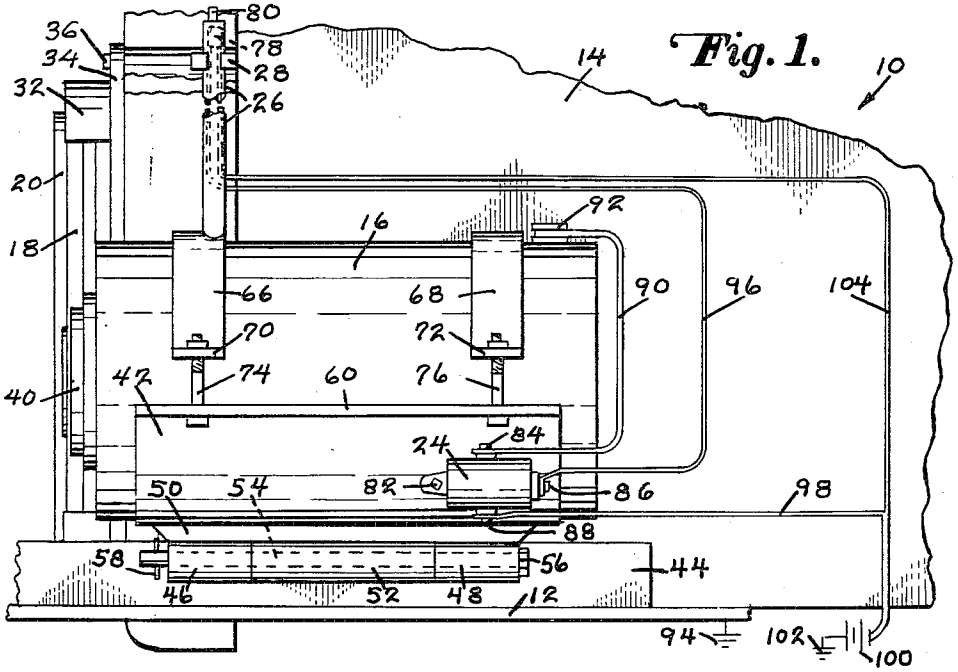
Aug. 28, 1956 J. E. CRITCHFIELD 2,760,377

STARTING MOTOR ATTACHMENT

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Fig. 1.



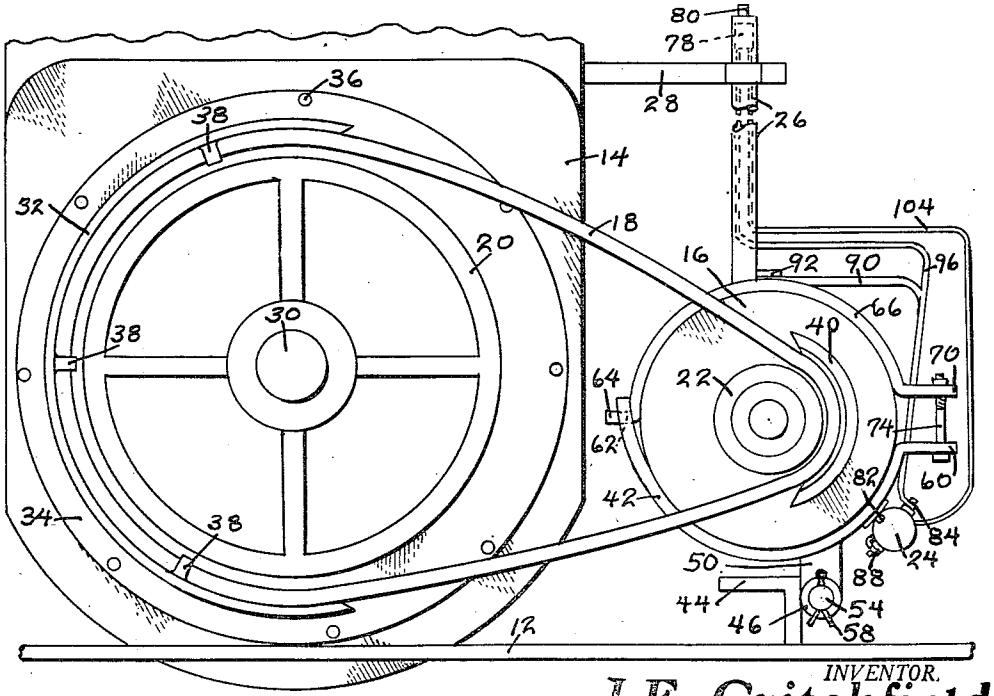


Fig. 2.

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STARTING MOTOR ATTACHMENT

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4 Claims. (Cl. 74—8)

This invention relates to starting devices for starting internal combustion engines particularly of farm machinery and equipment, such as air compressors, welders, and the like, and in particular a small motor pivotally mounted on a platform of an engine with a belt trained over pulleys on the motor and engine and with a handle having a switch therein extended from the motor wherein in drawing the handle away from the engine the switch may be closed to start the motor, and with continued movement of the handle slack is taken up in the belt whereby the motor drives the engine thereby starting the engine.

