Aug. 4, 1925.

1,548,460

L. T. HARRIGAN

HYDRAULIC BRAKE

Filed July 7, 1924

2 Sheets-Sheet 1

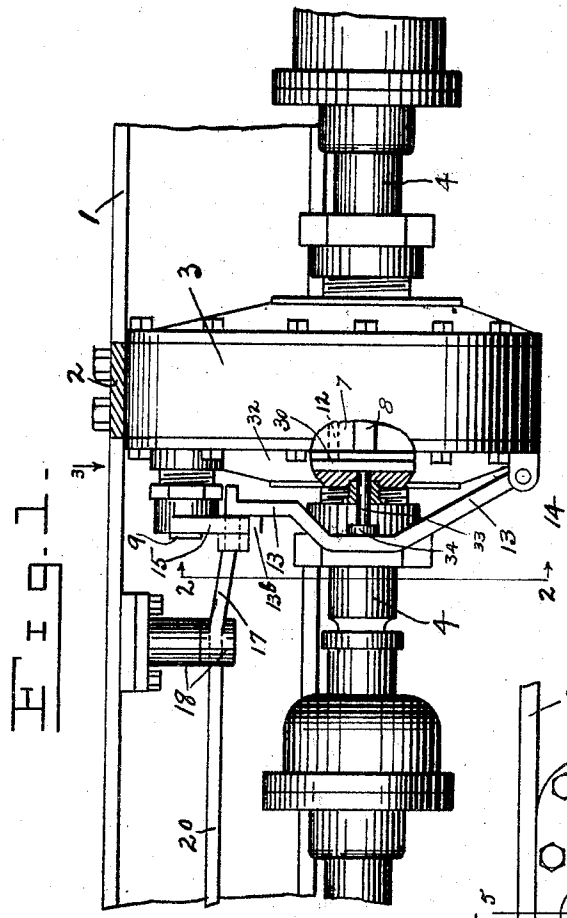


Fig. 1.

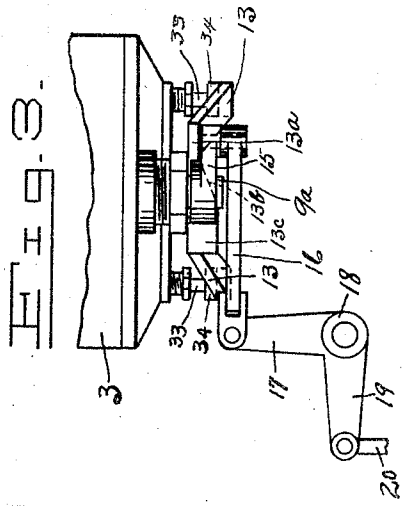


Fig. 3.

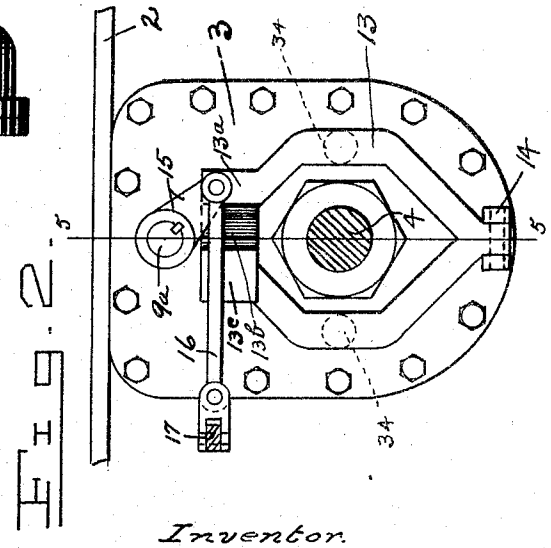


Fig. 2.

