May 30, 1944. F. P. LAWLER 2,350,120

HOIST

Filed May 27, 1942 2 Sheets-Sheet 1

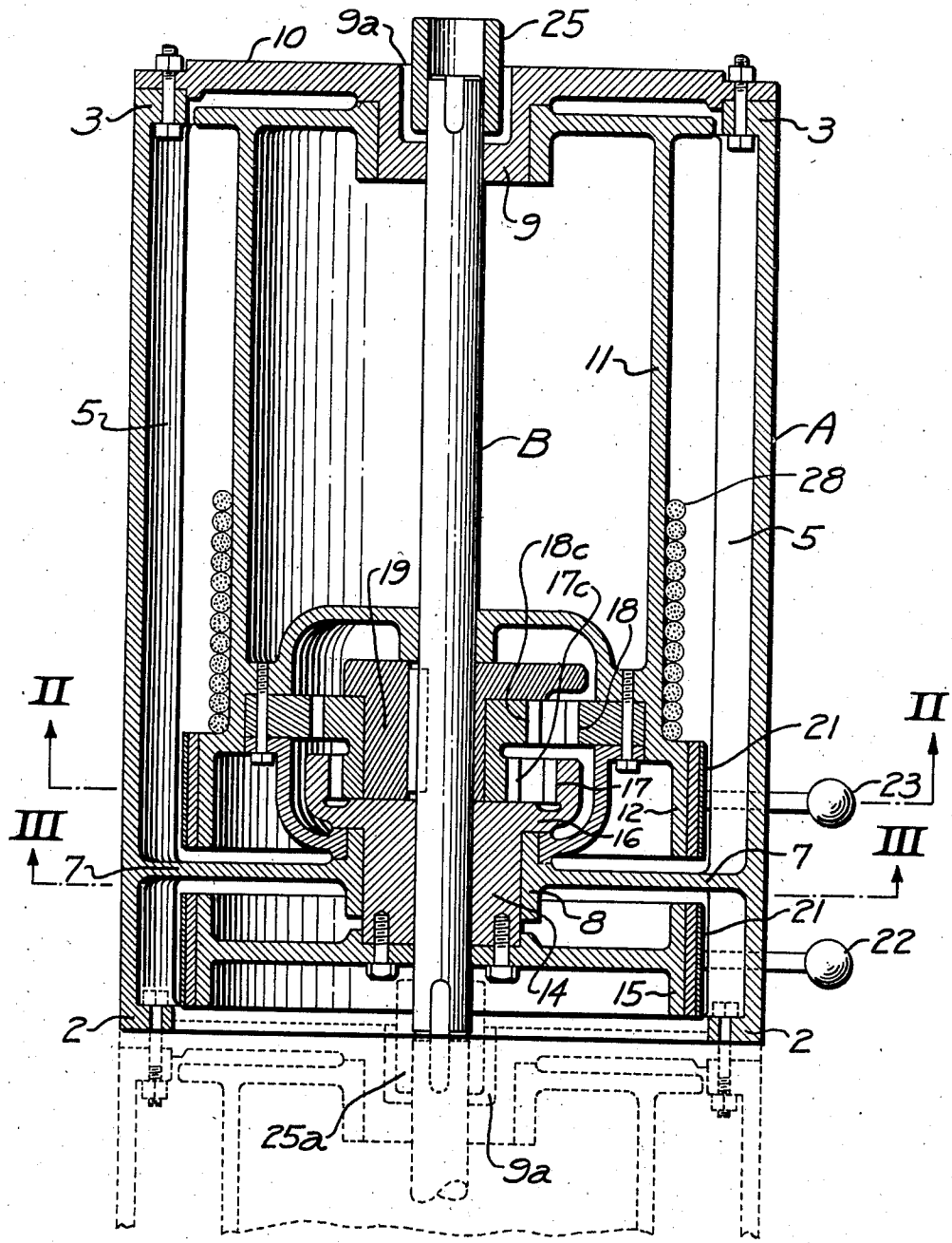


FIG. 1

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HOIST

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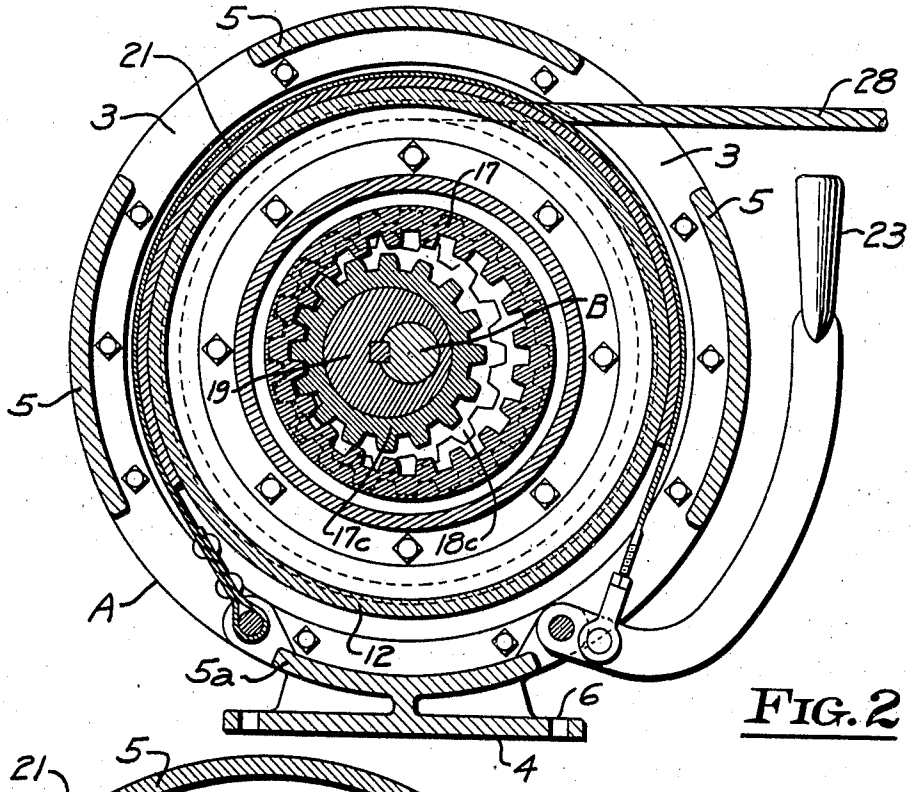


FIG. 2

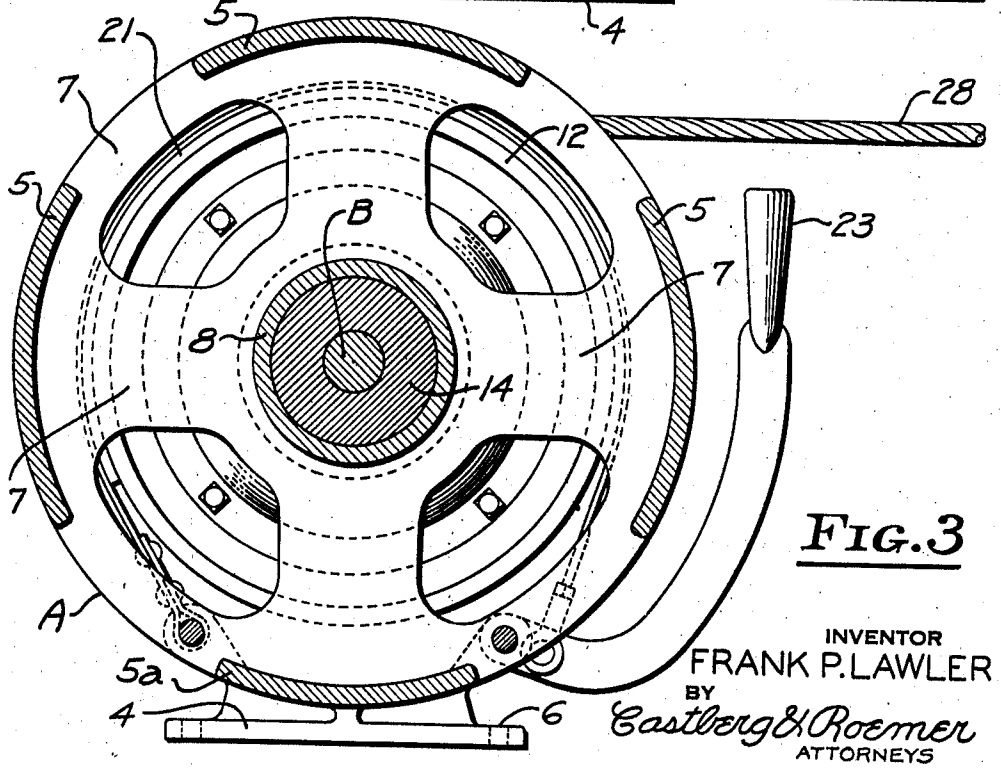


FIG. 3

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UNITED STATES PATENT OFFICE

2,350,120

HOIST

Frank P. Lawler, Chicago, Ill., assignor of one-third to Charles H. Grant, San Francisco, Calif., one-third to Frank P. Lawler, Chicago, Ill., and one-third to Paul J. Tyler, Oroville, Calif., jointly

