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D. G. TAYLOR

OIL WELL BAND WHEEL SPEED CONTROL

Filed March 29, 1926

Fig. 1

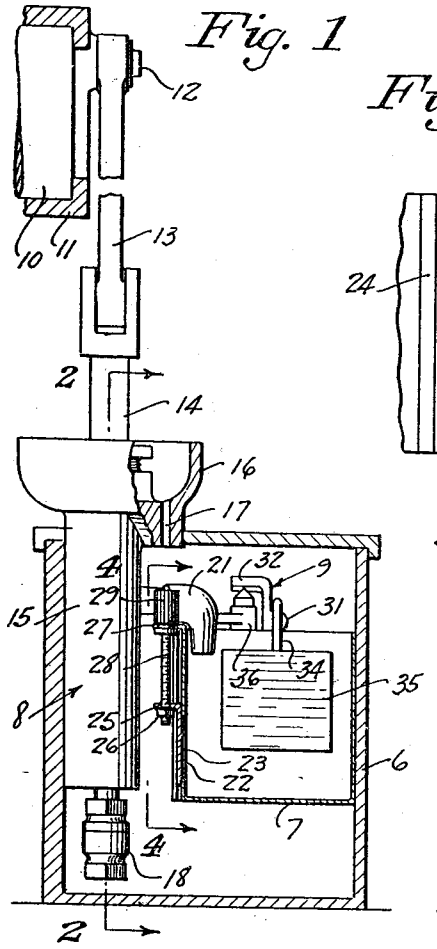


Fig. 4

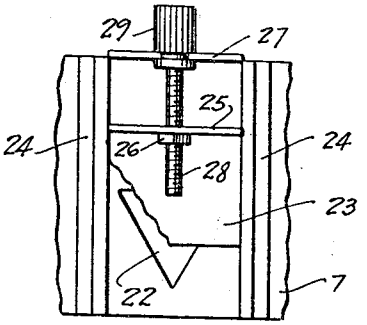
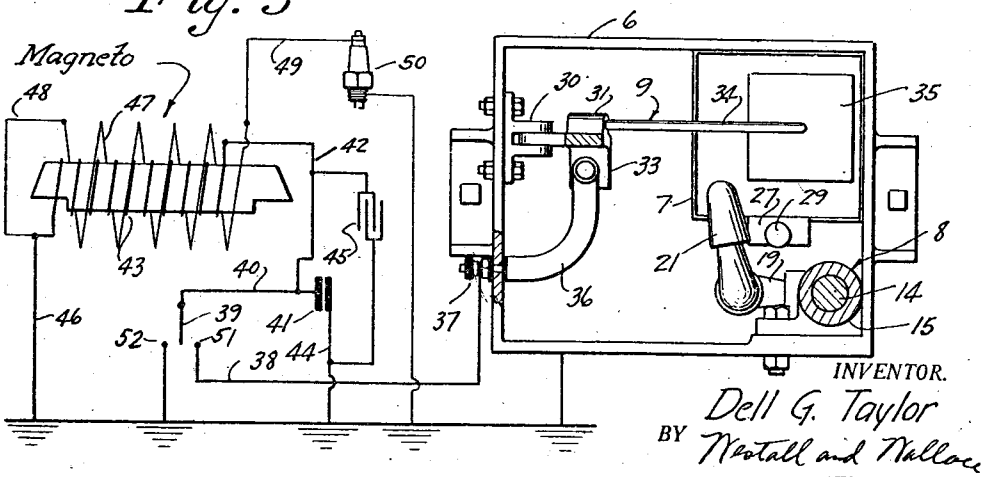


Fig. 2

Fig. 3



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UNITED STATES PATENT OFFICE.

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OIL-WELL BAND-WHEEL SPEED CONTROL.

Application filed March 29, 1926. Serial No. 98,309.

This invention relates to a device particularly adaptable for use to control the speed of oil well band wheels, but is not limited to such use. The present invention appertains to a device of the character described operable from a driven body and actuated in correspondence with the speed thereof so as to control the driver or prime mover. The present invention has a large field of use in oil well pumping plants and the embodiment shown herein is illustrated as applied thereto. In oil well pumping plants or outfits as commonly constructed, a slow speed band wheel forming a driven element is employed. Such pumping outfits are operated for long intervals without supervision or inspection. In many instances, the band wheel belt may begin to slip, generating heat which is sometimes sufficient to cause combustion and set fire to the rig. Obviously breakage of the belt may cause other damage.

The present invention has for its primary object the provision of a control operable by fluid transmission and suitable for slow speed. More specifically, it is an object of this invention to provide a control wherein fluid is supplied to a receptacle by a pump operated from the driven element of the rig, the receptacle having means for drainage at a selected constant rate. The drainage rate is adjusted to pass the fluid at the same rate the pump supplies it when the driven element is operated at its selected speed. Thus, a constant quantity of fluid would be maintained in the receptacle at the selected speed of the driven element. In connection therewith is a prime mover or driver control operated by the fluid level in the receptacle. In addition to the broader objects of this invention, there are certain details of structure whereby a durable, simple, economical construction is obtained and one which is not easily subject to trouble.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical sectional view through the control showing a fragment of the band wheel shaft; Fig. 2 is a section as seen looking in the direction of the arrow 2—2 of Fig. 1; Fig. 3 is a section as seen on the line 3—3 of Fig. 2, including a wiring diagram showing a connection to an ignition magneto for a gas engine; and Fig. 4 is a section as seen on the line 4—4 of Fig. 1.

Referring more particularly to the drawing, a case or sump tank 6 is shown, this case being constructed so that it may be conveniently mounted upon the floor of a pumping rig. Cast iron has been found to be a satisfactory material from which to construct the case. Mounted within the case 6 is a receptacle 7. There is also mounted within the case a reciprocating pump indicated generally by 8. The reference numeral 9 denotes float mechanism which is actuated by the level of the liquid within the receptacle 7.

