Aug. 9, 1966 J. M. DELANEY 3,265,358

LOAD LOWERING DEVICE

Filed April 22, 1964

Fig. 2

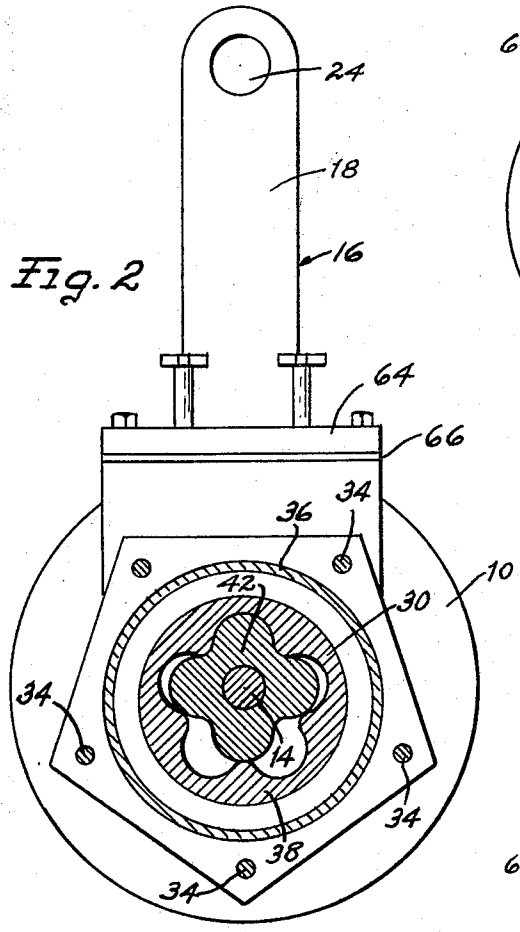


Fig. 4

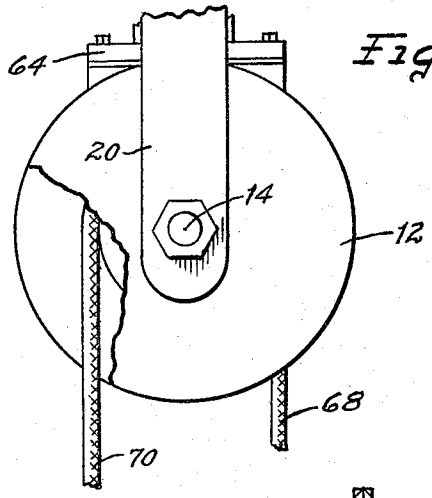


Fig. 1

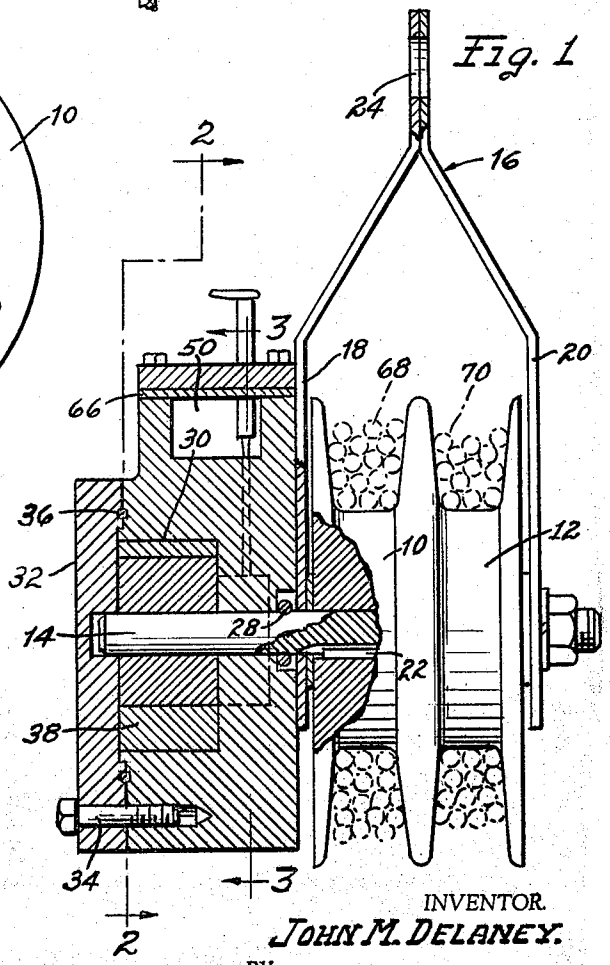
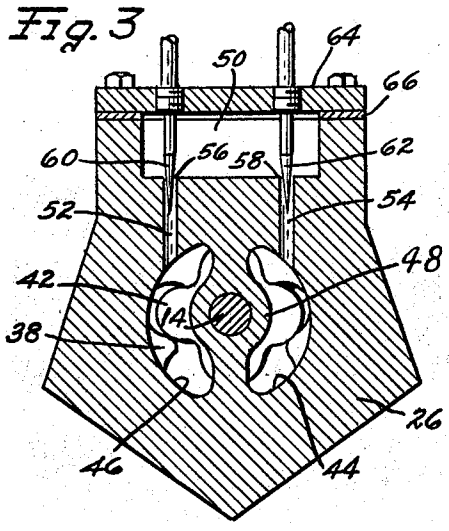


Fig. 3



INVENTOR.
JOHN M. DELANEY.
BY
Wallace P. Lamb
ATTORNEY.

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LOAD LOWERING DEVICE

John M. Delaney, 9571 E. Outer Drive, Detroit, Mich.

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1 Claim. (Cl. 254—158)

This invention relates generally to devices for regulating the rate of descent of a load and particularly to hydraulic devices for lowering a load at a desired fixed rate of descent.

