

J. A. ESSBERGER.
LIFTING AND TRANSPORTING APPARATUS FOR PROJECTILES.
APPLICATION FILED NOV. 1, 1911.

1,047,773.

Patented Dec. 17, 1912.

3 SHEETS—SHEET 1.

Fig.1.

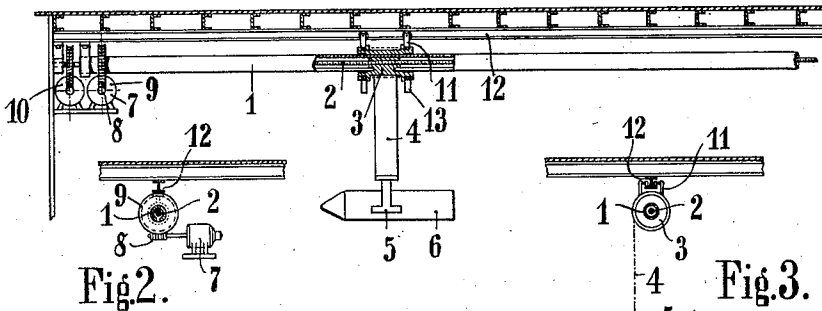


Fig.2.

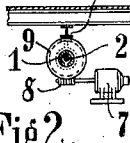


Fig.3.

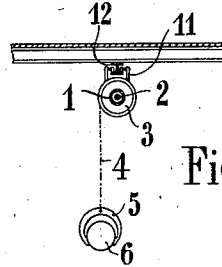


Fig.4.

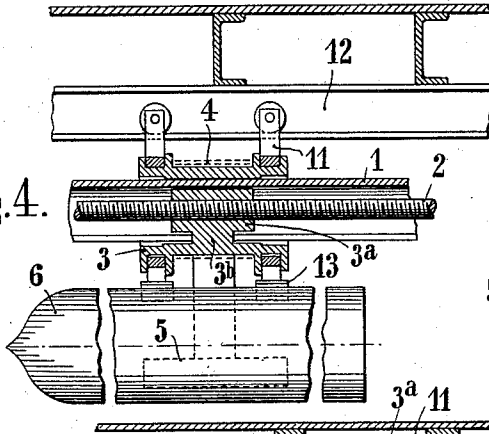


Fig.5.

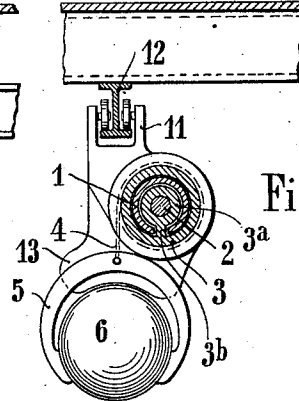
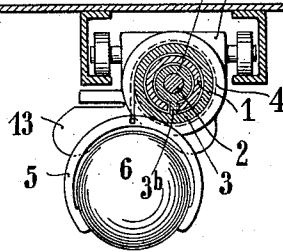


Fig.6.



Witnesses:

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3 SHEETS—SHEET 2.

Fig. 7.