The purpose of this invention is to provide means for connecting a starting motor to an engine with a belt whereby slack may be manually taken up in the belt to actuate the engine by the motor and wherein, upon starting of the engine, tension in the belt is manually relieved and the belt is retained in arcuate shoes on the engine and motor as the engine continues to operate.

The conventional type of starter, such as the Bendix, uses meshing gears with a pinion on a spring actuated coupling member, and such devices are too costly for farm machinery, and particularly for equipment that is subjected to the weather continuously.

With this thought in mind this invention contemplates a starting assembly wherein the gears are replaced with a belt and pulleys and with means for moving the motor away from the engine to increase tension in the belt for starting, and which is also adapted to move the motor toward the engine to relieve the tension so that the engine may continue to run with the motor stationary.

The object of this invention is, therefore, to provide a manually actuated starting connection between a starting motor and an engine which makes it possible to eliminate the conventional meshing gears and clutch assembly.

Another object of the invention is to provide a starting assembly for farm equipment and the like in which the starting elements are adapted to be installed on machinery now in use.

A further object of the invention is to provide a starting connection between a motor and an engine that is particularly adapted for farm machinery, such as compressors, welders, and the like, in which the starting connection is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies an internal combustion engine having a pulley with a substantially semi-circular shoe spaced therefrom on one end, a motor pivotally mounted adjacent the engine and also having a pulley with a substantially semi-circular shoe on one end, a belt trained over the pulleys of the engine and motor, a solenoid actuated switch positioned on the motor mounting, and a handle having a button actuated switch therein connected to the motor mounting and adapted to be manually actuated to place tension in the belt for operating the engine by the motor, and also adapted to be retained

in a position wherein the belt is slack while the engine is operating.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a side elevational view illustrating the improved starter motor mounting, parts of an engine adapted to be started by the motor being broken away.

Figure 2 is an end elevational view of the starter motor assembly showing an engine and a starter motor with a handle for moving the motor and showing the motor in the inoperative position wherein a belt connecting the motor to the engine is slack, or disengaged from pulleys of the motor and engine.

While one embodiment of the invention is illustrated in the above referred to drawings, it is to be understood that they are merely for the purpose of illustration, and that various changes in construction may be resorted to in the course of manufacture in order that the invention may be utilized to the best advantage according to circumstances which may arise, without in any manner departing from the spirit and intention of the device, which is to be limited only in accordance with the appended claims. And while there is stated the primary field of utility of the invention, it remains obvious that it may be employed in any other capacity wherein it may be found applicable.

In the accompanying drawings, and in the following specification, the same reference characters are used to designate the same parts and elements throughout, and in which the numeral 10 refers to the invention in its entirety, numeral 12 indicating a platform upon which the engine and motor are mounted, numeral 14 indicating an internal combustion engine, numeral 16 a motor for starting the engine, numeral 18 a belt adapted to be trained over a pulley 20 on the engine, and also over a pulley 22 on the motor, numeral 24 a solenoid switch positioned on the motor mounting, numeral 26 a handle for moving the motor in relation to the engine, and numeral 28 a spring clip for retaining the handle and motor with the belt slack.

The pulley 20 is mounted on the shaft 30 of the engine and an arcuate shoe 32, mounted on an end plate 34 that is secured to the engine with bolts 36, is spaced from the pulley and positioned to receive the belt when the belt is slack and free of the pulley, as shown in Figure 2. The shoe is provided with fingers 38 which extend over the edge of the belt for retaining the belt in the shoe.

The motor 16 is also provided with an arcuate shoe, as indicated by the numeral 40, and the shoe, which is mounted on a stationary part of the motor housing, is spaced from the pulley 22 and positioned to receive the belt when the belt is slack.

The motor 16 is positioned in a cradle 42 that is pivotally mounted on the platform 12, the platform being provided with an L-shaped bar 44 having hubs 46 and 48 at the ends and the cradle having a plate 50 extended downwardly therefrom and being provided with a hub 52 through which a pin 54, pivotally mounted in the hubs 46 and 48, extends. One end of the pin is provided with a head 56 and a cotter pin 58 extends through an opening in the opposite end.

One side of the cradle 42 is provided with a flange 60 and the opposite side is provided with slots 62 through which lugs 64 on the ends of straps 66 and 68 extend, and the opposite ends of the straps are provided with flange 70 and 72 respectively, that extend over the flange 60 of the cradle, and that are secured to the flange 60 with bolts 74 and 76.

The handle 26, which is tubular, is secured to the strap 66, such as by welding, and the upper end, which is adapted to be held in the spring clip 28, is provided with

a switch 78 that is adapted to be actuated by a button 80 for completing a circuit to the solenoid 24.

