Jan. 28, 1930. E. B. BRYANT 1,745,205

ELECTRICALLY OPERATED HOIST

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Fig. 1.

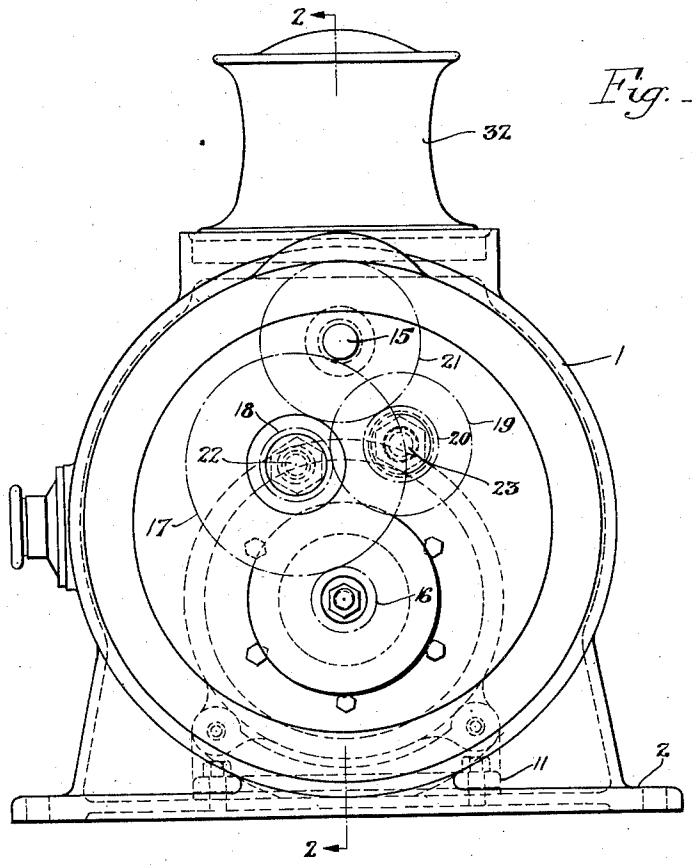


Fig. 3.

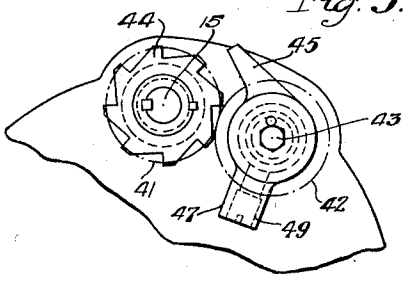


Fig. 4.

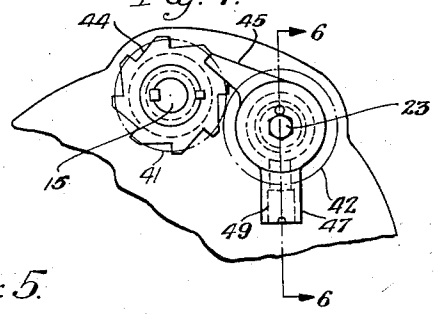
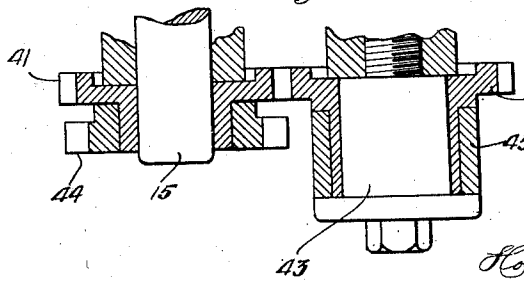


Fig. 5.



