

Jan. 8, 1952

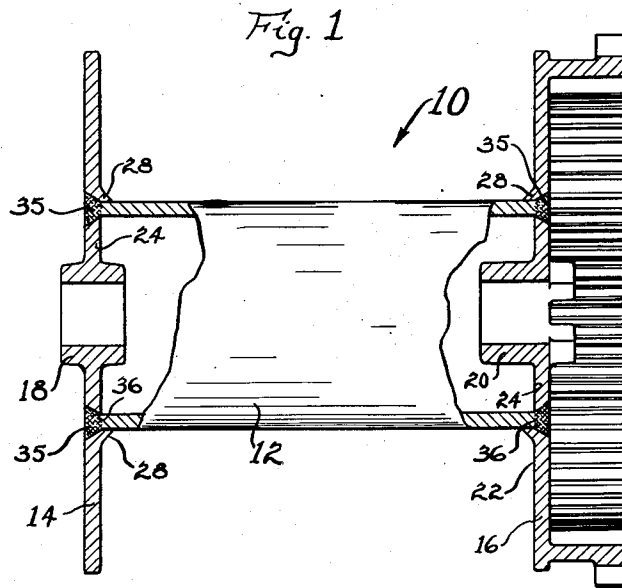
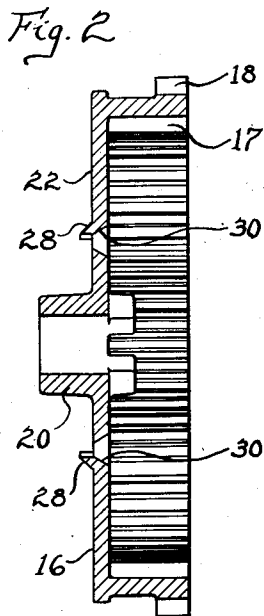
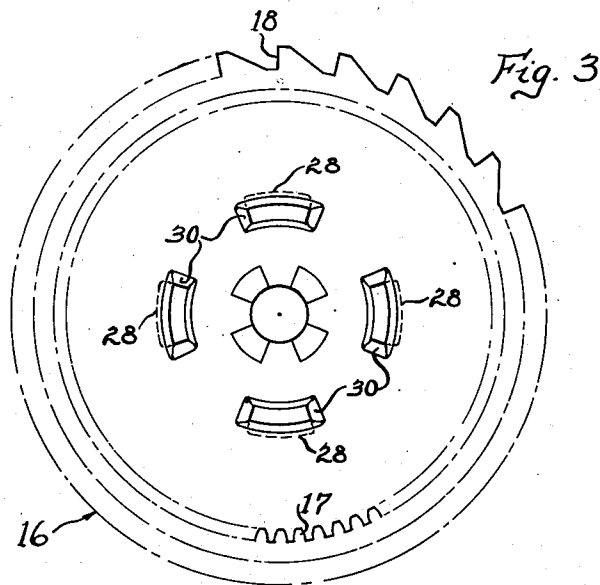
M. F. SASGEN

