

No. 689,329.

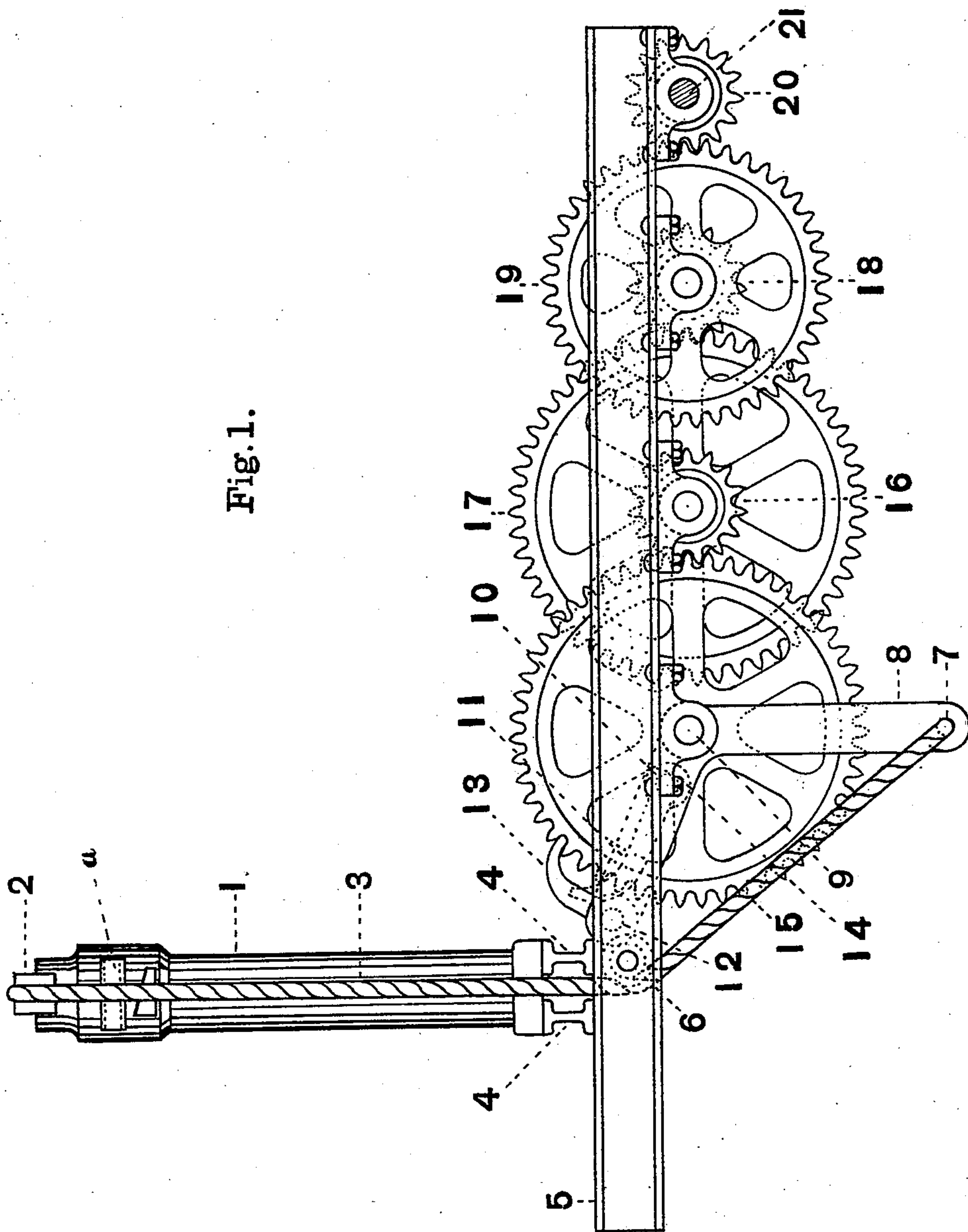
Patented Dec. 17, 1901.

