F. R. HOUSE.

AUTOMATIC ELEVATING OR LOWERING APPARATUS.

APPLICATION FILED MAR. 6, 1919.

1,359,993.

Patented Nov. 23, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

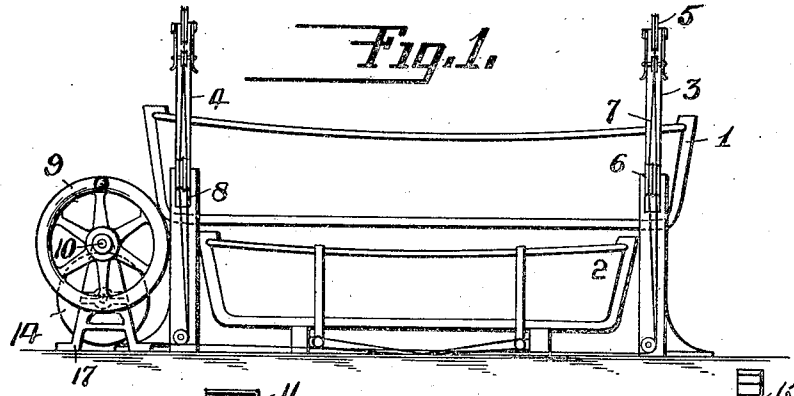
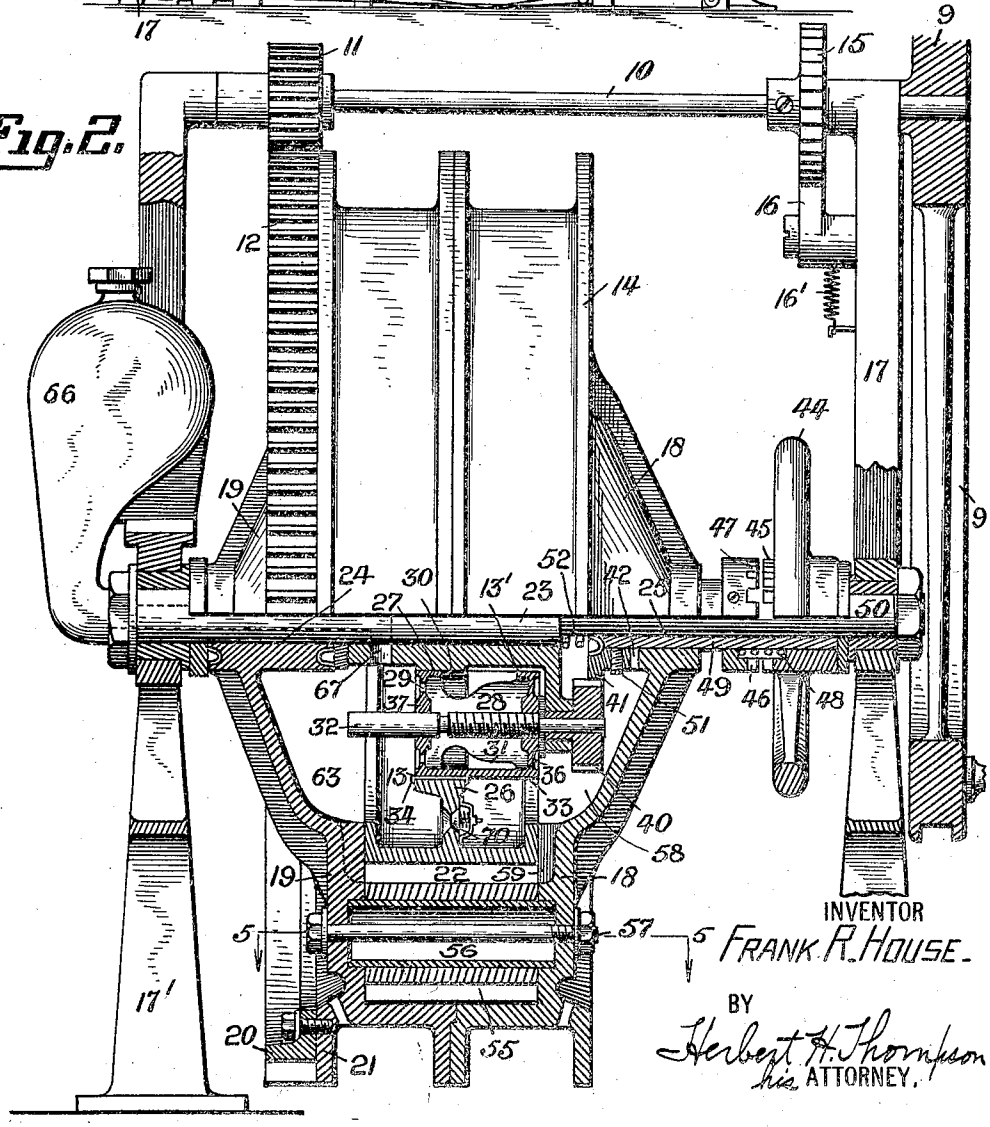


