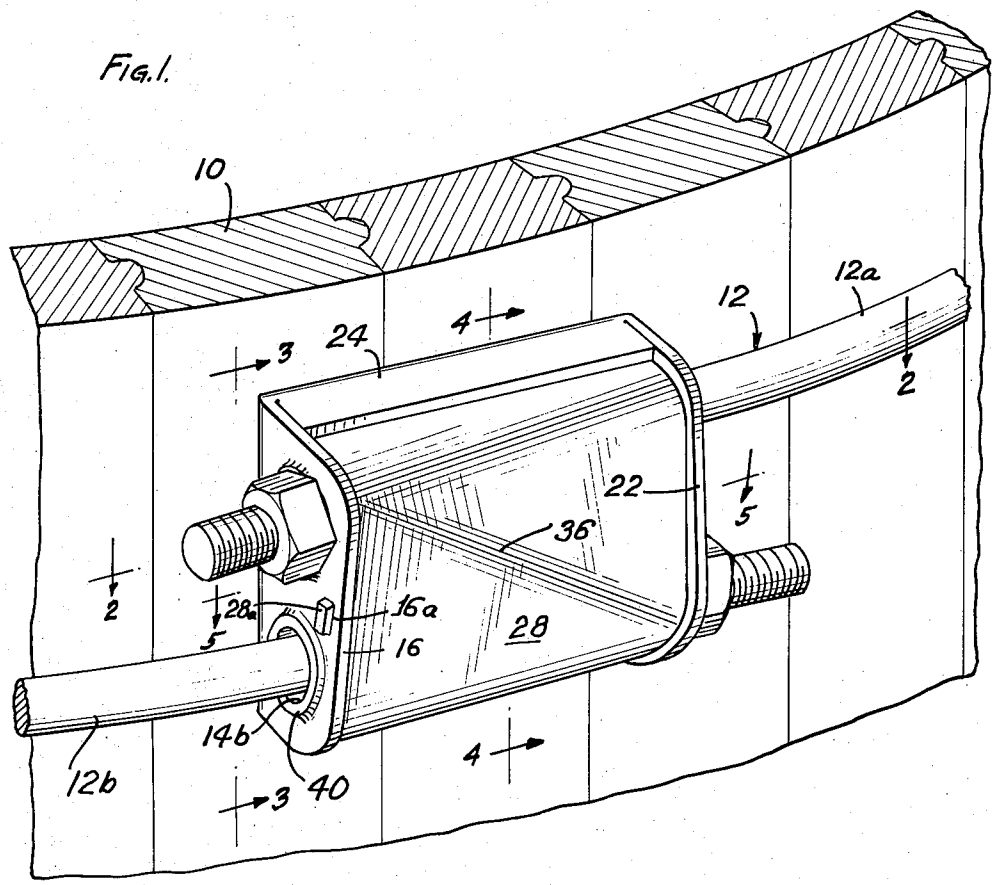
Jan. 17, 1961 W. RUTTEN 2,968,416

SILO LUG

Filed Sept. 19, 1958 3 Sheets-Sheet 1

Fig. 1.



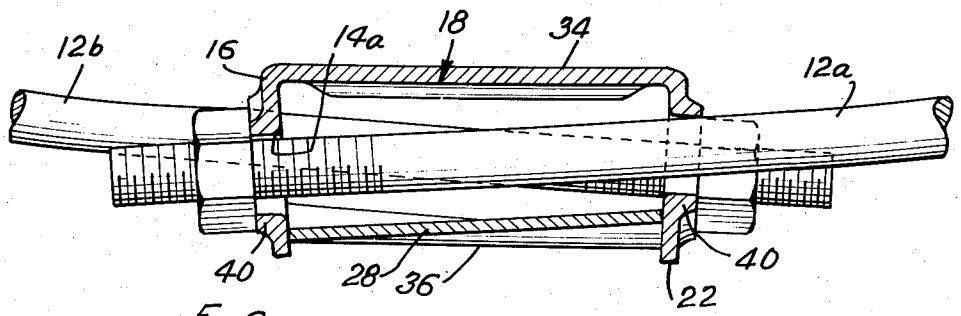


Fig. 2.

INVENTOR.

Walter Rutten, deceased by Marion Rutten, Lester Quinn, and The Northern Trust Company, an Illinois Corporation; by Joseph J. Regan, Vice President By Harry R. Hoffman - Atty.