J. H. SNOW.  
HYDRAULIC MOTOR.  
(Application filed Dec. 13, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

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*L. Stanley.*

INVENTOR

*Jacob H. Snow.*

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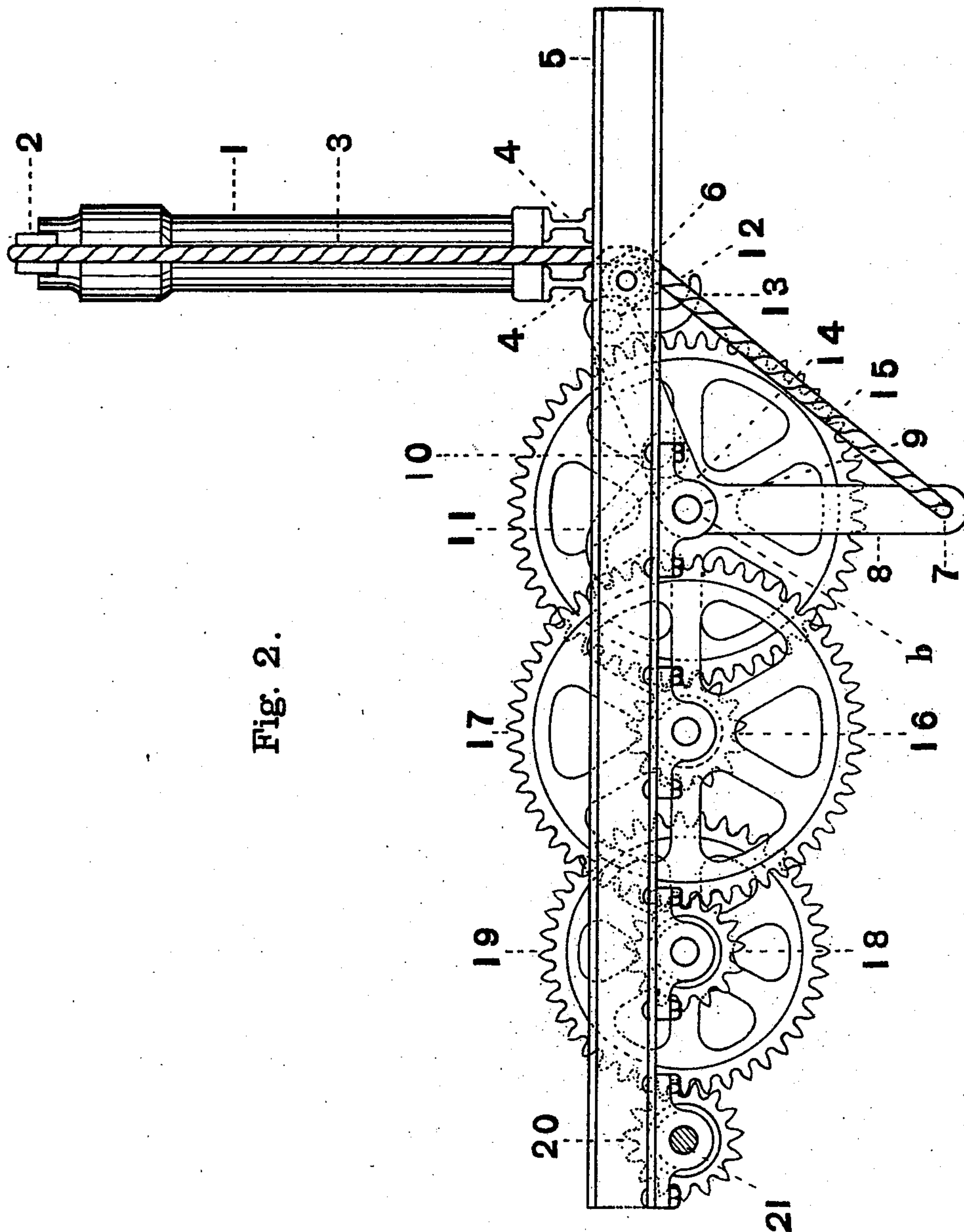


Fig. 2.