A band wheel shaft is indicated by 10 in Fig. 1. Mounted upon this shaft is a cap 11 having a crank pin 12 eccentrically mounted thereon. Secured to the crank pin 12 is a connecting rod 13 which is secured to the plunger 14 of the pump. The pump disclosed herein is a plunger pump having a barrel 15 closed at the top by a stuffing box and formed with a pan 16 for catching liquid which may leak through the stuffing box and returning it to the case through a drainage duct 17. An inlet to the pump barrel at the bottom thereof is provided with a valve structure 18. A discharge opening at the side of the barrel has an L 19 connected to a discharge valve structure 20 which communicates with a discharge line 21 arranged to discharge liquid into the receptacle 7. The pump is operated from the band wheel shaft taking liquid from the case 6 and discharging it into the receptacle 7 at a rate proportional to the speed of the band wheel shaft.

The receptacle 7 has in one wall thereof a triangular opening 22 located near the bottom of the receptacle. This opening serves as a drainage opening for the receptacle and is controlled by a gate 23. Suitable guide ways 24 for the gate are provided on the wall of the receptacle, and extending from the gate is a flange 25 having an extension 26 which is bored and internally threaded. This extension may be in the nature of a nut secured to the flange. Extending outwardly from the top of the receptacle is a flange 27 having a suitable opening to receive the stem 28 for the gate thereby forming a valve.

The stem is provided with a knurled operating head 29 and is suitably held in the flange 27 against endwise movement. By turning the head, the gate 23 may be raised

and lowered and the amount of opening for draining the receptacle likewise changed.

Mounted on a side wall of the case is a bracket 30 provided with spaced ears between which is pivotally mounted an electrical contact member 31. The contact member is provided with two laterally extending fingers 32 and 33 and with a socket for receiving a rod 34. Secured to the end of the rod is a float 35 which is disposed within the receptacle. Mounted upon the case is a finger 36 provided at its end with opposing contact points, one arranged to be engaged by finger 32 and the other by finger 33 forming a double throw single contact switch.

A bracket 30 of metallic material such as brass is mounted upon the case 6 and in electrical contact therewith so that the bracket is grounded upon the case. The contact member 31 is preferably made of brass or copper, and the finger 36 may likewise be made of copper. Finger 36 is mounted so as to be insulated from the case and has a binding post 37 at the end thereof. When the float 35 is in its lowest position, contact 31 is so disposed that finger 32 engages the upper point on finger 36, and an electrical circuit is made between the finger 36 and the case. When the float is in its uppermost position, finger 33 engages the lower point of finger 36, and an electrical circuit is completed from the post 37 to the case.

Referring more particularly to Fig. 3, a well known type of ignition magneto circuit is diagrammatically illustrated. A conductor 38 connects post 37 to one terminal of a double throw ground switch 39. The blade terminal is connected by a conductor 40 to one of the contacts of a breaker 41. A conductor 42 connects the contact to one terminal of a magneto primary winding 43. The other contact of the breaker is connected by a conductor 44 to the ground. The breaker contacts are shunted by a condenser 45 in the usual manner. The other terminal of the primary winding is grounded by means of a conductor 46. The secondary winding of the magneto indicated by 47 is connected through a conductor 48 to the ground and at the other end through a conductor 49 to a spark plug 50, which is grounded on the other side. Blade 39 of the double throw switch is arranged to make contact with either point 51 or 52. Point 52 is directly grounded. The magneto fires a gas engine in which the spark plug is mounted. When the ground switch 39 is open, the ignition is on. When the switch is closed, by the blade being either on contact 51 or 52, it is off, assuming the control contact 36 engages either contact 32 or 33. If the switch blade 39 is closed on contact 51 and contact 36 is not in engagement with either contact 32 or 33, the ignition is on. Thus, the control will, according to its position, assuming switch 39 is closed, place the ignition on or off.

Assume the outfit is working and shaft 10 rotating, switch 39 is open. Oil which is placed in the sump tank 6 will be transferred by the pump 8 into the receptacle 7 at a rate proportionate to the speed of the shaft. It will drain through opening 22 back into the tank at a constant rate. Assume the receptacle is allowed to fill by increased speed of the shaft or by hindering draining so that float 35 is raised to hold contact 36 out of engagement with contacts 32 and 33. Switch 39 is next closed on contact 51, it having served in starting the engine. The ignition is still on and the engine operates. If the speed is such as to pump more oil into the receptacle than is being drained, the float will be raised, the control making a ground connection and the engine missing fire until the normal fluid level is restored in receptacle 7, whereupon the ground connection is opened and ignition is resumed. If the speed drops, because of slippage of the belt or other causes, the control grounds the magneto and the engine misses. Thus, the engine may be stopped by the speed falling below a selected rate or it may be made to hit and miss if too high a speed is attained. Adjustment of speed is made by manipulation of the gate 23 to change the drainage opening. The engine may be stopped by placing blade 39 on contact 52.

What I claim is:

A device for controlling the speed of a driven mechanism comprising a sump tank, a receptacle mounted therein having a drainage port for discharging liquid at a constant rate from said receptacle into said sump, a valve for adjusting the flow of fluid through said port, a pump operated by said mechanism for transferring liquid from said sump to said receptacle whereby the rate of liquid supply thereto is proportionate to the speed of said pump and mechanism, a float arm pivotally mounted on said tank, a float on said arm, and a double throw electrical contact switch operated by movement of said arm in either direction and controlling the driver.

In witness that I claim the foregoing I have hereunto subscribed my name this 17th day of March, 1926.

DELL G. TAYLOR.