Jan. 17, 1961 W. RUTTEN 2,968,416

SILO LUG

Filed Sept. 19, 1958 3 Sheets-Sheet 2

FIG. 3.

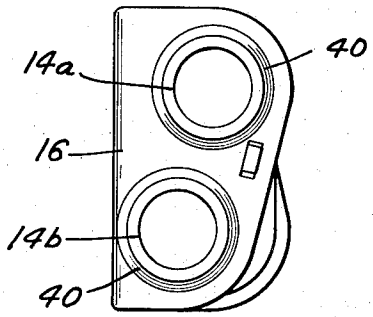


FIG. 4.

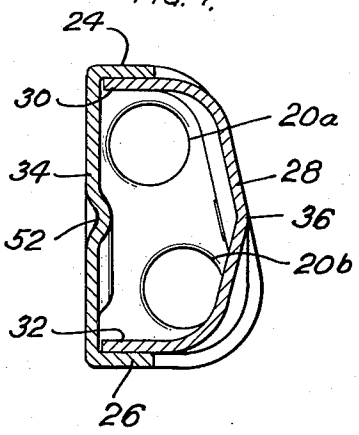
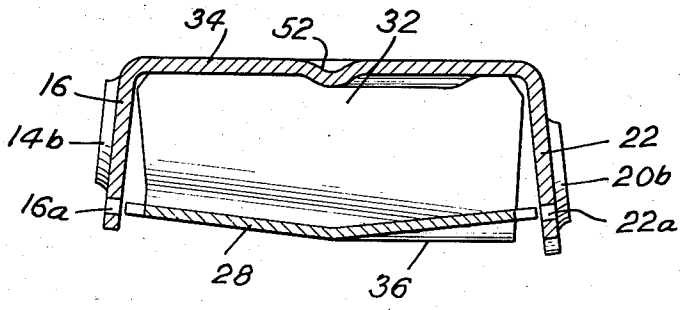


FIG. 5.



INVENTOR.

Walter Rutten, deceased by Marion Rutten Lester Quinn, and The Northern Trust Company, an Illinois Corporation, by Joseph J. Regan Vice-President