INVENTOR:
EVERETT B. BRYANT
DECD., BY
NETTIE F. BRYANT,
ADM'X.
by her Attorneys.
Howson & Howson

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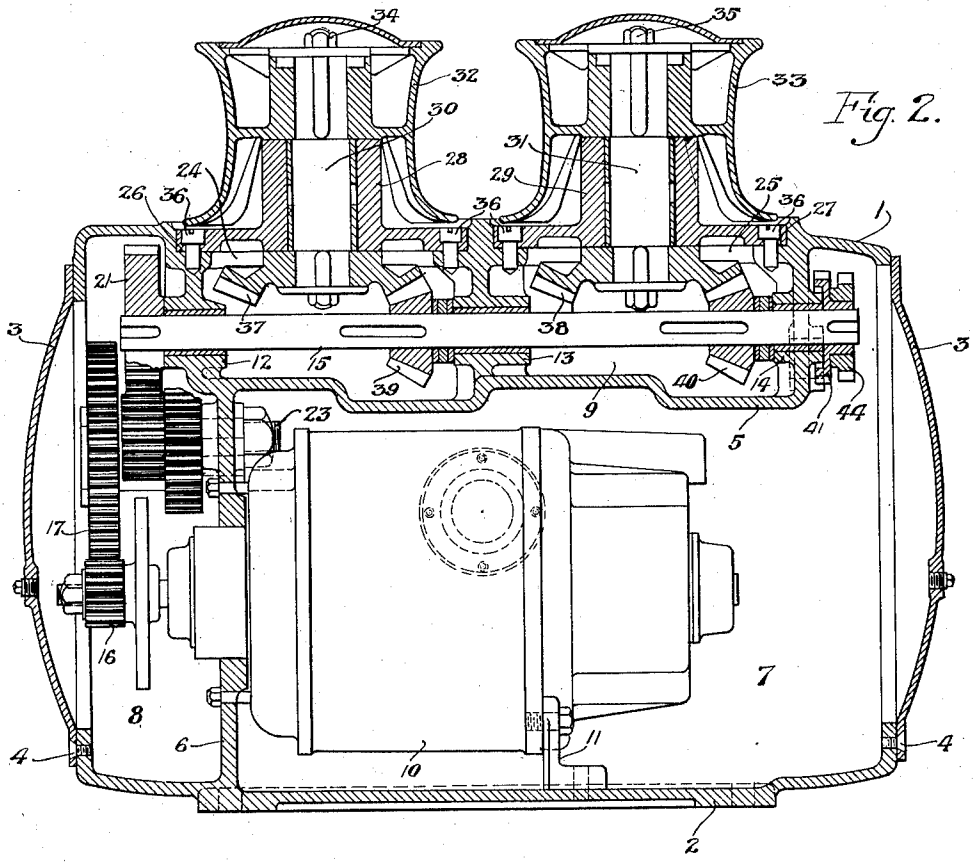


Fig. 2.

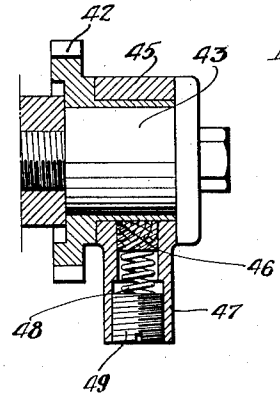


Fig. 6.

INVENTOR:
EVERETT B. BRYANT, DECD.,
by NETTIE F. BRYANT, ADM'X.

by her Attorneys.
Howson & Howson

Patented Jan. 28, 1930

1,745,205

UNITED STATES PATENT OFFICE

EVERETT B. BRYANT, DECEASED, LATE OF PHILADELPHIA, PENNSYLVANIA, BY NETTIE F. BRYANT, ADMINISTRATRIX, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO AMERICAN ENGINEERING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

ELECTRICALLY-OPERATED HOIST

Application filed June 19, 1928. Serial No. 286,683.

This invention relates to improvements in electrically-operated hoists, and the principal object of the invention is to provide a novel form of hoist characterized by compactness of construction and by high efficiency.