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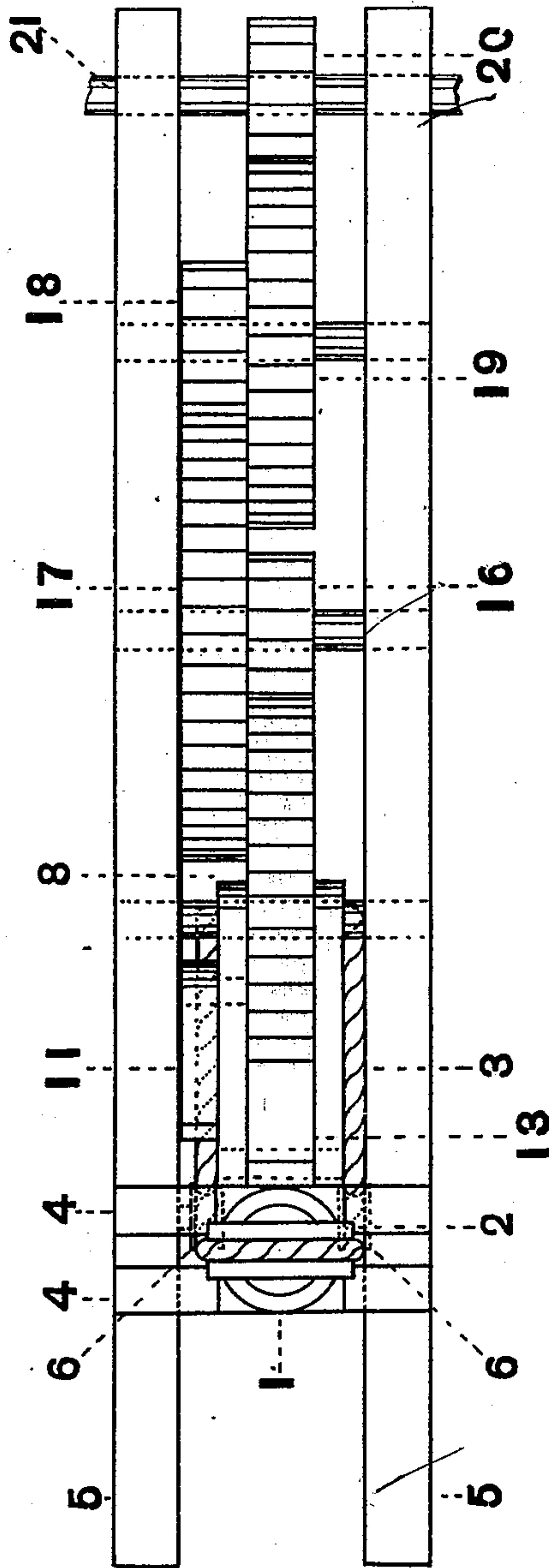
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Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JACOB H. SNOW, OF INDIANAPOLIS, INDIANA.

## HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 689,329, dated December 17, 1901.

Application filed December 13, 1900. Serial No. 39,749. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB H. SNOW, a citizen of the United States of America, residing in Indianapolis, county of Marion, State of Indiana, have invented certain new and useful Improvements in Hydraulic Motors, of which the following is a specification.

My invention relates to an improvement in hydraulic motors; and the primary object is to utilize the power developed in and by a hydraulic jack and transform it into rotary motion, whereby it may be applied in various ways for driving vehicles, machinery of various kinds, or what not; and an object of my present invention is to provide motor-power for so-called "motor-vehicles;" and it consists of a hydraulic jack and piston, in combination with a flexible means engaged by the piston, a lever to which the flexible device is connected, and rotating mechanism engaged and operated by means located on the lever, which mechanism may be connected with a variety of devices. Thus it will be seen that my invention transforms the reciprocating motion of the hydraulic piston into rotary motion, which is utilized in any desired manner.

My invention further consists in certain novel features of construction and combinations of parts, which will be more fully described hereinafter and particularly pointed out in the claims.

In the accompanying drawings, Figures 1 and 2 are views in elevation of a form of my invention, taken from opposite sides; and Fig. 3 is a plan view.