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

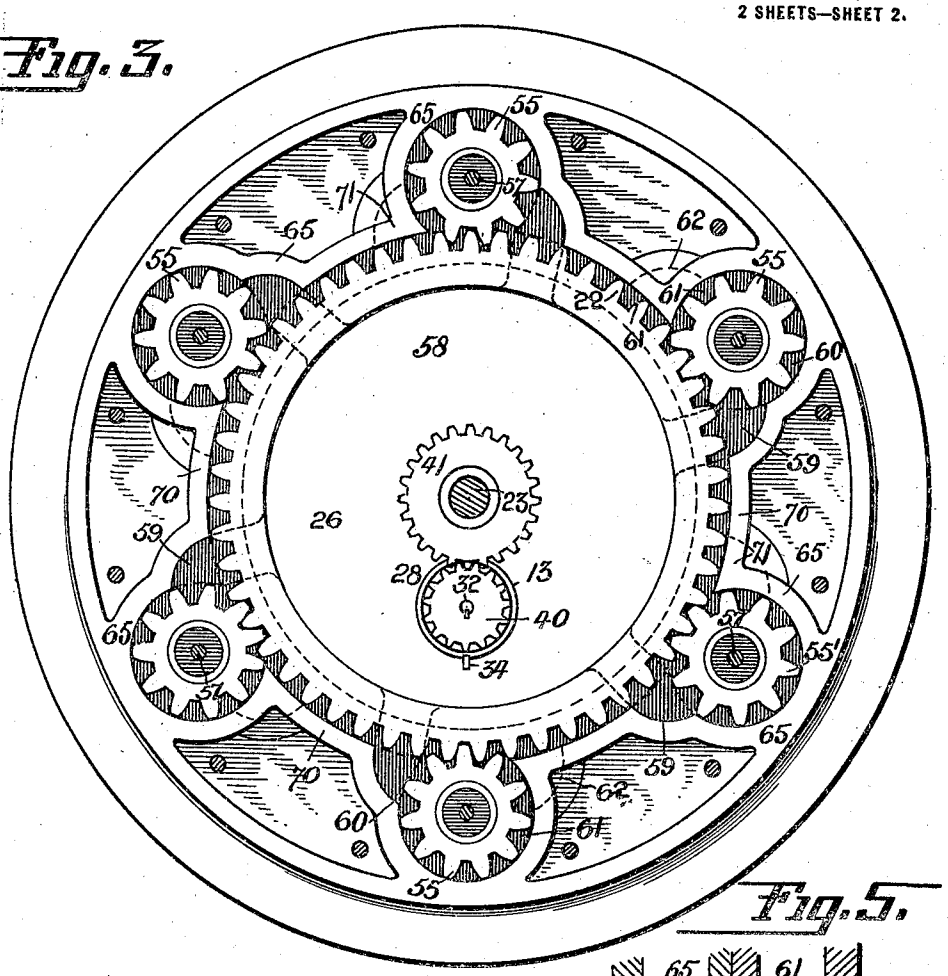


Fig. 4.