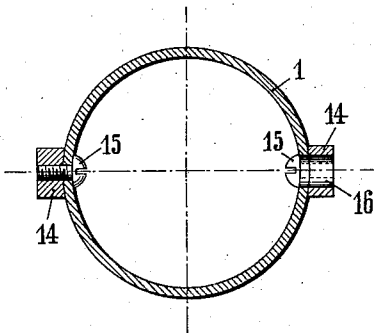
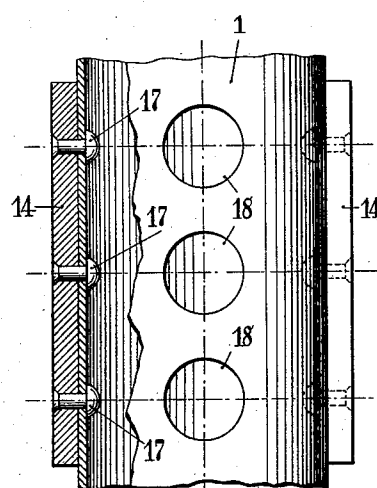
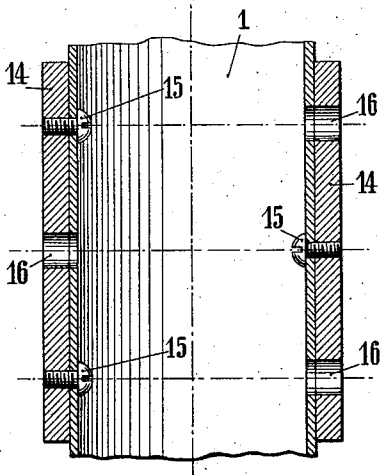
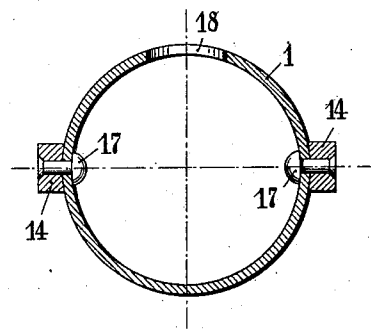


Fig. 8.



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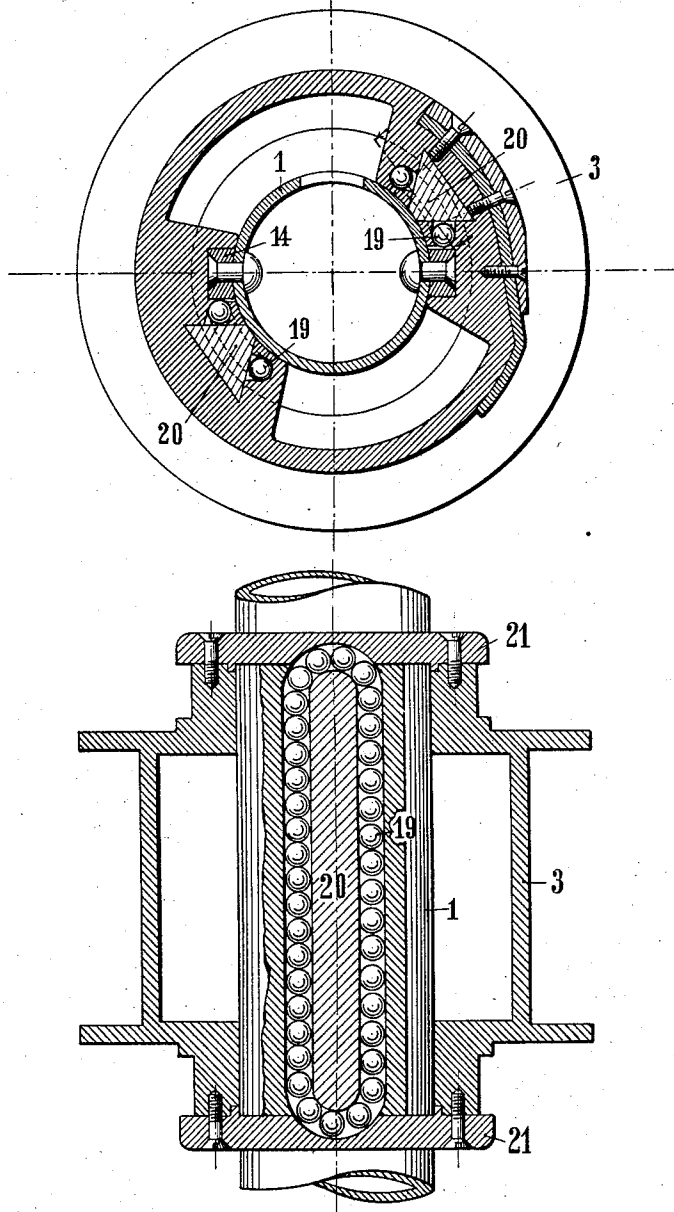
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3 SHEETS—SHEET 3.

Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN A. ESSBERGER, OF BERLIN, GERMANY.

LIFTING AND TRANSPORTING APPARATUS FOR PROJECTILES.

1,047,773.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed November 1, 1911. Serial No. 657,942.

To all whom it may concern:

Be it known that I, JOHN A. ESSBERGER, engineer, a subject of the Emperor of Germany, residing at Münchenerstrasse 18, Berlin, Germany, have invented certain new and useful Improvements in Lifting and Transporting Apparatus for Projectiles, of which the following is a specification.

My invention relates to lifting and transporting apparatus for projectiles on board ship. Owing to the small space at disposal for such apparatus on battle-ships and the like and to the necessity of limiting the weight as much as possible and, in addition, to the necessity of absolute safety of working such difficulties are met with that no satisfactory construction of apparatus has heretofore been designed. In contradistinction thereto, my improved lifting and transporting apparatus not only perfectly fulfils the said requirements but occupies but very little space.

One illustrative embodiment of my invention and some modifications thereof are represented by way of example in the accompanying drawings, wherein:—

Figure 1 is a sectional side elevation showing the general arrangement of my apparatus, Fig. 2 is an end elevation of the lifting driving gear, and Fig. 3 is an end elevation of the traveling crab or trolley having a projectile suspended therefrom; Figs. 4 and 5 are sectional side and end elevation, respectively, showing the trolley on an enlarged scale; Fig. 6 is a sectional end elevation showing a modified form of the latter, and Figs. 7 to 9 are sectional detail views showing the drive of the load drum.

Referring firstly to Figs. 1 to 3, the numeral 1 designates the lifting spindle. It is formed as a hollow shaft in which is mounted the traversing spindle 2. The lifting spindle passes coaxially through the load drum 3 which carries on a band 4 the grab 5 for the projectile 6. The spindle or shaft 1 is driven by the motor 7 through the medium of the worm 8 and the worm-wheel 9, and the spindle or shaft 2 is driven in like manner by the motor 10. As the hollow shaft 1 must be made as light as possible it is not able to carry the load drum and the projectile. For this reason the drum, as clearly shown in Figs. 4 to 6, is suspended in supports 11. These supports are provided with rollers running on a girder 12 attached to the deck. The drum together

with the supports and rollers thus form a primitive kind of trolley. The drum itself may be considered to be the frame of the trolley.

The hollow shaft 1 has a slot along its entire length in order to be able to connect the interior nut 3^a on the endless screw 2 with the drum 3. The connecting member 3^b between the drum and the nut acts in the slot as a tongue and groove. When wound up the projectile rests against the iron bands 13 which serve as abutments preventing oscillation. In Figs. 4 and 5 the rollers are shown running on an H-girder, whereas the latter is substituted in Fig. 6 by two U-girders.

When a certain length is exceeded it is necessary to make the hollow driving shaft for the lifting movement of several parts. The shaft then has weak parts which it is desirable to support. This can be done by providing at the joints the well-known automatically yielding tilting supports.

Instead of a spindle I may use for the traversing motion a chain whose one side passes through the hollow shaft, and is attached to the inner projection of the load drum serving as a nut in the above described arrangement. The entire chain may, however, run outside the shaft. In this event it is preferable to use a tongue and groove for driving the load drum by means of the shaft 1. If tongue and groove are employed, some special measures are necessary in my improved lifting and transporting apparatus.