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2 Sheets-Sheet 2

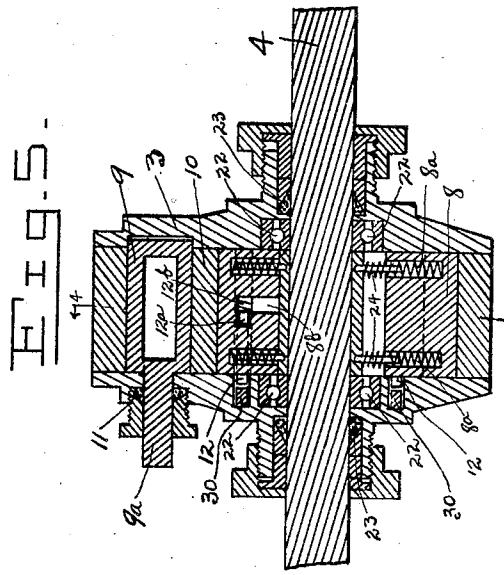


Fig. 5.

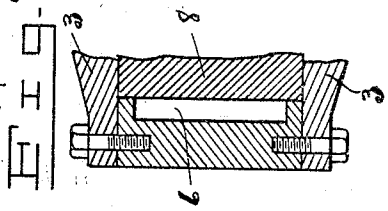


Fig. 7.

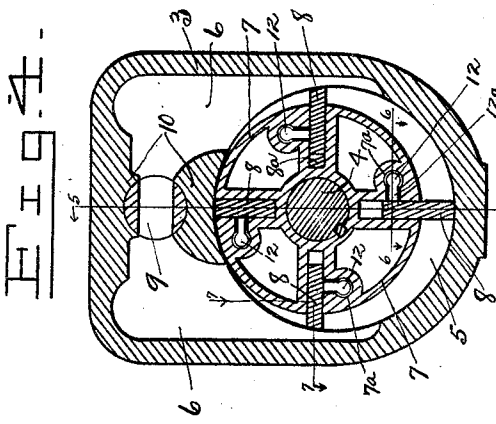


Fig. 4.

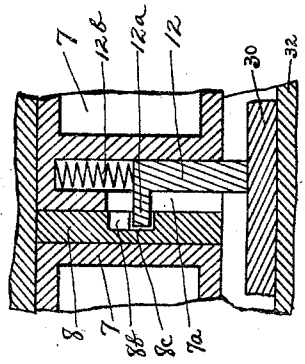


Fig. 6.

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By

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Patented Aug. 4, 1925. 1,548,460

UNITED STATES PATENT OFFICE.

LON T. HARRIGAN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO HYDRAULIC COMPANY, A CORPORATION.

HYDRAULIC BRAKE.

Application filed July 7, 1924. Serial No. 724,697.

To all whom it may concern:

Be it known that I, LON T. HARRIGAN, a citizen of the United States, and a resident of Los Angeles, county of Los Angeles, and State of California, have invented certain new and useful Improvements in Hydraulic Brakes, of which the following is a specification.

My invention relates to hydraulic brakes and more generally to a mechanism in which a fluid is propelled through a confined course of travel by a driven propeller interposed in said course of travel, said propeller being designed to be rendered inoperative at will and to run freely in the fluid without propelling the fluid along said course of travel. In devices in which the propeller cannot be rendered inoperative the constant churning of the fluid, and especially if that fluid is oil, causes it to become heated, and this is very objectionable. Therefore, the principal object of my invention is to solve this difficulty and make it possible to provide a hydraulic brake mechanism in which the propeller blades or vanes can be rendered inoperative when no braking or retarding action is desired, and to again render them operative as and when desired.

Other objects and advantages of my invention and other applications thereof will be apparent to those versed in the art, and in order to explain the same, I have illustrated one embodiment thereof on the accompanying sheets of drawings, in which,—

Figure 1 is a side elevation of a mechanism in which my invention is embodied;

Figure 2 is an end view thereof taken on line 2—2 of Fig. 1;

Figure 3 is a view looking down on Fig. 1, at the arrow 3;

Figure 4 is a vertical sectional view taken through Fig. 5, on line 4—4;

Figure 5 is a vertical sectional view taken on line 5—5 of Fig. 4;

Figure 6 is a sectional view through Fig. 4 at line 6—6; and

Figure 7 is a fragmentary sectional view on line 7—7, Fig. 4.

