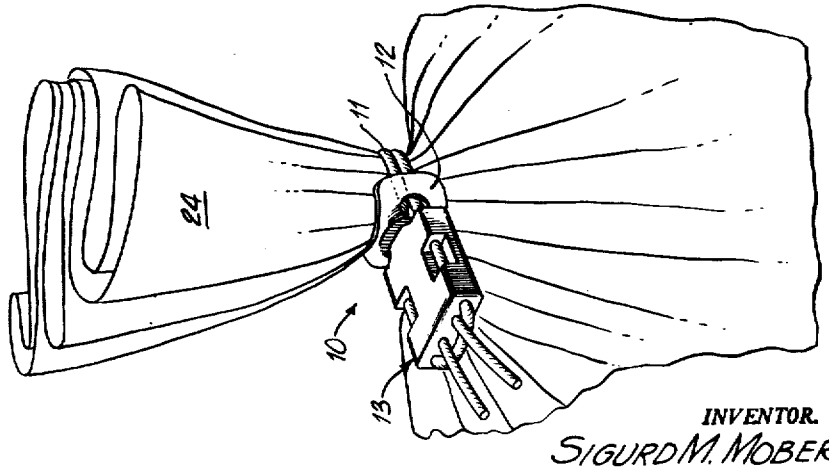


Fig. 1.



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Fig. 4.

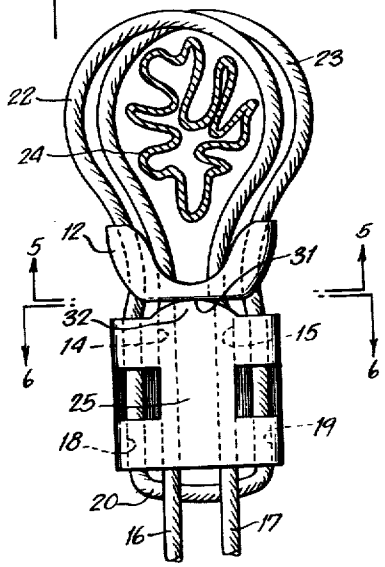


Fig. 7.

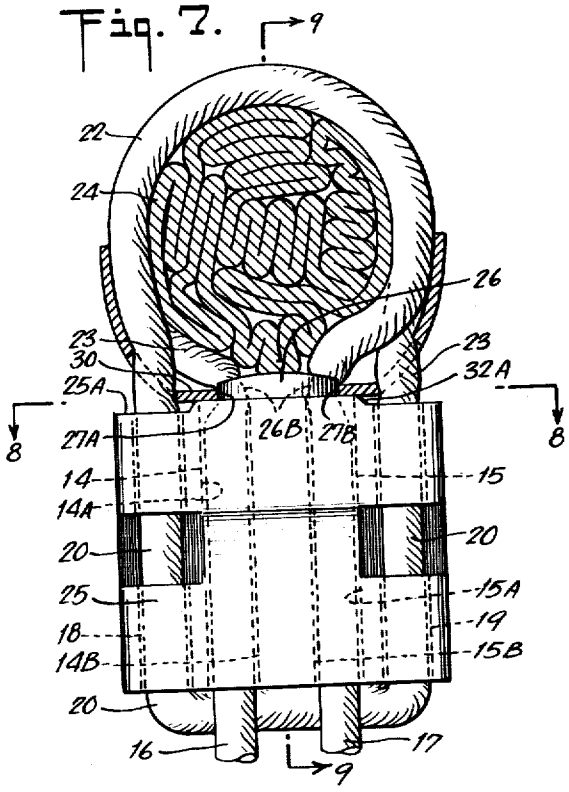


Fig. 5.

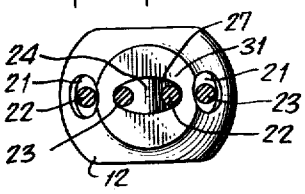


Fig. 8.