2,581,716

CONSTRUCTION OF DRUM FOR HOISTS, WINCHES AND THE LIKE

Filed March 22, 1946

2 SHEETS--SHEET 1



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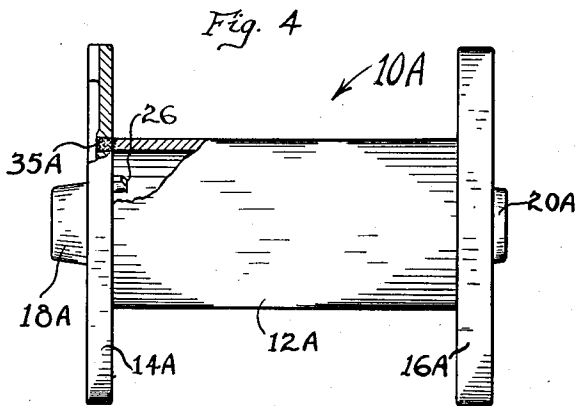
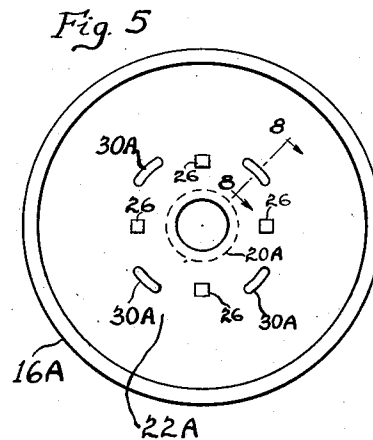
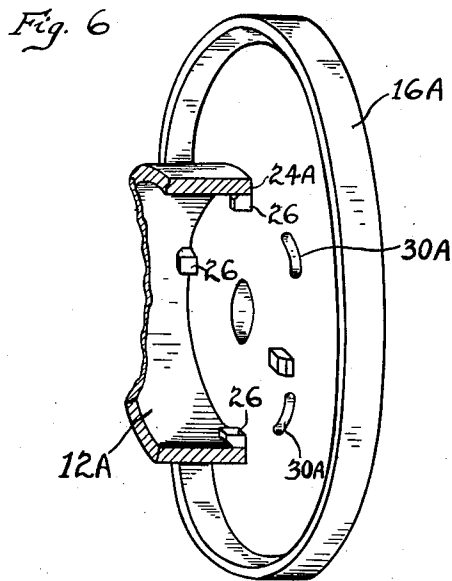
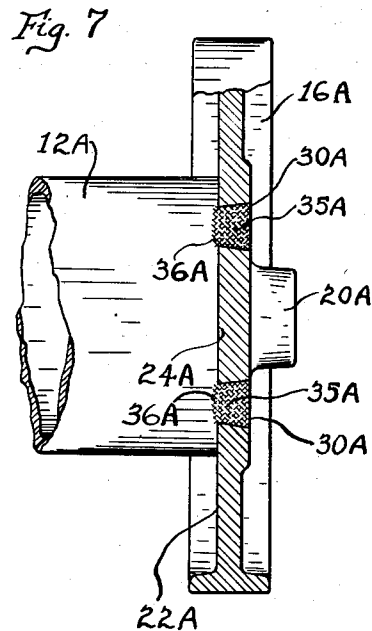
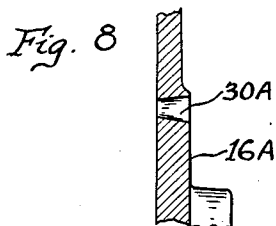
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CONSTRUCTION OF DRUM FOR HOISTS, WINCHES AND THE LIKE

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2 SHEETS—SHEET 2



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CONSTRUCTION OF DRUM FOR HOISTS,
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1 Claim. (Cl. 242—117)

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This invention relates to the construction of drums of the character used in hoists, winches and the like, and the invention relates particularly to the manner of assembly of the separately formed elements of such drums.

Drums of the aforesaid character are commonly afforded by a central barrel of cylindrical form having separately formed flanges rigidly secured to the opposite ends of the barrel at right angles to the axis of the barrel, and these flanges are so formed as to provide mounting hubs concentric with the axis of the barrel whereby the drum may be supported for rotative movement. Such drums are utilized for operating a hoist or winch cable which is arranged to be wound about the barrel of the drum as an incident to rotative movement of the drum, and the forces required to impart the desired rotative movements to the drum or to hold the drum against rotation are applied to one or the other of the flanges of the drum. It will thus be clear that the forces that are applied between the flanges and the barrel of the drum are primarily of a torsional character which tend to disrupt the connection between the flanges and the barrel of the drum, but in addition to such torsional forces, the load applied to the cable that is being wound upon the barrel of the drum also acts in what might be termed shearing relationship applied transversely with respect to the axis of the drum and the tendency of such forces is also to disrupt the connection between the flanges and the barrel of the drum.

Because of the great forces that are thus applied to drums of the aforesaid character, it has been customary in the past to resort to rather elaborate and expensive methods of connection of the barrel to the flanges, and to simplify and reduce the cost of effecting such connection of the barrel to the end flanges is the primary object of the present invention.

In practice it has been found that it is advantageous to make the flanges of drums of the aforesaid character from a material such as malleable iron, and this has in the past led to the conclusion that the elements of such a drum could not be satisfactorily secured together by processes of welding, and a further object of the present invention is to enable such parts to be effectively and strongly secured together by welding processes that may be readily and easily performed. Another and related object is to enable the elements of such a drum to be secured together by processes of welding in such a manner that the effectiveness of the welded bond with the malleable iron flanges is rendered immaterial. A further and related object is to secure the ele-

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ments of such a drum together by processes of welding wherein welded material serves to afford a mechanical interlock between the associated elements of the drum to maintain these elements in the desired associated relationship, and a further object is to afford means that are effective when the parts are thus secured together by welding to afford an interlocking action which holds the parts against relative displacement axially of the drum, laterally of the axis of the drum, and rotatively with respect to the axis of the drum.

Other and further objects of the present invention will be apparent from the following description and claim and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments and the principles thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claim.