By Harry H. Hitzeman - ATTORNEY

Jan. 17, 1961 W. RUTTEN 2,968,416

SILO LUG

Filed Sept. 19, 1958

3 Sheets-Sheet 3

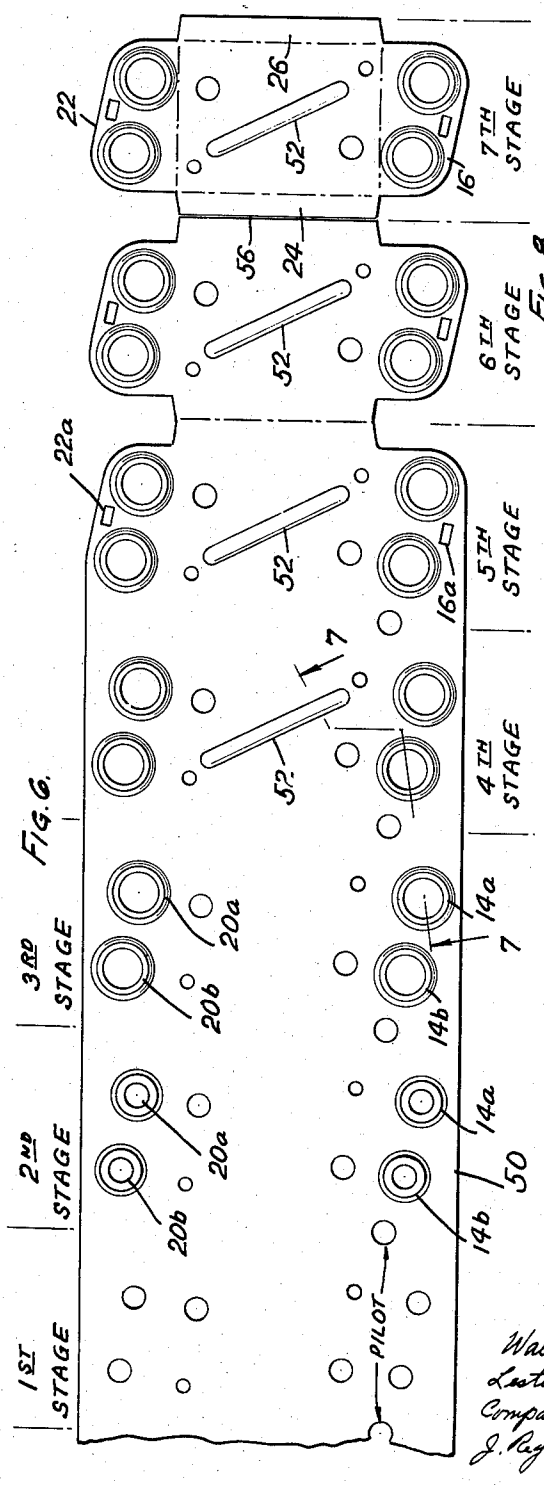


FIG. 6.

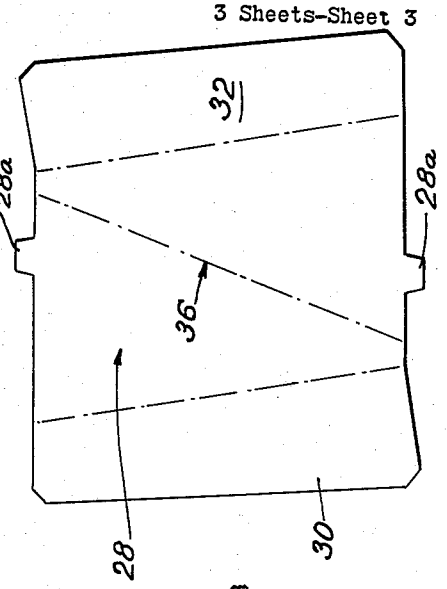


FIG. 8.

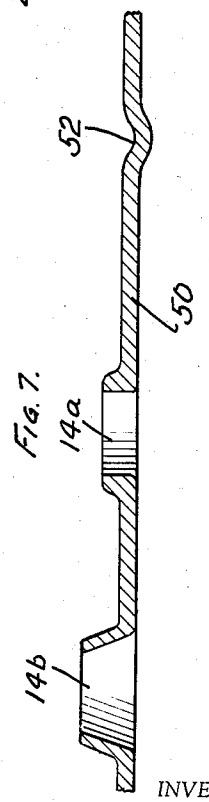


FIG. 7.

INVENTOR.

Walter Rutten, deceased by Marion Rutten Lester Rhein, and the Northern Trust Company, an Illinois Corporation, by Joseph J. Ryan, Vice President

By Harry H. Hitzeman ATTORNEY.

United States Patent Office 2,968,416
Patented Jan. 17, 1961

2,968,416

SILO LUG

Walter Rutten, deceased, late of Plainfield, Ill., by Marion Rutten and Lester Quinn (% Lester Quinn, Railoc Company Inc.), Plainfield, and Joseph J. Regan, Chicago, Ill., executors

Filed Sept. 19, 1958, Ser. No. 762,118

4 Claims. (Cl. 217—95)

This invention relates to improvements in silo lugs and similar devices.

The invention relates more particularly to silo lugs employed for the purpose of tying together the ends of the rods or encircling bolts or hoops which are used on silos, tanks and similar structures.

Silo lugs have been made for a period of years in several different ways. In the past silo or hoop lugs have been made of malleable castings. Then silo lugs pressed from sheet metal were made, usually in two pieces, i.e., an open sided housing of substantially rectangular shape and a reinforcing plate used as a strut between the two end walls of the housing. Such a structure is generally shown in the Peter Rutten Patent No. 2,244,728.

Another present day silo lug structure is shown in Clarence S. Anderson Patent No. 2,406,054 which shows a silo lug lug made of three sheet metal stampings, one a channel-shaped element and the others end plates which fit together loosely and are held in operative position by the ends of the hoops or silo rods which encircle the silo.

With today's ever increasing size and capacity of silos, tanks and storage bins, hoops of a larger diameter are required and silo lugs of greater strength are needed. Accordingly, the principal object of the present invention is to provide an improved silo lug which may be easily and cheaply made and which will be stronger and more durable than silo lugs made in the past.

A further object of the invention is to provide an improved silo lug of the type described specifically reinforced for greater strength at the rod receiving openings, this being one of the spots of weakness in prior art structures.