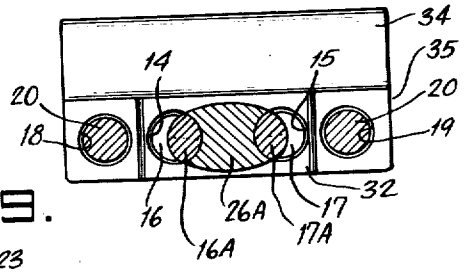


Fig. 6.

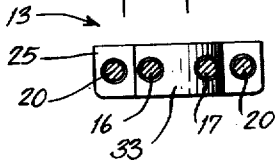
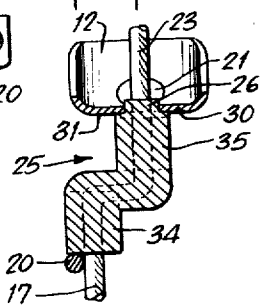


Fig. 9.



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BAG SEAL

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Application December 21, 1954, Serial No. 476,634

3 Claims. (Cl. 292—308)

The present invention relates to bag seals and refers more particularly to the type of seal comprising a fibrous shackle member which encircles the neck of a bag, passes through a stiff guard member which partially encircles the neck of the bag, and then passes through a comparatively soft seal member which is deformed so as to grip the shackle tightly. In devices of this type, the shackle is tightened around the bag neck prior to the deformation of the seal, and the bag neck is thus sealed securely in a manner intended to prevent tampering. Prior constructions rely heavily on the fact that tampering will be discouraged by the knowledge that an attempt to loosen the shackle around the bag neck, and remove and replace the same after gaining access to the contents of the bag, will be rendered evident by a changed appearance of the seal member. The latter can be made weak, so that, having been deformed in a crimping fashion in the sealing of the bag, the tampering will be evidenced by a collapsed condition of the crimped seal member, such as to cause investigation.

An object of the present invention is the provision of additional evidence of tampering, in the form of a frayed condition of the shackle member or of a cutting of the same by the guard member as a result of tampering.

Another object is the provision of a seal which may be applied with less pressure from the sealing tool.

Another object of the present invention is the provision of seal means whereof the shackle member may be more conveniently severed by a knife when the seal is to be broken by an authorized person.

Still another object is the provision in a seal means of a seal member providing greater convenience in the application thereto of the crimping tool when a very full bag is to be sealed.

In accomplishing the foregoing and other objects of the present invention, the wall of the guard member abutting the seal member and surrounding the hole through which the shackle end portions pass, is devoid of flanges, and the seal member is provided with a projection of arcuate profile extending toward the guard member. The shackle end portions being led through bores in the seal member in well-known manner, and these bores being parallel and side-by-side widthwise of the seal member, the said arcuate projection extends across that portion of the width of the seal member occupied by the two bores for the shackle end portions. In the type of seal member having four bores with axes in a common plane and of which the two central bores receive the shackle end portions, the arcuate projection extends widthwise of the seal member across the two central bores only, terminating inwardly of the two outer bores.

The length of the hole in the guard member lies across the two central bores and is less than the distance between the outer walls of this pair of bores. The shackles fill said bores only loosely enough to assure free running, and the shackle end portions are constricted inwardly toward each other by their engagement in the guard hole even before the sealing of the seal member.

Advantages of the above construction include the fact that the projection displaces the seal member from the guard to a small extent, which extent seems to be critical in the matter of convenience in applying the sealing tool to the seal member when the bag is very full. Such displacement of the body of the seal member from the guard member further facilitates cutting the shackle member with a knife when the bag is to be opened by an authorized person, when the seal member is of the type having the four aligned bores, it being understood that the portion of the shackle member passing through an outside bore is cut in such case.