In the drawings:

Fig. 1 is a side elevational view of a drum constructed in accordance with the invention, a portion of the view being in longitudinal section;

Fig. 2 is a sectional view of one flange;

Fig. 3 is an end view of the flange;

Fig. 4 is a side elevational view taken partially in longitudinal section and illustrating another drum embodying the features of the invention;

Fig. 5 is an elevational view of the inner side surface of one of the end flanges of the drum of Fig. 4;

Fig. 6 is a fragmental perspective view taken partially in section and illustrating the inner surface of one of the end flanges in association with the barrel of the drum of Fig. 4;

Fig. 7 is an elevational view of the drum of Fig. 4, taken partially in section; and

Fig. 8 is a fragmental sectional view taken substantially along the line 8—8 of Fig. 5.

In the form chosen for disclosure in Figs. 1 to 3 of the drawings, the invention is embodied in a drum 10 adapted for use in hoisting winches and the like and having a drum barrel 12 with end flanges 14 and 16 secured to opposite ends of the barrel 12, and it is with the mounting the end flanges 14 and 16 on the barrel 12 that the present invention is concerned. Drums of the character shown herein are utilized for hoisting extremely heavy loads, and the rotative mounting of the drum is afforded by means such as a

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mounting shaft extended axially through axial mounting hubs 18 and 20 formed on the flanges 14 and 16, respectively. The operation of the associated hoisting cable is effected by winding the same about the barrel 12, and the requisite starting, driving and braking forces are applied to one of the flanges, as the flange 16, the driving forces being applied to internal gear teeth 17 while stopping or locking forces are applied as by a braking or locking dog to teeth 18 formed exteriorly on the flange 16. Such a mode of use of the drum makes it necessary that the connections of the barrel 12 to the two flanges 14 and 16, and particularly the flange 16, be extremely rugged and strong, and in accordance with the present invention this is accomplished in a simple and inexpensive manner.

Thus under the present invention the two flanges 14 and 16 are formed from malleable iron and while generally similar in form, the two flanges 14 and 16 may be different in the rim constructions thereof in order to adapt the same to the different uses and functions required. With respect, however, to the association of the barrel 12 with the flanges 14 and 16 the construction and method may be identical, and therefore the construction and method will be described in detail with respect to the flange 16. Thus, as will be evident in Fig. 2, the flange 16 has a generally flat inner end face 22 against which the flat annular end face 24 of the barrel 12 may be disposed in a concentric relation with respect to the hub 20, and means are afforded on the face 22 of the flange 16 for holding the barrel against lateral displacement from such concentric relationship. In the form shown in Figs. 1 to 3 such means are afforded by a plurality of circumferentially spaced axially projecting lugs 28 which are formed integrally with the flange and are disposed for engagement with the outer surface of the barrel 12. The barrel 12 is formed with the annular end surfaces 24 normal to the axis of the barrel, and ordinary steel pipe or tubing may be employed as the basic material for the barrel 12 and may be cut to the desired form by relatively simple operations.

When the end of the barrel 12 has thus been located within annular row of lugs 28 so as to be thereby held against lateral displacement with respect to the flange 16, means are, under the present invention, rendered effective to hold the flange 16 and the drum 12 against relative endwise displacement, thereby to hold the end portion of the barrel 12 in the desired operative relationship with respect to the lugs 28. In accordance with the present invention this is effected by means of welding, and this is accomplished in such a way that an extremely high strength is afforded for resisting torsional displacement of the barrel 12 with respect to the flange 16. Thus the flange 16 has a plurality of circumferentially spaced arcuate slots 30 formed therethrough in such positions as to be disposed opposite the end surface 24 of the barrel 12, and these slots 30 are tapered as will be evident in Figs. 1 to 3, so as to be of greater width and length on the outer face of the flange 16 than they are on the inner face 22 of the flange. In the form of the invention shown in Figs. 1 to 3, the lugs 28 are formed so as to be disposed along the outermost edges of the slots 30. With the parts held firmly in the relation shown in Fig. 1, a plurality of retaining tongues or keys 35 are formed in the respective slots 30

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by a welding operation wherein welding rod material is welded as at 36, Fig. 1, onto the end surface 24 of the barrel 12, and the deposit of welding rod material is continued to such an extent as to completely fill the openings 30. Thus the tongues or keys 35 are of dovetail form, so as to thereby mechanically interlock with and resist endwise withdrawal of the flange 16, and because of this, the character or strength of the welded bond between the welding rod material and the malleable iron or other substance is rendered immaterial.