Referring now in detail to the drawings, I will describe the particular mechanism used to embody my invention for descriptive purposes, said mechanism being shown as a brake means applied to the drive shaft of a motor vehicle. In the drawings, 1, designates a part of the frame or chassis of a motor vehicle, with a cross beam, 2, to which is shown suspended a housing 3, through which the propeller shaft, 4, of said motor vehicle runs. Referring now to Fig. 4, said housing is shown provided with a cylindrical chamber, as 5, above which in said housing, is a circulating space or area, as 6, which extends down on both sides of the cylindrical chamber 5, and is slightly narrower, as will be understood by reference to Fig. 7, which is taken on line 7—7 of Fig. 4. The propeller shaft 4, is eccentrically positioned through said cylindrical chamber 5, and is provided with a rotor 7, keyed to said shaft, in which rotor 7, are mounted four radially disposed vanes, 8, 8, adapted to slide in and out of said rotor, as will be understood from Fig. 4, the outer ends of said vanes traversing the wall of said cylindrical chamber 5, and moving in and out during their revolutions. Said vanes bridge the circulating space, 6, as indicated in Fig. 7. In the upper part of said housing 3, and designed to close the circulating space, is a valve, 9, in a suitable housing 10, said valve having an operating shaft, or extension 9^a, extending through a suitable packing, 11, as indicated in Figs. 4 and 5.

Assuming now that the housing is filled with a fluid, the rotating of the rotor with its vanes normally moved outwardly by means of springs 8^a, would cause said fluid to be circulated from one side of the housing upwardly and through the valve 9, and down through the other side of the housing, and thus said fluid would be propelled continuously through this circulating course of travel. Now if said vanes can be rendered inoperative, it will be evident that said rotor can revolve in said fluid without churning the same and without causing the same to travel through said housing. I will now describe the mechanism I have shown for accomplishing this very thing, although I am aware that other means can be used to render said rotor inoperative in the function of propelling the fluid through said course of travel in said housing.

Each of said vanes, 8, is provided with a longitudinally extending channel, as 8^b, with an offset portion, 8^c, as indicated in Fig. 6, said channel being L-shape. Slidably mounted in the rotor body 7, in suitable ways 7^a, are pins, 12, having toes or lateral extensions 12^a, said pins being normally moved in one

direction by means of coiled springs, 12^b, set in said ways, 7^a, in said rotor 7, as clearly indicated in Fig. 6. A bearing ring 30, is loosely mounted in a suitable recess, 31, in one head, 32, of said housing, and is designed to bear against the ends of said pins, 12, as will be clear from Fig. 5, and also Fig. 1. Operating pins 33, are interposed between the opposite sides of the yoke 13, and said bearing ring 30, said pins being provided on their outer ends with heads, 34, and at their inner ends extended through the housing head, 32, in engagement with said bearing ring 30, whereby when said operating pins are pushed inwardly by said yoke, they in turn press the bearing ring 30 against the pins 12, in a manner hereinafter again referred to. Said yoke is constructed at its upper end in three thicknesses, as at 13^a, 13^b, and 13^c, the portion 13^b being of beveled form and tapering from 13^a to the thickest portion, 13^c, and constituting a cam, as will be understood from Figs. 2 and 3. Mounted on a short shaft, which is the operating shaft, 9^a, of the valve 9, in the main housing 3, is an arm 15, the end of which is provided with a link, 16, having its other end connected to an arm 17, of a bell crank, 18, the other arm of which bell crank is designated 19 and is connected with an operating rod, 20, which may be extended to any suitable operating member within reach of the operator. Thus when said rod is pulled and said bell crank 18 is rocked, the link 16 is pulled, as is also the arm 15, and as said arm 15 is designed to have cam action with the cam portion 13^b of the upper end of the yoke 13, it will be clear that said yoke is moved inwardly at its upper end, with the result that it forces the pins 33, 33, inwardly against the bearing ring 30, which in turn forces the pin 12 inwardly until their inner ends, or toes, 12^a, Fig. 6, register with the channel 8^b, in the vane 8, thus allowing said vane 8 to be forced outwardly by its spring 8^a. Thus said vane will function as a propeller for the fluid or oil in the housing 3. When said yoke is released and allows said pins 33, ring 30, and pins 12 to be moved outwardly again by the springs 12^b, they will automatically be moved outwardly as said vanes are moved inwardly by the wall of the cylindrical chamber 5, or in the position of the uppermost vane 8, Fig. 4, whereupon the toe 12^a of said pin will again be moved into the extension 8^c of the channel 8^b in the vane, and said vane will then be held withdrawn until said pin 12 is again moved inwardly by the movement of the yoke 13, and the pins 33, 33 and bearing ring 30.