A further and important advantage of the described construction is that the seal so provided has novel tamperproof qualities, which, being known to prospective tamperers, will prevent tampering. The extrusion through the guard hole of a portion of the arcute projection of the seal member disposes a portion of the soft extruded metal into the same plane as the sharp-cornered, flangeless end walls of the hole in the guard. The shackle end portions are thus gripped firmly between said extruded portion and said end walls of the guard hole in such a way that any tampering will fray or sever them altogether.

In order to give a detailed description of this invention, one possible embodiment thereof is shown, for illustrative purposes, in the accompanying drawings in which:

Figure 1 is a perspective view of the improved seal applied to the neck of a full bag, and before the deformation of the seal element.

Fig. 2 is a corresponding view after the seal element has been deformed.

Fig. 3 is a corresponding view illustrating a typical form of tampering and some of the results thereof in a seal of the type described.

Fig. 4 is a top elevational view of the improved seal applied to the neck of a bag, the neck being sectioned in a horizontal plane, and the shackle member not yet having been tightened.

Fig. 5 is a section on the line **5—5** of Fig. 4.

Fig. 6 is a section on the line **6—6** of Fig. 4.

Fig. 7 is a view corresponding to Fig. 4, but with the shackle tightened, the seal member deformed and the guard member further shown in horizontal central section.

Fig. 8 is a section on the line **8—8** of Fig. 7; and

Fig. 9 is a section on the line **9—9** of Fig. 7, the bag neck and shackle loops encircling the latter being omitted.

Referring now in detail to the drawings, the improved bag seal **10** comprises the conventional, elongate, fibrous, flexible shackle member **11**, the stiff, preferably metal, arcuate guard member **12** and the relatively soft and deformable seal member **13** which, for example, may be of deformable lead.

The invention is illustrated in connection with a seal member **13** having an inner pair of spaced-apart bores **14, 15** for receiving the shackle end portions **16, 17**, and an outer pair of bores **18, 19**. The axes of the bores are substantially parallel and in a common plane. With this form of seal member **13**, the shackle member **11** forms a first loop **20**, between and through the outer bores **18, 19**, further extending through outer holes **21** of guard member **12**, then forming the loops **22, 23** around the neck **24** of the bag, the shackle end portions **16, 17** finally passing through the inner pair of bores **14, 15**. By drawing the end portions **16, 17** tight, the bag neck **24** is closed tightly as seen in Fig. 7, guard member **12** being arcuate and approximately half encircling the closed bag neck. The shackle **11** runs freely in the bores, being only just loose enough to ensure free running.

When shackle **11** is to be drawn tight as in Figs. 2 and 7, that is accomplished and seal member **13** is deformed by a special tool which forces the body **25** of the seal member into a **Z** shape shown in vertical section in Fig. 9 and

in perspective in Fig. 2. This tightening of the shackle and deformation of the seal member while the shackle member is held taut causes a portion 26 of the body abutting the guard to be extruded through the central hole 27 of the guard which is opposite the inner pair of bores 14, 15.

Portions of the seal-member body 25 are cut out, amounting to substantially two thirds of the thickness of body 25, and extending outwards from the outer walls of bores 14, 15 and through the middle third of the height of body 25. Such weakened condition of the body 25 results in a collapsing of the same from the crimped shape of Fig. 2 to the mashed or collapsed shape of Fig. 3 if tampering is attempted by the insertion of an instrument 28 inside the loops 22 or 23 for the purpose of prying them loose.

Guard 12 has a substantially flat wall 30, the outer surface 31 of which abuts seal member 13 in operation. Hole 27 is formed in wall 30 extending therethrough. Wall 30 is devoid of flanges extending in either direction therefrom, the axial dimension of hole 27 thereby being the same as the thickness of the metal or other material constituting wall 30.