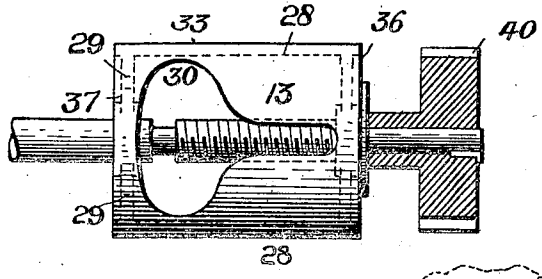
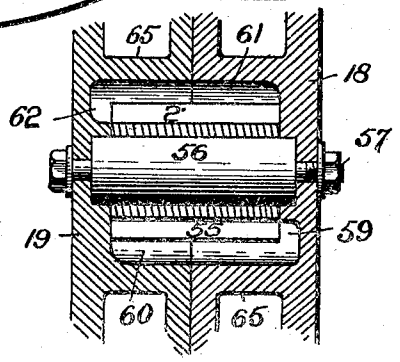


Fig. 5.



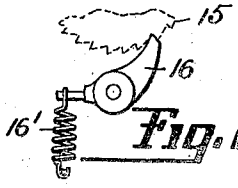


Fig. 6.

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UNITED STATES PATENT OFFICE.

FRANK R. HOUSE, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MARGARET TJADER, OF DARIEN, CONNECTICUT.

AUTOMATIC ELEVATING OR LOWERING APPARATUS.

1,359,993. Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed March 6, 1919. Serial No. 281,089.

To all whom it may concern:

Be it known that I, FRANK R. HOUSE, a citizen of the United States of America, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Automatic Elevating or Lowering Apparatus, of which the following is a specification.

This invention relates to speed limiting or braking devices for elevating apparatus such as davits for hoisting and lowering lifeboats, traveling cranes for raising and lowering heavy masses and other uses where it is desirable to permit an object to ascend or descend rapidly until near the end of its journey where it is very gradually brought to rest.

The object of the invention is to construct an apparatus of this character which will permit the lowering or hoisting of an object such as a lifeboat fairly rapidly but under absolute control and which will automatically slow down the lifeboat when it nears the water or upon any predetermined event so that the same is brought to rest gently and in the correct position on the surface of the water. At the same time, the boat is kept under the constant control of the operator.

Referring to the drawings in which what is now considered the preferred form of my invention is shown:—

Figure 1 is a diagrammatic front elevation of a ship's davit showing my invention as applied thereto.

Fig. 2 is a side elevation partly in section on a much larger scale of a drum for the davit constructed according to my invention.

Fig. 3 is a front elevation of the interior of the drum, one of the cover plates being removed.

Fig. 4 is an enlarged detail of the throttle valve betwen the two containers for the oil.

Fig. 5 is a section on line 5—5 of Fig. 2.

Fig. 6 is a detail of a pawl shown in Fig. 2.

While my invention is adapted for use in connection with many types of elevating devices I have illustrated it as applied to a ship's davit, a conventional form of which is illustrated in Fig. 1. Two lifeboats, 1 and 2, are here shown supported by the davit which comprises two or more upright arms, 3 and 4, on which are mounted suitable pulleys and pulley blocks, 5 and 6, for the ropes or cables, 7 and 8, supporting the boats. A hand-wheel, 9, is shown for manipulating the ropes to launch the boats; said wheel is mounted on a shaft, 10, which is also provided with a pinion, 11, meshing with a large gear, 12, connected to the drum or drums, 14. The gear, 12, is shown in the form of an annulus, 20, which is bolted or otherwise secured to a flange, 21, on the drum, the drum being journaled on a fixed shaft, 23. The shaft, 23, and handle, 9, are shown as mounted on brackets, 17 and 17′. A ratchet-wheel, 15, may also be mounted on shaft, 10. A pawl, 16, pivoted on the fixed bracket 17 is pressed into engagement with the wheel by spring 16′ and coöperates therewith to lock the mechanism against movement in one direction.