A further object of the invention is to provide an improved silo lug having rod receiving openings reinforced by first extruding and then compressing the annulus of the opening by coining.

Another object of the invention is to provide the improved silo lug above described in a continuous stamping, forming and coining operation by the use of a multiple die that performs all the stamping, punching, extruding and pressing or coining operations in series so that the same may be easily and cheaply made.

Other objects and advantages will be more apparent from the following description wherein reference is had to the accompanying drawings, upon which:

Fig. 1 is a front perspective view showing one of the silo lugs in use with the two ends of a silo encircling rod fastened therethrough, a portion of the rod and silo wall also being shown;

Fig. 2 is a plan sectional view thereof taken generally on the line 2—2 of Fig. 1;

Fig. 3 is an end elevational view of the silo lug taken in the direction of the arrows on Fig. 1;

Fig. 4 is a vertical sectional view of the same taken on the line 4—4 of Fig. 1;

Fig. 5 is a transverse sectional view thereof before the same has been assembled, taken generally on the line 5—5 of Fig. 1;

Fig. 6 is a plan view of the continuous sheet metal blank from which the rectangularly shaped housing portions of the silo lug are made in a continuous stamping, extruding, coining and bending operation;

Fig. 7 is a fragmentary cross-sectional view taken on the line 7—7 of Fig. 6 showing the steps of extruding and coining; and

Fig. 8 is a plan view of the blank from which the channel shaped brace is made, the dot-dash lines showing where the same is bent to the form generally shown in Figs. 4 and 5.

In the embodiment of the invention chosen to illustrate and describe the same, Fig. 1 shows a fragmentary section of the wall of the usual circular silo 10 that has the encircling hoop or rod 12 about the same for reinforcement thereof. These hoops are placed around the silo at various intervals between the top and the bottom of the silo, the number of hoops depending generally upon the diameter and height of the silo.

As best seen in Figs. 1 to 4, the two ends 12*a* and 12*b* of the encircling rod 12 are adapted to extend through suitable openings 14*a* and 14*b* in one of the end walls 16 of the housing member 18 and through similar openings 20*a* and 20*b* in the other end wall 22 of the housing 18. The housing 18 also has the bent-up side walls 24 and 26 which extend between the end walls 16 and 22. A reinforcing brace or plate 28 is provided, the plate 28 being generally U-shaped in cross-section and having the inwardly turned legs 30 and 32 which fit within the side walls 24 and 26 of the housing 18 against the back wall 34 thereof.

As can be seen, the plate 28 also has a diagonal bend 36 across its face, the bend generally being directed between the two ends of the plate and terminating in the vicinity of the bolt ends 12*a* and 12*b*. The plate 28 is also provided with a pair of side lugs 28*a* which serve to position and lock the same in place between the end walls of the housing 18 by being received in aligning openings 16*a* and 22*a* in the end walls 16 and 22 of the housing.

Each of the openings 14*a* and 14*b* and 20*a* and 20*b* are formed with a slightly raised shoulder 40, which results from the protruding and coining operation which takes place during the forming of the housing, as will be presently described. With the construction thus provided and as best shown in Figs. 1 and 2, the coining 40 at the bolt openings gives increased strength to the side walls 16 and 22 of the housing. In addition, the side walls 24 and 26 effect a brace between the end walls and additionally serve to provide a nesting fit for the legs of the reinforcing plate 28 which has the diagonal bracing therein as preveiously described. Thus it can be seen that an extremely tough and rigid structure has been provided and one which will be considerably stronger than any of those previously manufactured either by malleable casting method or by making the same from pressed metal.

Fig. 5 shows the lug in the position before the final pressing of the side walls 16 and 22 against the edges of the plate 28 and the position at which the housing is formed in the die operations which will presently be described. Figs. 6 and 7 illustrate generally the method of production of the housing of the silo lug of this invention.