The invention resides further in certain novel structural details and devices, as hereinafter set forth and as illustrated in the attached drawings, in which:

Figure 1 is an end elevational view of a hoist made in accordance with the invention with the end plate removed;

Fig. 2 is a longitudinal section on the line 2—2, Fig. 1;

Figs. 3 and 4 are fragmentary elevational views illustrating a detail of the mechanism;

Fig. 5 is a section on the line 5—5, Fig. 4, and

Fig. 6 is a section on the line 6—6, Fig. 4.

Referring to the drawings, the hoist comprises a substantially barrel-shaped housing 1 having a pedestal base 2, the ends of the housing being closed normally by means of heads or end plates 3, 3 suitably secured, as by means of screws 4, to the inwardly flanged ends of the housing. In the interior of and integral with the housing 1 are a transverse partition 5 and an upright partition 6 which divide the said interior into a main chamber 7, a relatively narrow or vertical chamber 8 at one end of the housing, and in the top of the housing and extending over the main chamber a relatively shallow or horizontal chamber 9.

In the main chamber 7 is mounted an electric motor 10, one end thereof resting upon a bracket 11, while the other end is secured to the partition 6 and projects through an opening in said partition into the chamber 8. Mounted in the chamber 9, in bearings 12, 13 and 14 formed integrally with the partitions 5 and 6, is a shaft 15 the ends of which project respectively into the chambers 7 and 8. This shaft is operatively connected with the motor through a train of spur gears in the chamber 8, said train including a pinion 16 on the motor armature shaft, a gear 17 meshing with said pinion and having connected thereto a pinion 18, a gear 19 meshing with the pinion 18 and having connected thereto a pinion 20, and a gear 21 on the shaft 15 which meshes with the pinion 20. The gears 17 and 19 and their respective associated pinions, 18 and 20, are journalled upon studs, 22 and 23 respectively, secured in the partition 6.

In the upper wall of the housing 1 and of the chamber 9 are openings 24 and 25 formed with annular recesses 26 and 27 respectively in which are seated flanged members 28 and 29. These members constitute vertical bearings for stub shafts 30 and 31 and supports for gypsey heads 32 and 33 respectively secured to the said stub shafts, the said heads being keyed to the upper ends of the said shafts and being secured thereto by means of top bolts 34 and 35. As shown in Fig. 2, the flanged bearing members 28 and 29 are secured to the housing by means in the present instance of screws 36. To the lower ends of the stub shafts 30 and 31 which project into the chamber 9 are attached bevel gears 37 and 38 respectively which mesh with bevel pinions 39 and 40 keyed to the shaft 15, the bevel gears and pinions 37, 38, 39 and 40, thus being enclosed in the transverse chamber 9.

With the aforedescribed mechanism, it will be apparent that power may be transmitted from the motor 10 to the gypsey heads 32 and 33 through the intervening mechanism including the spur gears 12—19, shaft 15, bevel gears 37—40, and shafts 30 and 31, the gearing affording the desired speed reduction between the driving and driven parts.

To prevent overhauling of the gypsey heads by the load in the event of failure of the motor or when the motor circuit is interrupted, there is provided an automatic brake the details of which are illustrated in Figs. 3, 4, 5 and 6. This brake comprises a spur gear 41,

keyed to that end of the shaft 15 which projects into the chamber 9; a second gear 42, journaled on a stub shaft 43 secured in the end wall of the partition 5 and meshing with the gear 41; a toothed wheel 44 keyed to the hub of the gear 41; and a detent or pawl 45 which is frictionally mounted on the hub of the gear 42 and which is arranged for cooperation with the toothed wheel or ratchet 41, as shown in Fig. 4, to prevent rotation of the shaft 15 in one direction. An operating frictional contact between the detent 45 and the gear 42 is afforded, see Fig. 6, by a spring-pressed plug 46 mounted in a hollow boss 47 projecting from the hub of the pawl 45, which plug is resiliently pressed with a predetermined pressure against the hub of the gear 42 by means of a spring 48 confined between the outer end of the plug 46 and a threaded plug 49 in the outer end of the boss. This frictional pressure is sufficient to tend to cause the pawl 45 to move with the gear 42 but not sufficient to cause binding when the detent engages the toothed wheel 44 or a stop limiting the movement in the opposite direction. When the mechanism is normally operating with the parts moving in the directions indicated by the arrows in Fig. 3, the pawl is shifted so as to lie clear of the wheel 44, but in the event that the angular movement of the shaft 15 is reversed, there results a corresponding reversal through the gear 41 of the gear 42, with the result that the pawl is shifted, as shown in Fig. 4, into operative engagement with the toothed wheel 41, which thereby positively prevents further movement of the shaft 15 in that direction.