The jack is indicated by the numeral 1 and is of the usual form of hydraulic jack with plunger and valves for controlling the water used in operating it. It may be set in motion by the usual hand-lever inserted in the socket *a* in the accustomed manner. On the upper end of the plunger-rod a saddle 2 is secured, and over this saddle the cable 3 is placed. The ends of the cable extend downward from the saddle on either side of the jack into the space formed by the framework 4 and 5 of the motor, at which point they are preferably passed around sheaves 6 6 and thence to the outer end of the actuating-lever 8, where their ends are secured at point 7. This cable or other flexible device is au-

tomatically adjustable in that should one side thereof for any reason become longer than the other the excess would adjust itself on the shorter side by sliding over the saddle 2 as the piston made its outward stroke.

The actuating-levers are of bell-crank shape, and each is formed of an integral piece of metal or other suitable materials. It preferably consists of a pair of similarly-shaped plates oppositely disposed astride the large gear-wheel 15, and it is in the form of two arms disposed at an obtuse angle to each other and fulcrumed on the same axle 9 upon which gear-wheel 15 turns, which axle is preferably hung just beneath the longitudinal girders 5 5 by means of boxes *b*. A pawl 13 is pivoted at the upper end of this lever in position to take between two of the teeth of large gear-wheel 15, whereby to impart a rotary motion thereto as the lever is swung upward upon its axis with the upward motion of the plunger in the jack 1. In this way the stroke of the plunger, which, of course, is reciprocatory, is transformed into the rotary motion of the gear-wheel, and the rotary motion thus derived might be applied direct from the axle of this wheel; but in the great majority of applications to which I contemplate applying my improved motor it is desirable to develop speed as well as utilize the power of the jack, and therefore I provide additional gearing for deriving this speed, as shown in the various figures of the drawings. For example, the teeth of large gear-wheel 15 mesh with the teeth of a pinion 16, and secured at one side of pinion 16 is a large gear-wheel 17, in the present instance corresponding or substantially corresponding in size with wheel 15, and the teeth of wheel 17 may mesh with a pinion 18, and a larger wheel 19 on the side of wheel 18 corresponding to the position of pinion 16 intermeshes with the teeth of pinion 20, and pinion 20 is secured upon a drive-shaft 21, or this chain of gearing might be indefinitely multiplied, if desired, and the speed of the rotary shaft increased.

As a simple means for reversing the motion provision is made for applying the power of lever 8 direct upon the periphery of wheel 17, and this is done by throwing the pawl 13 back and rendering it idle, as indicated in Fig. 2,



and dropping dog 11, which is pivoted to one side of the lever 8 between two teeth of the gear-wheel 17, as shown in Fig. 2. This renders wheel 15 idle, as well as pawl 13, and the power is transmitted through wheel 17 to the rest of the gearing, in the reverse direction, of course, from the motion caused by the use of the pawl 13.

While the jack is illustrated in a vertical position, it is evident that it might be disposed horizontally and made to lie alongside the gear-wheel, thus forming a very compact motor for carriages or light vehicles.

As set forth in the statement of objects, one of the applications of this invention which I have particularly in view is the propulsion of vehicles of various types, and it is obvious that it can thus be applied without much alteration in the parts of the vehicle, as the shaft 21 could be utilized as the rear axle of the vehicle and have the rear wheels secured thereto. When thus applied to a wagon, for instance, it is merely necessary for the driver to operate the hand-lever of the hydraulic jack from time to time, and by the power created therein the vehicle is propelled and the raising of the piston or plunger once will run the wagon about a mile, after which the piston is let down just as the jack is used in other work, and the weight of the lower end of lever 8 causes the latter to drop and the pawl 13 to take another hold on the gear-wheel 15, and as this is done very quickly while the vehicle is in motion it does not stop the vehicle. To back the vehicle, it is simply necessary to throw the pawl 13 out and the dog 11 in, and to lock it against movement in either direction both the dog and pawl are thrown into engagement with teeth on the respective wheels they are intended to engage. In this way the vehicle is absolutely secured against motion. By means of this combination of gearing and power mechanism any speed desired can be obtained and the gearing will be effectual in causing the vehicle to run any distance from one mile to eight by once raising the piston or plunger of the jack.