The solenoid switch 24, which is secured to the motor cradle 42 with bolts 82, is provided with terminals 84, 86 and 88, the terminal 84 being connected by a wire 90 to a terminal 92 of the motor 16, the opposite terminal of which is grounded through the platform 12 as indicated at the point 94, the terminal 86 being connected to one terminal of the switch 78 in the handle by a wire 96, and the terminal 88 being connected by a wire 98 to one side of a battery 100 the opposite side of which is connected to a ground, as indicated by the numeral 102. The side of the battery to which the wire 98 is connected is also connected by a wire 104 to the terminal of the switch 78 opposite to that to which the wire 96 is connected.

By this means pressing on the button 80 as the handle is withdrawn from the spring clip energizes the solenoid 24 closing the switch thereof, and completing a circuit to the motor 16, starts the motor operating. With the motor operating continued outward movement of the handle places tension in the belt 18 whereby the engine shaft is rotated, so that the engine is started. With the engine operating the handle is replaced in the spring clip 28 and in bringing the centers of the pulleys toward each other slack is provided in the belt and the belt is received by the shoes 32 and 40, whereby the belt and motor remain stationary as the engine continues to operate.

From the foregoing specification, it will become apparent that the invention disclosed will adequately accomplish the functions for which it has been designed and in an economical manner, and that its simplicity, accuracy, and ease of operation are such as to provide a relatively inexpensive device, considering what it will accomplish and that it will find an important place in the art to which it appertains when once placed on the market.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Changes in shape, size, and rearrangement of details and parts such as come within the purview of the invention claimed may be resorted to, in actual practice, if desired.

Having now described the invention that which is claimed to be new and desired to be procured by Letters Patent, is:

1. In a starting motor assembly, the combination which comprises a platform, said platform being adapted to retain an internal combustion engine, a pulley adapted to be positioned on a shaft of an engine on said platform, an arcuate shoe adapted to be mounted on an engine on the platform and positioned in spaced relation to the pulley, a cradle pivotally mounted on the platform, a motor having a pulley on a shaft thereof positioned in said cradle, means for clamping the motor in the cradle, an arcuate shoe mounted on the motor and positioned in spaced relation to the pulley thereof, a belt trained over the pulleys of the engine and motor, a handle having a switch therein extended from the cradle, and a solenoid actuated switch positioned on the cradle and adapted to be actuated by the switch of the handle for closing a circuit to the motor, said handle being adapted to be held by a spring clip with the belt slack and retained in the shoes with the engine operating.

2. A starting motor assembly for an internal combustion engine comprising a supporting platform adapted to support an internal combustion engine, having a crank shaft, a pulley fixed on said shaft, belt retaining means disposed concentric to a portion of said pulley, a cradle, means pivotally mounting the cradle on the platform alongside of the internal combustion engine for movement laterally toward and away from the internal combustion engine, an electric motor mounted in the cradle, a pulley driven by said motor and laterally aligned with the pulley on the engine shaft, belt retaining means for said motor pulley, a belt connecting said pulleys and held by said retaining means when in a slack position for guided movement onto the pulleys, a handle extending from the cradle for swinging the cradle and the motor laterally toward and away from the engine, a switch on the handle, a switch means on the cradle actuated by said switch for closing a circuit to the motor and releasable holding means engaging the handle for holding said handle and cradle in an inoperative position, said handle moving the cradle and motor away from the engine to tighten the belt.

3. A starting motor assembly as claimed in claim 2, wherein said cradle includes a split clamp fixedly circumposed on the motor and having a tubular member depending therefrom and arranged parallel with the motor and said means mounting the cradle on the platform includes said tubular member, a support upstanding from the platform and having axially spaced apart and aligned hollow shafts between which the tubular member is axially disposed and a pin fitted in said hollow shafts and the tubular member.

4. A starting motor assembly for an internal combustion engine having a crank shaft comprising a pulley adapted to be fixed on said shaft, belt retaining means associated with said pulley, an electric motor having a shaft provided with a pulley, belt retaining means associated with said last pulley, means mounting said motor alongside the engine with the pulleys in lateral alignment and with the motor being swingable laterally toward and away from the engine, a belt connecting said pulleys and being held by said retaining means, when slack, for guided movement onto the pulleys, when tightened by movement of the motor away from the engine, a handle connected to the motor for swinging it toward and away from the engine to selectively tighten and slacken the belt, a solenoid actuated switch means carried by the motor and adapted to close a circuit to the motor, a manually operated switch on said handle for closing said switch means, and spring clip means adapted to be mounted on the engine in which the handle is releasably fixed for holding the motor and belt in a belt slackened position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,366,271	Matlock	Jan. 18, 1921
1,381,664	Rogers	June 14, 1921
1,719,102	Dickey	July 2, 1929
1,882,022	Leyvastre	Oct. 11, 1932
2,522,503	Dodwell	Sept. 19, 1950