My preferred location for the braking means is within the drum, 14. The drum is shown as provided with closed conical sides, 18 and 19. The interior of the drum is separated into two parts by a large broad gear, 22, which is fixed to the stationary shaft, 23, supporting the drum. The drum itself is journaled for rotation on said fixed shaft at 24 and 25. The said gear, 22, is provided with a central wall, 26, which separates the two compartments within the drum.

Meshing with the aforementioned large gear, 22, are one or more pinions, 55 (see Fig. 3) each of which is rotatably mounted on a hollow cylinder or shaft, 56, secured by means of a bolt, 57, between the two sections, 18 and 19, of the drum beyond the gear, 22. The interior of the drum is provided with a plurality of channel-shaped partitions, 71, which closely fit not only the top of the teeth, on gear, 22, at points, 70, between the pinions but also the teeth, 55′, of each pinion, 55, around the greater portion of the periphery of each gear as at 65. Leading from the oil chamber, 58, to each pinion at a point adjacent where it meshes with the large gear, 22, and at one end thereof is a port, 59, (see Figs. 2, 3, and 5). Said port leads into a channel or passage-way, 60, in the surrounding hood, 65, and extends along the gear teeth but terminates at the far end of the pinion. Opposite to said passage, 60, is a second passage-way, 61, leading along the gear teeth and into a second port, 62, which is located not only on the opposite side but at the opposite end of the pinion from the port, 59. Said port, 62,

leads into the oil chamber, 63, on the opposite side of the partition, 26, from the chamber, 58.

It will readily be seen that as the drum is rotated the pinions, 55, will be carried around with the drum and rotated on their individual axes by their engagement with the stationary gear, 26. As the pinions rotate, however, the oil which floods the two chambers, 58 and 63, and fills the passageways about the pinions will be pumped or forced by the gear teeth, 55′, from one chamber into the other after the well-known manner of gear pumps. Since both chambers are closed, the oil of course must be permitted to flow back from the chamber into which it is pumped to the other chamber and any limiting means which is interposed in the passage between the chambers will effectively serve to arrest or brake the rotation of the pinions by slowing down the flow of oil. From this it follows that if the return flow is entirely cut off the rotation of the pinions and hence the rotation of the drum will be stopped or at least slowed down to a very slight movement depending upon the clearances between the teeth, 55′, of the pinions and the inclosing hoods, 65, (see Fig. 3). If desired an auxiliary reservoir, 66, of the oil may be provided which is connected to a chamber, 63, by means of a bore, 67, through the shaft, 23.

For the purpose of varying the rate of flow of the oil there is slidably mounted in an aperture, 27, in said wall a hollow cylindrical member, 28, which acts as a throttle valve to limit the passage of oil or other fluid from one chamber to the other. The said valve may be constructed in the form of a hollow cylinder, 13, which may have apertures, 29, in the outer end wall, 37, and a specially designed slot or slots, 30 and 31, in the cylindrical wall, 13′. The cylinder is mounted upon a rotatable shaft, 32, journaled within said gear, 22, but cylinder, 13, is prevented from rotating with said shaft by any suitable means such as an axially extending slot, 33, which coöperates with a key or lug, 34, in the wall, 26, of gear, 22. One or both end walls, 36 or 37, may be threaded upon said shaft so that as the shaft is rotated the cylinder is moved axially in one direction or the other. The shaft is normally rotated and the throttle valve adjusted automatically as the boat is lowered, or in other words, whenever the drum, 14, rotates. For this purpose a pinion, 40, is fixed to said shaft, 32, which meshes with a gear, 41, secured to rotate with the drum, 14, as by means of clutch teeth, 42.