Application May 27, 1942, Serial No. 444,653

4 Claims. (Cl. 254—184)

This invention relates to a reduction gear operated cable drum which is adapted to be directly coupled to and driven by a prime mover such as an electric motor, a gas engine or the like.

The object of the invention is generally to improve and simplify the construction and operation of hoists of the character described; to provide a hoist which is adapted to be built in units and in which two or more units are adapted to be coupled end to end and to be driven by a common prime mover; to provide a hoist in the form of a reduction gear operated cable drum which is mounted and housed within a frame and which contains all controls required for operation; to provide a head for the frame which is applicable to one or both ends thereof, said head carrying a bearing for the support of one end of a cable drum and at the same time forming a coupling whereby one or more hoists may be coupled end to end; and further, to provide a head of the character described which forms a journal for one end of the drive shaft and permits the drive shafts of adjoining hoists to be coupled so that one or more aligned hoists may be driven from a single motor or prime mover.

This invention is shown by way of illustration in the accompanying drawings, in which:

Fig. 1 is a central longitudinal horizontal section of the hoist;

Fig. 2 is a cross section taken on line II—II of Fig. 1; and

Fig. 3 is a cross section taken on line III—III of Fig. 1.

Referring to the drawings in detail and particularly Fig. 1, A indicates in general an elongated frame consisting of a pair of ring shaped end flanges 2 and 3 which are connected by a longitudinally extending base section 4 and a plurality of barrel-type arms 5, the base section being in turn provided with foot lugs 6 whereby the frame as a whole may be secured to any suitable support. Extending radially from the base section 4 and the arms 5 is a disc or spider arms 7 and supported thereby is a bearing 8. This bearing is disposed adjacent one end of the frame, and a second bearing 9 is disposed at the opposite end, this latter bearing being formed integral with or secured to a head member 10 which is secured by bolts or the like to the end flange 3. Mounted within the frame and journalled on the bearings 8 and 9 is a cable drum 11 at one end of which is formed a brake drum 12. Journalled within the bearing 8 is a sleeve 14 and secured to one end thereof is a brake drum 15. Formed on the opposite end of the sleeve is an annular flange 16, and carried thereby is an internal ring gear 17. A similar ring gear 18 is secured to the cable drum and both ring gears are in constant mesh with a pair of connected spur gears 17c and 18c said spur gears being journalled on an eccentric 19 which is keyed or otherwise secured on a drive shaft B journalled at one end in bearing 9 and at the opposite end in bearing 8, or rather within the sleeve 14. Each of the brake drums is provided with a brake band 21, and each band has one end anchored to the frame arm 5a, Fig. 2. Levers 22 and 23 are pivotally supported on the same frame arm and are connected to the free ends of the respective brake bands.

The internal ring gears 17 and 18 together with the eccentric 19 and the connected spur gears 17c and 18c journalled on the eccentric form a reduction gear drive whereby power is transmitted from the drive shaft B to drive the cable drum. By this gear arrangement a high ratio of reduction is made possible and a reduction of thirty to one or more is readily obtainable. Thus it becomes possible to connect the drive shaft B directly to a high speed prime mover such as an electric motor, a gas engine or the like by means of a coupling such as indicated at 25.

In actual operation with power transmitted to shaft B, if it is desired to haul in on the cable indicated at 28, it is only necessary for the operator to apply the brake band 21 on the drum 15 by means of lever 22, and simultaneously release the brake band on the drum 12 by means of the lever 23. By so doing, brake drum 15, sleeve 14 and ring gear 17 become stationary, and gear 17c will accordingly roll within the gear 17 in a direction reverse to the rotation of the eccentric and the drive shaft B upon which it is secured, and as gear 18c is connected or formed integral with the gear 17c, it will rotate in unison therewith and as such will drive the ring gear 18 and the cable drum to which it is secured. The reduction in speed between the drive shaft B and the ring gear 18 will, of course, depend on the ratio between the gears 17, 17c, and 18 and 18c. This reduction may readily be thirty to one or greater, and any drum or cable speed may thus be obtained.