Hole 27 is elliptical, its length or major axis extending laterally of seal member 13 which it abuts in operation and substantially in the plane of the axes of bores 14, 15. Hole 27 is shorter than the distance between the outer walls 14A, 15A of the inner pair of bores 14, 15. As the shackle 11 substantially fills all the bores 14, 15, 18, 19, loosely enough, however, to permit free running of the shackle in the bores, the shortness of hole 27 compared to the overall width of the pair of bores 14, 15 results in a crowding or pinching or the shakle end portions 16, 17 against the inner walls 14B, 15B of the respective bores, as may be visualized from Fig. 4 in which the said shackle end portions extend inwardly toward each other as they pass from seal member 13 toward guard member 12 through which they then pass.

The minor axis of hole 27 exceeds in length the diameter of the bores 14, 15, and is less than the thickness of seal member 13.

An arch or projection 32 of arcuate profile is integral with and extends from body 25 of seal member 13 toward guard member 12, the arcuate end surface 33 of arch 32 abutting guard 12 in operation. Arch 32 extends across both bores 14, 15 and terminates inwardly of bores 18, 19.

The operation of the improved bag seal is as follows: the shackle end portions 16, 17 are first manually tightened, thus tightening all the loops 20, 22, 23. Then a deforming tool of well-known construction is applied to seal-member body 25 to further tighten the shackle mechanically and to squeeze and crimp the body 25, so that, as shown in Fig. 9, a portion 34 is backwardly or downwardly offset from the forward or upper portion 35 which abuts guard 12. Such mechanical tightening of the shackle causes the body 25 to be pulled and held forcibly by the shackle against the guard member 12. Such tightening, together with the squeezing of body 25 by the tool, causes the portion 26 of the relatively soft body 25 to be extruded into hole 27. The sectioned portion 26A, Fig. 8, of projection or arch 32 illustrates the shape of the neck of the extruded portion 26 on the section line 8—8 of Fig. 7, it being evident that some of the relatively soft material of seal member 13 has been forced to flow into hole 27 in conformity with the shape of the longitudinal boundaries of the latter hole, said boundaries being located inwardly of the adjacent boundaries of the arch 32. The material flowing into hole 27 therefore does not flow upwards or downwards of Fig. 8, being supported against such flow by the side walls of hole 27, but is free to flow right and left of Figs. 7 and 8, being resisted in such directions only by the flexible, fibrous, shackle end portions 16, 17. It is therefore true that lateral flow of the extruded material is not possible along

the minor axis of the hole 27, but is possible along the major axis thereof, as indicated by the dotted lines 26B of Fig. 7, illustrating in an exaggerated fashion for clarity the inner walls of the bores 14, 15 in the extruded portion 26.

The portion 26, thus extruding in both directions endwise of hole 27, pinches the shackle end portions 16, 17 against the end walls of hole 27. Said pinching or gripping is the more firm because the metal which would have flowed along the minor axis but was restricted, has caused more metal to flow toward the end walls. Said end walls 27A, 27B extend axially of hole 27 for a distance equal only to the thickness of wall 30, and form sharp, substantially rectangular corners with the inner and outer surfaces of wall 30, it having been noted that wall 30 has no flanges defining or operative in any way in respect of hole 27. The pinching force of portion 26 is therefore concentrated on the short portions of the shackle end portions 16, 17 held between portion 26 and the end walls 27A, 27B of hole 27, and this pinching force is accentuated by reason of the fact that the wall 30 of the guard member partially overlies and partially closes bores 14 and 15 in the same plane as the extruded portion 26. It is seen in Fig. 8 that the sections 16A, 17A of shackle end portions 16, 17 on the line 8—8 of Fig. 7 occupy only approximately three fifths of the diameter of the bores 14, 15 which the portions 16, 17 normally fill. It is also clear from Fig. 7 that the portions of said shackle end portions actually within hole 27 are even further constricted or pinched than the portions shown in Fig. 8. It is thus evident to those skilled in the art that any attempt to loosen the loops 22, 23 by a tool as in Fig. 3 will fray or shear the shackle end portions by reason of their tight engagement with the sharp-cornered end walls 27A, 27B.

