

Dec. 2, 1941.

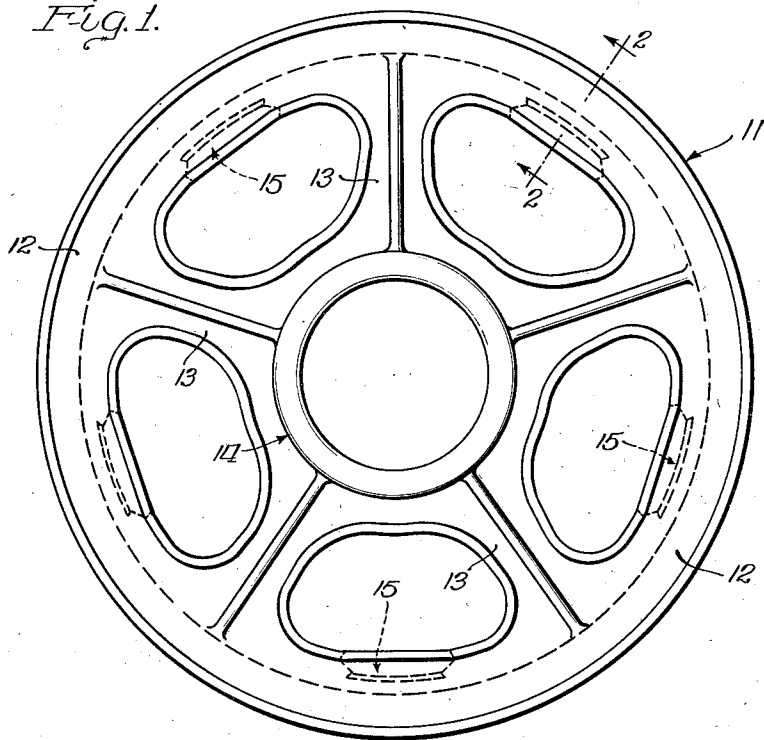
P. V. LARSEN

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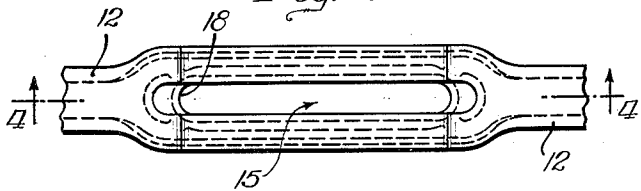
SHEAVE

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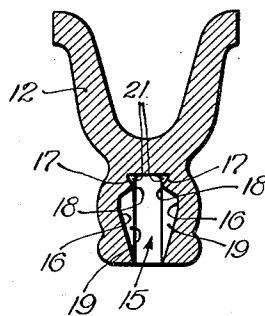
*Fig. 1.*



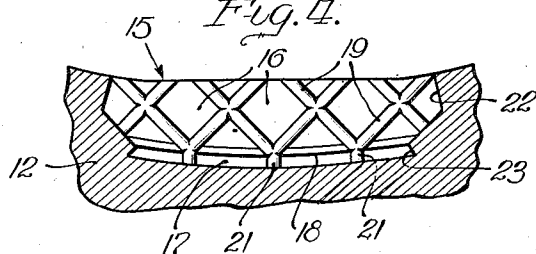
*Fig. 3.*



*Fig. 2.*



*Fig. 4.*



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## UNITED STATES PATENT OFFICE

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SHEAVE

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7 Claims. (Cl. 74—230.1)

This invention relates in general to rotatable members, such as sheaves, and more particularly to a novel method and means for statically balancing the same.

A principal object of the invention is the provision on a sheave, or other rotatable member, of a plurality of circumferentially spaced apertures or pockets which are designed to selectively receive molten metal in the quantity or amounts necessary for accurately balancing the member, and which are also designed to completely eliminate the possibility of such metal loosening or coming out after it has hardened and when the member is in motion.

Another important object of the invention is the provision of such pockets with radially disposed walls which are undercut or dove-tailed at two or more points so as to function in the desired manner regardless of the amount of molten metal which is deposited therein.

A further important object of the invention is the provision of such pockets with circumferentially spaced and axially extending ribs on the side walls thereof to prevent longitudinal moving or slippage of the metal deposited therein.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

In the drawing:

Figure 1 is an elevational view of a sheave embodying the features of the invention;

Figure 2 is a detail, radial section taken through one of the balancing pockets substantially on the line 2—2 of Fig. 1;

Figure 3 is a detail plan view of one of the balancing pockets; and

Figure 4 is a longitudinal section taken substantially on the line 4—4 of Fig. 3.

Referring more particularly to the drawing, reference numeral 11 indicates in general a sheave of any suitable or desired construction, which is employed herein merely as illustrating one of any number of different types of rotatable members with which the instant invention may be employed. The sheave 11 comprises an exteriorly slotted rim 12, and a plurality of circumferentially spaced spokes 13 and a hub portion 14 which are preferably formed integrally therewith.

The inner portion of the rim 12 is provided intermediate each pair of adjacent spokes 13 with a radially or outwardly and circumferen-

tially or longitudinally extending recess or balancing pocket, indicated generally by reference numeral 15. The same number of pockets 15 are thus provided as there are spokes 13, and they are equally spaced from each other circumferentially of the sheave in the manner illustrated in Fig. 1.