By staking a heavy wagon having this motion applied and raising the rear wheel off of the ground a belt can be thrown over one or both of the rear wheels and the power applied to run machinery—as, for example, a farmer could utilize it to drive a corn-sheller, a corn-cracker, or feed-cutter, or it could in like manner be used to drive any other machinery.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact construction herein set forth; but,

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A motor comprising a hydraulic jack and piston, flexible, automatically-adjustable

means passing over the piston, an integral lever suitably pivoted to the framework, the flexible means connected to the lever, a dog and a pawl pivotally located on the lever, drive-shafts journaled in the frame, a train of gears mounted on the shafts, the pawl and dog adapted to engage the train of gears whereby they are actuated by the reciprocations of the piston.

2. A motor comprising a hydraulic jack and piston, flexible automatically-adjustable means passing over and engaged by the piston, an integral lever suitably pivoted to the frame, the flexible means connected to the lever, a train of gears journaled in the frame, and means on the pivoted lever for actuating the train of gears in two directions.

3. A motor for automobiles comprising a hydraulic jack and piston, an integral lever pivoted in the frame, a flexible automatically-adjustable means connected to and passing loosely over and engaged by the piston, a pawl and a dog pivoted some distance apart on the lever and means engaged by the pawl and dog whereby to actuate the automobile in two directions.

4. A motor comprising a hydraulic jack and piston, an integral lever pivoted in a framework, a flexible automatically-adjustable means connected to the lever and passing over and engaged by the piston, a train of gears journaled in the framework and a pawl and a dog pivotally secured on the lever, the pawl adapted to engage one of the gears to drive the gearing in one direction and the dog adapted to engage an entirely independent gear to drive the mechanism in the opposite direction.

5. A motor comprising a hydraulic jack and piston, a saddle located on the upper free end of the piston, an integral lever suitably pivoted to the framework, a flexible automatically-adjustable device connected to the lever and passing over and engaged by the saddle on the piston, a train of gears journaled in the framework, and means on the lever for engaging the train of gears whereby they may be driven in either of two opposite directions.

6. A motor comprising a hydraulic jack and piston, an integral lever suitably pivoted to the framework, a flexible automatically-adjustable means connected to the lever and passing over and engaged by the piston, a drive-shaft, means for transmitting motion to the drive-shaft and means on the lever adapted to engage the last-named means whereby to transmit the power derived from the piston to the drive-shaft.

7. A motor comprising a hydraulic jack and a piston, a bell-crank lever suitably pivoted to the framework, a flexible automatically-adjustable means connected to one arm of the lever, the flexible means passing over and engaged by the piston, a pawl and a dog located, respectively, at either end of the other integral arm of the lever, a drive-shaft,



means connected with the drive-shaft for actuating it, the pawl and dog adapted to engage the last-named means whereby to rotate the drive-shaft in one or the other of two directions.

5 8. A motor, comprising a hydraulic jack and piston, a lever pivoted in the frame, a flexible means passing loosely over and engaged by the piston, the flexible means connected to the lever, a pawl and a dog pivoted  
10 some distance apart on the lever and separate means engaged by the pawl and by the dog, respectively, whereby it is actuated in two directions.

15 9. A motor comprising motive means located on a frame, a lever pivoted on the frame, a flexible means passing loosely over and engaged by the motive means, a pawl and a dog pivoted some distance apart on the lever, the  
20 flexible means connected to the lever where-

by the motion of the motive means is transmitted thereto, a train of gearing journaled in the frame, and separate means pivoted on the lever, one of which means is adapted to engage one of the train of gears to actuate it  
25 in one direction and the other of said means on the lever adapted to engage another of the gears to actuate the train in the opposite direction, the motion of the gearing being stopped when both of the means pivoted on  
30 the lever are in engagement with their respective gears.

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

JACOB H. SNOW.

Witnesses:

L. E. SNOW,

L. L. STANLEY.