As the arch 32 extends only across the inner pair of bores 14, 15, its abutment with the guard 12 presents less bearing area and the extrusion of portion 26 takes place with less force applied by the tool. It follows, then, that the tool is more easily operated.

Greater convenience in applying the tool to body 25 is also provided by the arch 32, which causes body 25 to stand off from guard 12 as clearly seen in Fig. 4, thereby affording room for the tool to be moved easily into operating position relatively to the body 25 even though the bag may be very full as illustrated in Figs. 1, 2 and 3. A satisfactory height of arch 32 has been found to be about five sixty-fourths of an inch in a seal element 13 measuring eleven sixteenths square including the arch, and of course measured before deformation.

A further advantage of arch 32 is that a slight base portion 32A of the arch remains after deformation, as in Fig. 7. This yields an advantage in connection with authorized opening of the bag when loops 22, 23 are customarily cut by a sharp knife when the seal is to be broken by an authorized person. The cutting takes place substantially in the plane of line 8—8 of Fig. 7. With the present invention, the knife, having severed the loop 22 or 23, will strike the soft lead portion 32A of the body 25 and will not be dulled, whereas without arch 32 the knife would strike the hard guard 12 and quickly be dulled.

In view of the evident possibility of utilizing the concept of this invention in various structural forms, this invention should be considered of the full scope set forth in the following claims.

I claim:

1. A sealing device for application to the mouth of a bag of flexible material for closing the same, comprising a deformable seal member having a pair of approximately parallel bores extending therethrough, an elongate, flexible shackle member, opposite end portions of which are extensible through said bores and an intermediate portion of which constitutes a loop which is extensible about the neck of a bag to which the device is applied, and a stiff guard member of thin sheet material between

said seal member and said loop; said seal member having an arcuate, deformable arch, in contact with said guard member and extending from an outer side wall portion of one of said bores to an opposite outer side wall portion of the other of said bores, and said guard member having a substantially flat wall, in contact with said arch, with an elongate aperture therein through which said shackle member extends, said flat wall being approximately perpendicular to said bores and said aperture in the guard member being of a length less than the distance between said opposite outer side wall portions of said bores at said arch and of a width less than the thickness of said arch; said shackle member being adapted to be tensioned tightly about such a bag neck, said seal member being adapted to be deformed to tightly grip portions of the shackle member extending through said bores, and the deformability of said arch of the seal member being such that, upon such tensioning of the shackle member and such deformation of the seal member, portions of said flat wall, defining opposite sides of said elongate aperture, become embedded in opposite side portions of said arch, causing an intermediate portion of the arch to protrude into said elongate aperture, and edges of the material of the guard member which define opposite ends of said elongate aperture being adapted to tightly pinch adjacent parts of the shackle member's end portions between said opposite end edges and said protruding portion of the arch.

2. A sealing device according to claim 1, said guard member being of sheet metal and being cup-shaped with opposite arcuate edges which are adapted to partially encircle and engage the neck of a bag therewithin, said guard member, further, being adapted to hold such a bag neck substantially spaced from said seal member to facilitate application of a sealing tool to the seal member when the sealing device is being applied to a full bag.

3. A sealing device according to claim 1, said seal member being of relatively soft lead and having flat, coplanar surfaces extending outwardly from opposite ends of said arch and a second pair of bores substantially parallel to said first-mentioned bores and opening at said flat surfaces, end portions of said arch adjoining said flat surfaces being exposed when the device is sealed, the guard member having opposite end portions facing and spaced from said flat surfaces and having additional apertures therein in substantial alignment with the bores of said second pair, said second pair of bores and said additional apertures being adapted to have portions of the shackle member extend therethrough and across the spaces between said flat surfaces and said end portions to form separate bag-neck encircling loops, the ends of which extend through the first-mentioned bores, and said end portions of the arch being in position to engage the edge of a knife used in either of said spaces to cut a portion of a shackle member extending thereacross.

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