The hoist here shown is particularly constructed and designed to permit two or more hoist units to be connected end to end in a minimum of space and to permit the drive shafts of each unit to be coupled so that two or more hoists when connected may be driven from a common prime mover. With this purpose in mind, it will be noted that the frame A is so constructed that

the head member 10 may be secured to either or both ends thereof as shown in Fig. 1 thus making it possible to connect the hoist units to the right or left of any one unit so that the cable drums may be rotated in one or in opposite directions; also it should be noted that the drive shaft has a length no greater than the frame A and that the head bearings 9 are recessed as at 9a so that a sleeve coupling 25a may readily be introduced between the connected hoist units. The head members 10 together with the flanges 2 and 3 thus form couplings between the frames of respective hoist units and in addition therewith the heads also form bearings for the end of each cable drum and a bearing for one end of each drive shaft. It will be apparent, from the construction shown, that the prime mover can be coupled to either end of the hoist unit and that additional hoist units can be coupled to the end opposite the prime mover. Also, by changing the relative ratios of the gears 17—17c and 18—18c, the drum speed can be varied over a very wide range, thus permitting adjacent coupled hoist units to deliver varying cable speeds to suit various service requirements, while driving the drive shafts B of adjacent hoist units at a common speed.

For the purpose of simplicity, independent lever controls are shown to actuate the brake bands but a single lever control, such as shown in my former Patent #2,242,193, may be employed to operate the two brake bands of each hoist unit. Also a single lever control for two adjacent hoist units may be used as shown in my Patent #2,199,668, and while this and other features of my invention have been more or less specifically described and illustrated, I nevertheless wish it understood that changes may be resorted to within the scope of the appended claims, and that the materials and finish of the various parts employed may be such as the experience of the manufacturer or varying conditions of use may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a hoist of the character described a frame, a bearing in the frame adjacent one end thereof, a head member secured to the opposite end of the frame, a bearing on said head, a drive shaft extending through and journalled in the frame and head bearing, a cable drum journalled on both bearings, a reduction gear drive interposed between the drive shaft and the cable drum to drive the same, a second head member secured to the frame at the end opposite the first named head member, a second frame secured to said second head member and having a cable drum and drive shaft journalled thereon, and a coupling member connecting the first and the second named drive shafts to drive them in unison.

2. In a hoist of the character described, a frame, a bearing in the frame adjacent one end thereof, a head member secured to the opposite end of the frame, a bearing on said head, a drive shaft extending through and journalled in the frame and head bearing, a cable drum journalled on both bearings, a reduction gear drive interposed between the drive shaft and the cable drum to drive the same, a flange on the end of the frame adjacent the frame bearing, said flange adapted to receive a head and frame for the support of a second cable drum unit, a drive shaft in said second head and frame the adjacent ends of the drive shaft in the first and second frames being within the ends of the respective frames, and a coupling member connecting the adjacent ends of the said shafts to permit them to be driven in unison.

3. In a hoist of the character described an elongated frame having an annular flange at one end, a bearing supported in the frame adjacent one end thereof, a head member secured to the annular flange at the opposite end of the frame, a bearing on said head, a cable drum journalled within the frame on the respective bearings, a drive shaft extending through said drum and journalled in the respective bearings, a reduction gear drive interposed between the drive shaft and the cable drum to drive the drum, and an annular flange on the frame at the end opposite the first named annular flange, said second named flange forming a coupling to receive and secure the head member and frame for a second drum.

4. In a hoist of the character described an elongated frame having an annular flange at one end, a bearing supported in the frame adjacent one end thereof, a head member secured to the annular flange at the opposite end of the frame, a bearing on said head, a cable drum journalled within the frame on the respective bearings, a drive shaft extending through said drum and journalled in the respective bearings, a reduction gear drive interposed between the drive shaft and the cable drum to drive the drum, an annular flange on the frame at the end opposite the first named annular flange, said second named flange forming a coupling to receive and secure the head member and frame of a second drum, a drive shaft in the second drum, and means for coupling said shaft to the first named drive shaft at a point between the head of the second frame and the frame bearing in the first named frame.

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