One of the objects of the invention is to provide an improved device for restraining the rate of descent of a load to a desired safe rate of descent.

Another object of the invention is to provide a device of the above mentioned character which is particularly adapted for use as a safe escape means from a burning building.

A specific object of the invention resides in the provision of a hydraulic braking system in association with a pulley shaft to determine the rate of rotation of the pulley.

Other objects of the invention will become apparent from the following detail description, taken in connection with the accompanying drawing in which:

FIG. 1 is a view partly in elevation and partly in section of my device;

FIG. 2 is another view partly in elevation and partly in section of the device and taken along the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1, and

FIG. 4 is an elevational view, partly broken away.

Referring to the drawing by characters of reference, the device includes a pair of integral pulleys **10** and **12** which are keyed or otherwise affixed onto a rotatable shaft **14**. A bracket or hanger **16** has depending legs **18** and **20** with aligning holes near their lower ends to receive the shaft **14**. The hub of the pair of integral pulleys **10** and **12** is connected to the shaft by a key **22**. Adjacent its upper end, the hanger **16** is provided with an aperture **24** for the purpose of mounting the hanger on a hook or other support provided on a building structure.

The shaft **14** projects beyond the hanger leg **18** into a body **26** of a pump and surrounding the shaft within the body there is a sealing and locking ring **28**. Eccentric with respect to the axis of shaft **14**, the body **26** has a bore-like recess **30** in its outer face which is closed by a cover plate **32**. The cover plate **32** may be secured to the body **26** by screws **34**, and between the plate and body, a displaceable sealing ring **36** is provided.

Rotatably mounted within the body recess **30** there is a driven pump member **38**, the outer cylindrical periphery of which fits snugly within the bore-like recess. The inner periphery of the pump member **38** is uniformly contoured to provide angularly spaced extended portions **40** and alternate rounded recesses in the general configuration of gear teeth and affixed to the shaft **14** there is a driving pump member **42**. The periphery of the driving member **42** has a contour corresponding to the inner contour of the driven pump member to effect a meshing relationship therewith, as shown in FIG. 2. It will also be seen by reference to FIG. 2 that the eccentric relationship between the axis of rotation of the driven pump member **38** and the driving pump member **42** provides for the movement of a fluid, such as oil for example,

in the direction of rotation. The pump members **38** and **42** or the space therebetween is in communication with a pair of recessed chambers **44** and **46** which are separated by a web **48** and are generally arcuate in contour, as seen in FIG. 3. Connected to the arcuate chambers **44** and **46** is an upper chamber or reservoir **50** for oil, the chambers **44** and **46** being respectively connected to chamber **50** by vertical passages or bores **52** and **54**. As shown in FIG. 3, the passages **52** and **54** have ports **56** and **58** respectively into which extend adjustable flow regulating valve members **60** and **62**. The stems of the valve members **60** and **62** are adjustably screwthreaded into a top cover plate **64** for chamber **50** and the joint between the cover and the pump body is sealed by a gasket **66**.

Wound about the pulley **10** in one direction there is a rope **68** and wound about the other pulley **12** in the opposite direction there is another rope **70**. A load or a person may be lowered from a high point, such as from an upper story of a building by means of one of the two ropes **68** and **70** which may have a sling or net attached thereto for convenience. The weight of the load or person will cause the pulleys to rotate in a direction to unwind the rope and lower the load or person at a safe predetermined rate of descent by reason of the hydraulic restricting force opposing rotation of the pulleys. Rotation of the pulleys **68** and **70** rotates the shaft and the driving pump member **42** which in turn rotates the driven pump member **38**. Assuming that the driven pump member **38** is being rotated in a clockwise direction, as viewed in FIG. 3, it will be seen that the liquid in the closed circulatory system will be forced to flow about its circulatory path in the direction of rotation of the driven pump member. For example, liquid will flow from the reservoir **50**, through the restricted flow port **58**, down passage **54** into chamber **44** and then between the pump members **38** and **42**, and then up the passage **52** and back to the reservoir **50** through the flow restricting port **56**. The flow restricting ports **56** and **58** determine the rate of descent of the load or person. When the load or person has reached the ground on rope **68**, the other rope **70** may be used to lower another load or person. The use of the rope **70** causes the pulleys to rotate in a counterclockwise direction, facing FIG. 4, for the reason that the rope **70** is wound on its pulley **12** in the opposite direction to the winding of rope **68** on its pulley **10**. This counterclockwise rotation of the pulleys causes the liquid in the closed circulatory system to flow in a corresponding direction retarded, as before, by the restricted ports **58** and **60** which determine the rate of descent of the load or person. At the same time that the second load or person is descending on rope **70**, the rope **68** is being rewound for use in the lowering of the next load or person.

While I have shown and described my load lowering device in considerable detail, it will be understood that many variations and changes may be made without departing from the spirit and scope of the invention.

I claim:

A brake comprising a body, a first rotatable pump member within said body having an inner sinuous periphery around the axis of said member, a second rotatable pump member within said first rotatable member and having its axis or rotation eccentric with respect to the axis of rotation of said first pump member, said second pump member having a sinuous outer periphery cooperable with the

sinuous inner periphery of said first pump member to effect a pumping action, a wheel driven shaft extending into said body and connected to drive said second pump member, means within said body defining liquid inlet and outlet chambers in communication with said pump members, a liquid reservoir within said body in communication with said inlet and outlet chambers and with said pump members providing a closed liquid circulatory system, and a valve member controlling the rate of flow of the liquid through said system to effect a braking operation on said shaft.

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EVON C. BLUNK, *Primary Examiner.*

SAMUEL F. COLEMAN, *Examiner.*

H. C. HORNSBY, *Assistant Examiner.*