In Fig. 6 the sheet of metal 50 may move through a progressive die which in the original or first stage stamps the group of nine holes and then passes to the second stage where the beginning of the protruding of the bolt hole openings 14*a* and 14*b* on one side and 20*a* and 20*b* on the other side is started. In the next operation the extruding of the holes 14*a* and 14*b* and 20*a* and 20*b* is

continued. In the third stage, a still further extruding action takes place as well as the beginning of the coining operation as shown in Fig. 7. This coining operation is simply the forming of the ridges or annulus around the openings **14***a* and **14***b* by hammering or compressing the metal lip to compress the molecules into a ridge of smaller size. This is known to give the area much greater strength. In the fourth stage, the diagonal reinforcing rib **52** is formed in the back wall portion **34** of the housing. In the fifth stage, the lug receiving opening **16***a* and **22***a* are stamped. In the sixth stage the outside contour of the end walls of the housing members is cut, and in the final or seventh stage the finished blank is severed from the adjacent blank as shown at **56**, and the blank is bent down to form the end walls **16** and **22** at the angle shown in Fig. 5 with the side walls **24** and **26** bent up at right angles as shown in Fig. 4.

Thus the construction of the housing member of the lug is a continuous stamping, extruding, coining and forming operation on a single piece of sheet metal that is fed through progressive dies from one end of the same.

Fig. 8 illustrates the blank from which the channel-shaped brace **28** is constructed, the same being bent along the dot-dash lines indicated to the formation shown in Figs. 1 to 4 of the drawings. The assembly is thus complete when the brace is placed in the position shown in Fig. 5 and the ends **16** and **22** are pressed together, thus locking the two parts of the lug into a unitary structure. It will be noted that the angle of the walls **16** and **22** is at approximate right angles to the axis of the bolt member that passes through the openings, so that the nut fastened on the end of the same for holding the end of the tie-rod in place bears at direct right angles against the supporting surface of the same.

From the above and foregoing description it can be seen that the silo lug which has been produced by the method described is of far greater strength than silo lugs made by any other method presently employed. By extruding and then coining the openings through which the tie-rod ends pass, the openings are thus greatly strengthened and there is less tendency for the lug to crack, bend or break at this point.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of the present invention which, generally stated, consists in the matter shown and described and set forth in the appended claims.

What is claimed is:

1. A silo lug comprising an open-ended housing and a cap which, when assembled together, comprise a completely enclosed rectangularly shaped housing, said open-ended housing formed of sheet metal and having a flat base, a pair of transverse end walls and shorter transverse side walls, said side walls separated from said end walls and forming parallel braces between said end walls, each of said end walls having a pair of openings formed therein for receiving a silo encircling tie rod therethrough, the peripheral edges of said openings each having an outwardly projecting annulus formed by a coining process, said cap being U-shaped and being positioned between the end walls of said housing and having its legs fastened within and against the transverse side walls of said housing.

2. A silo lug comprising an open-ended housing and a cap which, when assembled together, comprise a completely enclosed rectangularly shaped housing, said open-ended housing formed of sheet metal and having a flat base, a pair of transverse end walls and shorter transverse side walls, said side walls separated from said end walls and forming parallel braces between said end walls, each of said end walls having a pair of openings formed therein for receiving a silo encircling tie rod therethrough, the peripheral edges of said openings each having an outwardly projecting annulus formed by a coining process, said cap being U-shaped and being positioned between the end walls of said housing and having its legs fastened within and against the transverse side walls of said housing, the end edges of said cap having medial fingers extending outwardly therefrom and the end walls of said housing having finger-receiving openings therein between each pair of circular openings.

3. A silo lug having a generally elongated rectangular shaped base, integral end walls bent at right angles thereto and side walls bent at right angles from said base between the edges of said end walls to form a brace therebetween, said end walls having aligned openings for receiving a silo rod, and a U-shaped brace member and cap fastened between the two side and the two end walls of said silo lug to form a closed rectangularly shaped lug.

4. A silo lug having a generally elongated rectangular shaped base, integral end walls bent at right angles thereto and side walls bent at right angles from said base between the edges of said end walls to form a brace therebetween, said end walls having aligned openings for receiving a silo rod, and a U-shaped brace member and cap fastened between the two side and the two end walls of said silo lug to form a closed rectangularly shaped lug, said cap having outwardly projecting aligning fingers on opposite ends and said end walls having complementary openings for receiving the same.

References Cited in the file of this patent

UNITED STATES PATENTS

609,356	Krantz	Aug. 16, 1898
850,048	Playford	Apr. 9, 1907
1,481,415	Casper	Jan. 22, 1924
2,257,536	Roycraft	Sept. 30, 1941
2,406,054	Anderson	Aug. 20, 1946
2,488,710	Cooper	Nov. 22, 1949

FOREIGN PATENTS

251,728	Great Britain	May 13, 1926