The aforedescribed construction, in which the transmission mechanism is mounted in chambers at one end of the housing and extending over the motor chamber, is particularly desirable by reason of extreme compactness, strength and simplicity.

What is claimed is:

1. In a hoist, a housing having integral partitions defining a main chamber, a vertical chamber at one end of said main chamber, and a horizontal chamber overlying said main chamber, a motor in said main chamber, a shaft extending longitudinally of said horizontal chamber, reduction gearing in the vertical chamber connecting said motor and shaft, and a plurality of gypsey heads mounted on the housing and operatively connected to the said shaft.

2. In a hoist, a housing having integral partitions defining a main chamber, a vertical chamber at one end of said main chamber, and a horizontal chamber overlying said main chamber, a motor in said main chamber, a shaft extending longitudinally of said horizontal chamber and projecting at one end into the vertical chamber and at the other end into said main chamber, reduction gearing in the vertical chamber connecting said motor and shaft, braking means for the shaft in the main chamber, and a plurality of gypsey heads mounted on the housing and operatively connected to the said shaft.

3. In a hoist, the combination with a housing, of a pair of vertical shafts journaled in the top of said housing, a gypsey head attached to the upper end of each of said shafts, a horizontal shaft in the interior of said housing, bevel gearing connecting each of said vertical shafts with the horizontal shaft, a transverse partition in said housing supporting and encasing said horizontal shaft, a vertical partition forming a main chamber underlying said horizontal shaft, and a vertical chamber at one end of said housing into which one end of the shaft projects, a motor mounted in the main chamber and projecting through said vertical partition, and reduction gearing in said vertical chamber connecting the motor with the shaft.

4. In a hoist, the combination with a substantially cylindrical housing having detachable end plates and in the interior thereof integral partitions dividing the housing into a main chamber, a vertical chamber at one end of the housing, and a horizontal chamber overlying said main chamber, a motor mounted in said main chamber and projecting into said vertical chamber, a shaft extending longitudinally of said horizontal chamber, bearings for said shaft formed integrally with said partitions, one end of said shaft projecting into the vertical chamber, spur reduction gearing in said vertical chamber connecting the motor with the said shaft, a pair of vertical shafts in the upper part of said housing projecting at their lower ends into the said horizontal chamber, bevel gears connecting each of said vertical shafts with the horizontal shaft, a gypsey head attached to the upper end of each of said vertical shafts, and flanged members detachably mounted in the top of said housing and constituting journals for said vertical shafts and supports for said gypsey heads.

5. In a hoist, the combination with a housing having in the interior thereof integral transverse and vertical partitions dividing the housing into three chambers, detachable head plates at the ends of said housing giving access respectively to two of said chambers, said housing having openings in the top affording access to the third chamber, flanged members detachably secured in said openings and constituting journals for a pair of vertical rotatable heads, a motor mounted in one of the chambers defined by said vertical partition, and transmission mechanism in the other chambers operatively connecting the motor with said vertical heads.

6. In a hoist, the combination with a housing having a vertical partition, a motor secured to one side of said partition and projecting therethrough, a shaft mounted in the

upper part of said housing and extending longitudinally thereof, studs projecting from said vertical partition and constituting journals for spur reduction gearing operatively connecting the motor with said shaft, a pair of vertical rotatable heads journaled in the top of said housing, and gearing operatively connecting said heads with the shaft.

NETTIE F. BRYANT,
Administratrix of the Estate of Everett B. Bryant, deceased.