Manual means are also provided whereby the valve may be independently adjusted at any position of the drum. For this purpose a hand-wheel, 44, is shown which is provided with clutch teeth, 45, adapted to engage corresponding clutch teeth, 46, on a collar, 47, when pushed inwardly against the action of spring, 48. Collar, 47, is fixed to the sleeve, 49, which is loosely mounted on the reduced extension, 50, of shaft, 23. Gear, 41, is also fixed to said sleeve as indicated by the set screw, 51. Upon pushing in on the hand-wheel, 44, against collar, 47, it is seen that not only will the two be locked together by the clutch teeth but the entire sleeve, 49, carrying with it the gear, 41, will be pushed inwardly against the action of spring, 52. This will disengage clutch teeth, 42, thus permitting shaft, 32, and cylinder 13 to be rotated independently of the drum. As soon, however, as the hand-wheel is released the clutch teeth, 42, are thrown into mesh and the throttle valve adjusted automatically.

From the foregoing description it will readily be seen that by properly designing the slot, 30, a lifeboat may be lowered from a steamer at a fairly rapid but uniform rate until it arrives within a predetermined distance of the water when it is slowed down to a safe speed for launching. At the same time the boat is at all times under the control of the operator since he may readily adjust the cylinder by means of the hand-wheel, 44. A one way by-pass valve 70 may be provided which need not be adjustable as the amount of fluid passing through the said valve is dependent entirely upon the position of the throttle valve.

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

1. In a launching device for lifeboats a drum adapted to receive a cable, a gear fluid pump connected therewith for controlling the speed thereof, and variable means for throttling the circulation of fluid through said pump responsive to the extent of the revolution of the drum.

2. In an elevating device, a drum adapted to receive a cable, braking means therefor, means responsive to the extent of revolution of the drum for varying the strength of said braking means and manual means also for varying the braking effect and operable through said first named means.

3. In a launching device for lifeboats a drum adapted to receive a cable, a gear fluid pump connected therewith, and variable means controlled by the rotation of the drum for throttling the circulation of fluid through said pump.

4. A variable brake for elevating devices, comprising a plurality of intermeshing gears, one of said gears being connected to said device, a plurality of fluid containers, a passage-way leading from a container into the meshing teeth of two gears, a second passage-way leading from adjacent the opposite side and end of said mesh-

ing teeth into another of said containers and a valve connecting said containers which is actuated by said device to vary the resistance to the transfer of fluid.

5. A variable brake for elevating devices comprising a rotatable member, a plurality of fluid containers within said member, a pinion journaled in said member, a stationary gear within said member meshing with said pinion, a passageway leading from the container into the meshing teeth of said gears, a second passageway leading from the opposite side and end of said meshing teeth into the other of said containers, a return passageway connecting said containers, and variable throttling means in one of said passageways.

6. A variable brake for elevating devices comprising a rotatable member, a plurality of fluid containers within said member, a pinion journaled in said member, a stationary gear within said member meshing with said pinion, a passageway leading from the container into the meshing teeth of said gears, a second passageway leading from the opposite side and end of said meshing teeth into the other of said containers, a return passageway connecting said containers operable by rotation of said member, and variable throttling means in one of said passageways operable by the revolution of said member.

7. The combination with a launching device for life boats including a rotatable hollow drum, of a speed controlling device therefor comprising a fluid brake connected to and housed within said drum and a variable throttling device for said brake also housed within said drum.

8. In an elevating and lowering mechanism, the combination with a hollow rotatable member, a stationary gear within said member, a partition dividing the space within said member, a pinion journaled in said member and meshing with said gear, the meshing teeth of said gears forming one passageway between said spaces, a second passage between said spaces, and a valve moved by the rotation of said member for controlling said second passage.

9. In an elevating and lowering mechanism, the combination with a hollow rotatable member, a stationary gear within said member, a partition dividing the space within said member, a pinion journaled in said member and meshing with said gear, the meshing teeth of said gears forming one passageway between said spaces, a second passage between said spaces, a valve moved by the rotation of said member for controlling said second passage, and manual means without the drum for adjusting said valve.

In testimony whereof I have affixed my signature.

FRANK R. HOUSE.