Referring more particularly to Figs. 2 to 4, it will be seen that each of the balancing pockets 15 comprises longitudinally extending or side walls which are undercut or dove-tailed at 16 and are also undercut at the base of the pocket at 17, these undercut portions joining on each side wall to define a longitudinally disposed rib 18 which is spaced a short distance from the bottom of the pocket and projects laterally into the same. Each of the side walls of the pocket 15 is also provided with laterally projecting, spaced ribs 19 which intersect or cross each other, as shown in Fig. 4, to form a beaded lattice-work. These ribs 19 are arranged on each side wall in two parallel series in the main part of the pocket as defined by the undercut portions 16, the ribs of one series being disposed at right angles to those of the other series. Adjacent the longitudinal rib 18, adjacent ribs 19 of the two different series intersect and terminate in downwardly or outwardly extending ribs 21 which traverse the undercut portion 17. Each of the end walls of each pocket 15 is undercut at 22 adjacent the upper or inner open end of the pocket, slopes from such undercut portion toward the center of the pocket, and is undercut again at 23 below or outwardly of the ribs 18.

As has been stated hereinbefore, the purpose of the several pockets 15 is to facilitate the accurate balancing of the sheave 11, or any other rotatable member in which they may be provided. To accomplish this function, the sheave 11 is freely rotatably mounted upon a suitable shaft, or the like, to determine its condition of static balance, and molten metal, preferably lead, is selectively poured into one or more of the pockets 15 in such amount or quantities as will effect perfect static balance of the sheave.

The necessary amount of molten metal thus poured into any one of the pockets 15 may vary between relatively wide limits in any given case. The provision of the undercut portions 16, 17, 22 and 23 and the ribs 18, 19 and 21 in each balancing pocket 15, however, will positively prevent such metal from loosening, slipping or coming out of the pockets, after it has hardened, regardless of the particular amount thereof which has been added. This desired result will obtain even if the

amount of lead, for example, which is poured into a balancing pocket 15 does not exceed  $\frac{1}{2}$  ounce in weight, and without regard to the quantum of the forces subsequently exerted thereon by the rotation of the sheave, or other rotatable member. The importance of so preventing shifting or other movement of the added metal relative to the rotatable member may best be realized, perhaps, when it is considered that any such shifting of the metal would result in the rotatable member immediately being thrown out of balance.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A rotatable member having a plurality of similar pockets formed therein and equally spaced from each other circumferentially of said member to selectively receive molten metal in an amount necessary to statically balance the member, the walls of each of said pockets having under-cut portions and the side walls thereof having longitudinally spaced, angularly disposed ribs extending transversely into said pockets, whereby after any amount of said molten metal has solidified it will positively be prevented from any movement relative to said member upon rotation thereof.

2. A sheave, comprising a rim portion, a plurality of pockets formed in the inner surface of said rim portion and equally spaced from each other circumferentially thereof, said pockets having under-cut portions and a beaded lattice-work formed on some of the walls thereof, and metal inserts selectively cast in said pockets in an amount necessary to balance said sheave, said under-cut portions and beaded lattice-work preventing displacement of said inserts relative to said rim portion upon rotation of said sheave.

3. A rotatable member having a rim portion, a plurality of similar pockets formed in the inner surface of said rim portion and equally spaced from each other circumferentially of said portion to receive molten metal selectively in any amount necessary to balance the member statically, the walls of each of said pockets being dove-tailed in two directions, the side walls in each of said pockets having spaced ribs extending laterally into the pockets whereby shifting relative to said member of any amount of metal placed therein, after the same has hardened, is prevented.

4. A sheave, comprising a rim portion, a plurality of pockets formed in the inner surface of said rim portion and equally spaced from each other circumferentially thereof, each of said pockets having a plurality of under-cut portions in each direction, and a beaded lattice-work formed on some of the walls thereof, and metal inserts selectively cast in said pockets in an

amount necessary to balance said sheave, said under-cut portions and beaded lattice-work preventing displacement of said inserts relative to said rim portion upon rotation of said sheave, regardless of the size of said inserts.

5. A sheave, comprising a rim portion, a plurality of elongated pockets formed in the inner surface of said rim portion and equally spaced from each other circumferentially thereof, each of said pockets having a plurality of under-cut portions along each of the side walls of said pockets and at each end thereof to form continuous ridges extending inwardly from the walls of said pockets, a beaded lattice-work formed on the side walls of each of the pockets and disposed at angles to said ridges, the spaces between the ridges and the lattice-work forming holding depressions, whereby after molten metal placed in said pockets to balance the sheave statically has solidified it will be positively prevented from any movement relative to said member upon rotation thereof regardless of the amount of molten metal required.

6. A sheave, comprising a rim portion, a plurality of elongated pockets formed in the inner surface of said rim portion and equally spaced from each other circumferentially thereof, each of said pockets having a plurality of under-cut portions, along each of the side walls of said pockets and at each end thereof to form continuous ridges extending inwardly from the walls of said pockets, said ridges being parallel to each other and to the inner surface of the rim portion, a beaded lattice-work formed on the side walls of each of the pockets and disposed at angles to said ridges, the spaces between the ridges and the lattice-work forming holding depressions, whereby after molten metal placed in said pockets to balance the sheave statically has solidified it will be positively prevented from any movement relative to said member upon rotation thereof regardless of the amount of molten metal required.

7. A sheave, comprising a rim portion, a plurality of elongated pockets formed in the inner surface of said rim portion and equally spaced from each other circumferentially thereof, each of said pockets having a plurality of under-cut portions, along each of the said walls of said pockets and at each end thereof to form continuous ridges extending inwardly from the walls of said pockets, said ridges being parallel to each other and to the inner surface of the rim portion, said ridges being disposed between the bottom and top edges of said pockets and being spaced from said edges, a beaded lattice-work, formed on the side walls of each of the pockets and disposed at angles to said ridges, the spaces between the ridges and the lattice-work forming holding depressions, whereby after molten metal placed in said pockets to balance the sheave statically has solidified it will be positively prevented from any movement relative to said member upon rotation thereof regardless of the amount of molten metal required.

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