When connecting the tongue or feather with the hollow lifting shaft there are difficulties owing to the wall of the shaft having to be kept as thin as possible having regard to the extreme saving of weight necessary in ship-building. It is therefore impossible to let the tongue or feather in the usual manner into the shaft or to screw it thereto by providing a screw thread in the wall of the hollow shaft. For this reason I introduce cap screws through suitable holes in the wall into the shaft and hold the tongue or feather from the inside. In this kind of connection the screw thread is provided in the tongue. Without increasing the weight too much the latter can be of such a size that the screw thread is of sufficient length. When the tongues or feather is to be connected with the shaft by rivets difficulties are met with in this case also.

The rivets must also be introduced through holes in the shaft and placed from the inside through the wall of the shaft and the tongue in order that they may be riveted from the outside. The shaft is connected with the load drum by the said tongue in such manner that the drum can be axially displaced on the shaft, but cannot rotate relatively thereto. The distance which the drum can be axially displaced is somewhat considerable and the speed is appreciable. Therefore, there is both considerable wear and also somewhat great consumption of energy occasioned by friction at the place of contact between the tongue and the load drum. In order to diminish these I provide balls at the place of contact which, on the one hand, bear against the steel tongue and, on the other hand, run on a hardened piece of steel. The balls are in a groove which returns on itself in order that they can roll unimpededly on the tongue while the trolley is traveling.

In Fig. 7 the numeral 1 designates the hollow shaft and 14 the tongue. The screws 15 are inserted and tightened through suitably wide holes 16 located diametrically opposite where the screws are fastened.

In Fig. 8 the screws are substituted by rivets 17. They are introduced through holes 18 which are located at two adjacent tongues, and are preferably midway between them. A suitable tool can be put through the same holes and held against the head of the rivet while riveting.

In Fig. 9 the hollow shaft and tongue are again designated 1 and 14, respectively. The tongue is connected with the hollow shaft in the manner described with reference to Fig. 8. On the side of the tongue loaded by the projectile are provided balls 19 which rest against a hardened steel rod 20 provided in the load drum. This rod 20 is pushed from one side into the drum, the balls are then inserted, and then the covers 21 are fixed in position and serve for closing the ends of the groove returning on itself in which the balls roll when the trolley moves.

I claim:—

1. In lifting and transporting apparatus for projectiles on board ship, the combination, with a girder, of rollers running thereon, supports carried by the rollers, a load

drum journaled in said supports, a shaft coaxial with the drum for directly rotating the same, and means entirely independent of said shaft for traversing the drum.

2. In lifting and transporting apparatus for projectiles on board ship, the combination, with a girder, of a hollow shaft, a load drum, having a groove, coaxially surrounding the said shaft, supports revolubly carrying said drum, and rollers running on said girder, and carrying said supports, a tongue in said groove and secured on the outside of said shaft.

3. In lifting and transporting apparatus for projectiles on board ship, the combination, with a girder, of a hollow shaft having holes in the wall thereof, a load drum, having a groove, coaxially surrounding the said shaft, supports revolubly carrying said drum, and rollers running on said girder, and carrying said supports, a tongue in said groove, and cap screws having their caps in said shaft securing said tongue on the outside thereof.

4. In lifting and transporting apparatus for projectiles on board ship, the combination, with a girder, of a shaft, a load drum, having a groove, coaxially surrounding the said shaft, supports revolubly carrying said drum, and rollers running on said girder and carrying said supports, a tongue in said groove, said drum having a second groove returning upon itself, and balls in the latter groove, adapted to run against said tongue.

5. In lifting and transporting apparatus for projectiles on board ship, the combination with a girder, supports movable along the girder, a load drum revolubly carried by the supports, a hollow shaft projecting through the drum on which it is movable, the hollow shaft having a groove, a tongue on the drum projecting into the shaft, and means inside of the hollow shaft engaging said tongue to traverse the drum, whereby the drum has a bodily movement and is rotated in all such positions by the hollow shaft.

In testimony whereof, I have signed my name to this specification in the presence of two witnesses.

JOHN A. ESSBERGER.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.