In the form chosen for disclosure in Figs. 4 to 8 of the drawings, the invention is embodied in a drum 10A having a drum barrel 12A with end flanges 14A and 16A secured to opposite ends of the barrel 12A. The rotative mounting of the drum is afforded by means such as a mounting shaft extended axially through axial mounting hubs 18A and 20A formed on the flanges 14A and 16A, respectively. The operation of the associated hoisting cable is effected by winding the same about the barrel 12A, and the requisite starting and driving forces are applied to one of the flanges, as the flange 14A which in such an instance constitutes what is usually termed the gear or drive flange of the drum, while the stopping or locking forces are applied to the other flange, as the flange 16A which is in such an instance termed the brake flange of the drum.

The two flanges 14A and 16A are formed from malleable iron and while generally similar in form, the two flanges 14A and 16A may have different rim constructions and widths to adapt the same to the different uses and functions required. Thus, as will be evident in Figs. 4 and 6, the flange 16A has a generally flat inner end face 22A against which the flat annular end face 24A of the barrel 12A may be disposed in a concentric relation with respect to the hub 20A, and means are afforded on the face 22A of the flange 16A for holding the barrel against lateral displacement from such concentric relationship. In the form shown in Figs. 4 to 8 such means are afforded by a plurality of circumferentially spaced axially projecting lugs 26 which are formed integrally with the flange and are disposed for engagement with the inner surface of the barrel 12A.

When the end of the barrel 12A has thus been located in an embracing relation with respect to the annular row of lugs 26 so as to be thereby held against lateral displacement with respect to the flange 16A, the flange 16A and the drum 12A are secured against relative endwise displacement by means of welding that is accomplished in substantially the same manner as hereinbefore described. Thus the flange 16A has a plurality of circumferentially spaced arcuate slots 30A formed therethrough in such positions as to be disposed opposite the end surface 24A of the barrel 12A, and these slots 30A are tapered as will be evident in Figs. 4, 7 and 8, so as to be of greater width and length on the outer face of the flange 16A than they are on the inner face 22A of the flange. With the parts held firmly in the relation shown in Figs. 4, 6 and 7, a plurality of retaining tongues or keys 35A are formed in the respective slots 30A by a welding operation wherein welding rod material is welded as at 36A, Fig. 7, onto the end surface 24A of the barrel 12A, and the deposit of welding rod material is continued to such an extent as to completely fill the openings 30A.

Thus the tongues or keys 35A are of dovetail form, so as to thereby mechanically interlock with and resist endwise withdrawal of the flange 16A.

From the foregoing description it will be apparent that the barrel of the drum may be formed from commercially available steel tubing that may be cut at right angles to its axis by easily performed machine shop operations, and this steel drum may be readily and easily associated with the malleable iron flanges by process of welding in such a manner that the character of the welded bond between the welding material and the end flanges is of no particular moment. The present invention so relates the welded material to the steel barrel that such welding material form a plurality of tongues or keys that are mechanically interlocked due to the tapered form of the openings so as to thereby hold the end flanges on the barrel against endwise separation with respect to the barrel. Because of this endwise locking action, the effectiveness of the annular rows of lugs is assured, and these lugs serve to prevent relative movement of the barrel and the flanges in a direction perpendicular to the axis of the drum. The keys that are formed from the welding material will of course have an extremely good welded bond with the end edges of the barrel, and because of this, the torsional forces that are effective between the barrel and the end flanges of the drum are taken in shear by the material of the keys, and this results in an exceedingly high resistance to such torsional forces.

Thus the drum of the present invention may not only be manufactured at a reasonable cost, but this drum possesses extremely high strength to resist the forces and shocks to which it is subjected in use.

Thus, while I have illustrated and described preferred embodiments of my invention it is to be understood that these are capable of variation and modification and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claim.

I claim:

A winding drum and cable winch comprising a cylindrical steel barrel having continuous even end faces extending in planes perpendicular to the axis of the barrel, and end flanges formed of malleable iron having their inner side faces abutting against opposite end faces of the barrel in coaxial relation therewith, each of said flanges having an annular series of spaced arcuate slots concentric with the axes of the barrel and flanges, each of the slots diverging outwardly from the inner face of the flange and being larger at the outer face of the flange, and each flange having an annular series of spaced lugs formed integral therewith concentric with the axis thereof and the axis of the barrel, said lugs projecting laterally from the inner face of the flange and engaging longitudinal face portions of one end of the barrel, and keys formed from welding material welded onto the ends of the barrel and filling the slots in the flanges, whereby torsional displacement of the barrel with respect to the flanges is resisted and the flanges are mechanically interlocked to the barrel by the keys extending into the tapered slots to prevent endwise displacement of the flanges with respect to the barrel, the annular series of lugs of the flanges serving to prevent relative movement of the barrel and the flanges in a direction perpendicular to the axis of the barrel.

MATTHIAS F. SASGEN.

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