It will also be understood that the operation of the rod 20, through the connections 18, 16 and 15, turns the valve 9, which controls the passage of the fluid in the housing 3 from one side to the other, and if said valve is closed, or partially closed, and said vanes are out in position to operate and propel said fluid, it will be clear that there will be a retarded or checked action, for if the circulating passageway is closed, the propellers cannot turn and as they are secured to the shaft, said shaft is held until said passage way is opened by opening the valve 9, or until the vanes are again locked in their innermost or inoperative positions.

Suitable anti-friction bearings, as at 22, 22, and packings, as at 23, 23, will obviously be necessary and will be used, and guide pins, as 24, 24, telescoping into suitable openings in the vanes, 8, as seen in Fig. 5, can be used, and many other details of construction and arrangement can be used without departing from the spirit of my invention, and I do not, therefore, limit the invention to the showing made for descriptive purposes, except as I may be limited by the hereto appended claims.

I claim:

1. In a hydraulic brake, a housing having therein a cylindrical chamber and a circulating space extending over said cylindrical chamber at opposite sides and communicating therewith, a propeller in said cylindrical chamber, vanes slidably mounted in said propeller and adapted to bear against the wall of said cylindrical chamber and to bridge the mouth of said circulating space from one side of said housing to the other side thereof, said circulating space being open around the outer ends of said vanes, a valve controlled passage interposed in said circulating space and adapted to be closed at will, means for locking said vanes within said propeller in inoperative positions, and means for releasing them at will, whereby they move outwardly radially and force a fluid in said housing from one side thereof through said valve controlled passage in said circulating space, substantially as shown and described.

2. In a hydraulic brake, a housing having therein a cylindrical chamber and a circulating space around opposite sides of said cylindrical chamber, said circulating space being of greater diameter than said cylindrical chamber and somewhat narrower, a valve controlled passage forming a part of said circulating space and dividing it into opposite sides extending downwardly around the opposite sides of said cylindrical chamber, a rotor rotatably and eccentrically mounted in said cylindrical chamber, vanes slidably mounted in said rotor and adapted to project therefrom and move around the wall of said cylindrical chamber and to bridge the narrower portions of said circulating space, whereby fluid in said chamber and space can flow around the ends of said vanes in said circulating space, and means for locking said vanes withdrawn within said rotor

in inoperative positions at will, substantially as shown and described.

3. A hydraulic brake of the character referred to including a housing having therein a cylindrical chamber and a circulating space above and extending down over the opposite sides of said cylindrical chamber, said circulating space being outside of said cylindrical chamber at its opposite sides and somewhat narrower axially than said cylindrical chamber, said circulating space being divided with a valve whereby it can be closed to separate its opposite sides, a rotor rotatably and eccentrically mounted in said cylindrical chamber, vanes slidably mounted in said rotor and movable radially in and out of said rotor, said vanes being adapted to bear against the wall of said cylindrical chamber as they revolve in their operative position to force fluid from said cylindrical chamber through said circulating space and back to the opposite side of said circulating space and into said cylindrical chamber, and means for locking said vanes withdrawn into said rotor at will, whereby said rotor can run freely in said cylindrical chamber.

4. A hydraulic brake comprising in combination, a housing having therein a cylindrical chamber and a circulating space overlying and communicating with said cylindrical chamber at its opposite sides and below the axis of said cylindrical chamber, a rotor rotatably mounted in said cylindrical chamber and adapted to wipe the wall of the same and to pass over said circulating space as they move around the opposite sides of said cylindrical chamber, means for closing said circulating space intermediate its opposite sides, vanes slidably and radially mounted within said rotor, and spring actuated latch means for automatically locking said vanes withdrawn into said rotor at will, whereby said rotor can revolve freely, substantially as described.

Signed at Los Angeles, Los Angeles County, California, this 1st day of July, 1924.

LON T. HARRIGAN.

Witnesses:
W. R. LITZENBERG,
LUCAS F. SMITH.