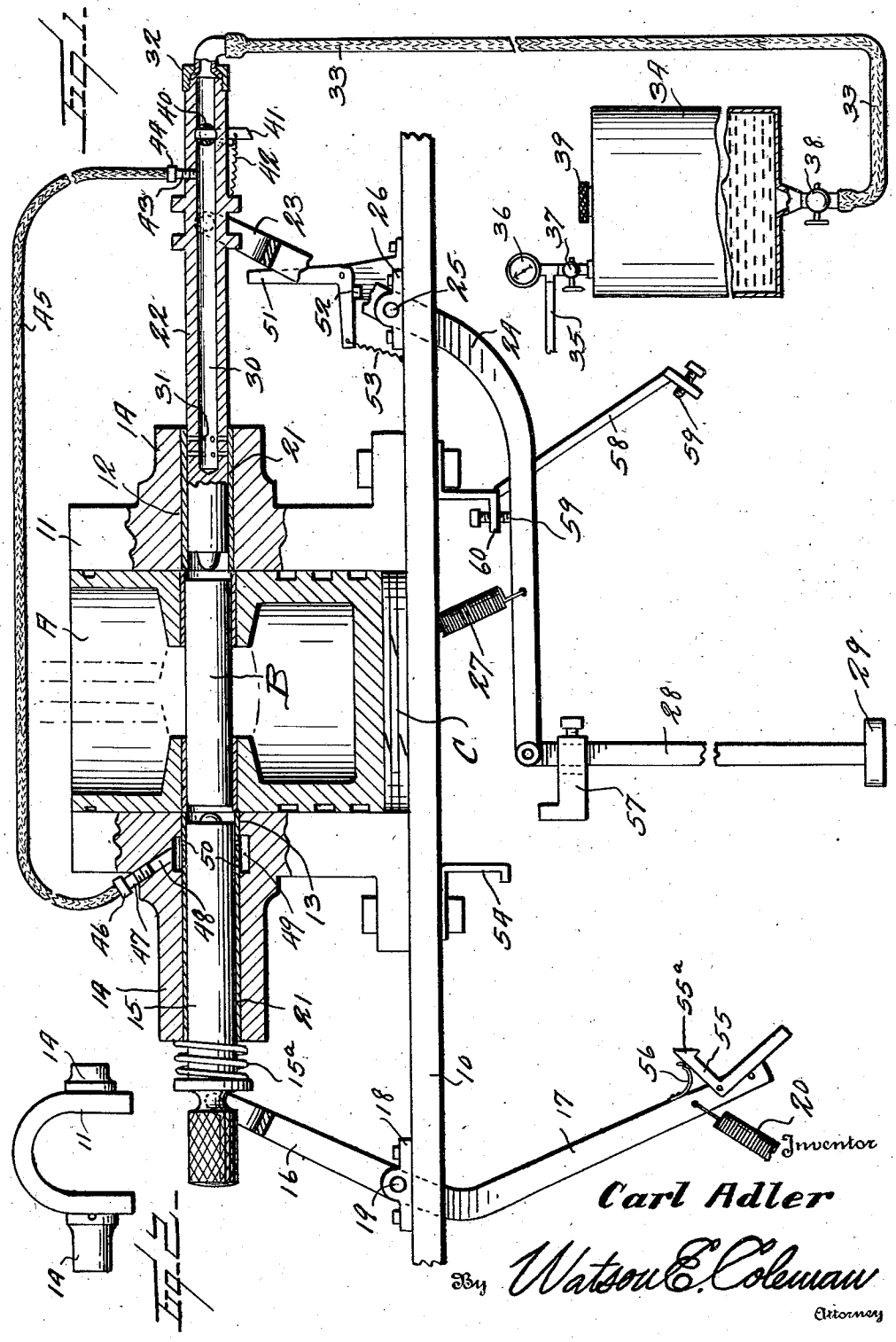
March 17, 1936. C. ADLER 2,033,906

WRIST PIN OILER AND PISTON ROD CONNECTER

Filed March 14, 1935



Inventor
Carl Adler
By Watson E. Coleman
Attorney

Patented Mar. 17, 1936 2,033,906

UNITED STATES PATENT OFFICE

2,033,906

WRIST PIN OILER AND PISTON ROD CONNECTER

Carl Adler, Lorain, Ohio

Application March 14, 1935, Serial No. 11,111

8 Claims. (Cl. 184—1)

This invention relates to devices for oiling the wrist pins of pistons and connecting the piston rods thereto while these parts are in the process of assembly at the manufacturing plant. At the present time, the method of oiling and connecting these parts in all automobile plants known to me is substantially as follows:

Oiling the wrist pin is accomplished by a workman who pulls the pistons out of the moving motors which are being carried along at a uniform speed by a conveyor. The workman places the pistons on his bench and then oils the wrist pins. To this end, he dips a rod into oil, sticks it against the end of the wrist pin and forcibly pushes out the wrist pin by this rod. The workman catches the pin as it comes out of the piston. The pin is dipped into oil and then re-fitted into the piston. As the fit has only approximately a thousandth inch tolerance, it requires considerable accuracy on the part of the workman to fit the pin back into the piston. The pin is pushed through one bushing of the piston and the piston then slid over to the next workman who picks up the connecting rod, puts it inside the piston and pushes the wrist pin into the hole of the connecting rod a little distance just sufficient to hold the rod and piston together. The piston is then thrown against a rubber plate, the wrist pin taking the force of the throw, and this pushes the pin inside the piston. This workman then slides the piston with the rod to the next workman who tightens the rod on to the wrist pin and then the piston is passed on to the next workman who again tightens the wrist pin bolt a little, and this workman also inspects the piston for nicks and to determine whether the rod is tight on the wrist pin, etc.

The general object of the present invention is to provide a machine for accomplishing this removal of the wrist pin from the piston, the oiling of the wrist pin at its bearings and the replacement of the wrist pin, the machine doing away with the necessity of the steps previously described and of using a number of workmen for accomplishing this purpose.

My invention is illustrated in the accompanying drawing wherein:

Figure 1 is an elevation of my machine partly broken away and showing in section a piston within the holder.

Figure 2 is a top plan view of the piston holder by itself.

Referring to the drawing, 10 designates a bench. Bolted to the bench is a U-shaped casting 11, that is, U-shaped in plan view as shown in Figure 2 and having its opposed portions just sufficiently separated as to receive in it and center a piston. The side portions of the casting 11 have two opposed bores 12 and 13.

Both side walls of the casting 11 have outwardly projecting hubs 14 cast thereon or otherwise connected thereto, to form bearings for the rams which operate through the bores 12, these bearings 14 being, of course, bored to register with the bores 12 and 13. Operating within the bore 13 is a ram 15, which is engaged adjacent its outer end by the fork 16 of a lever 17. This lever is pivoted on bearing brackets 18, the lower end of this lever below the pivot 19 being extended downward and laterally or to a position beneath the casting 11. A spring 20 is attached to the lower end of this lever and retracts the lower end of this lever so as to cause the upper end of the lever to be urged toward the casting 11, which casting constitutes the cylinder holder. The bearing openings 12 and 13 are provided with steel bushings or bearing sleeves 21.

Operating through the bore 12, that is, through the bearing sleeve 21 thereof, is a ram 22 which is provided intermediate of its length with an annular groove for the reception of the forked end 23 of a lever 24. This lever is pivoted upon a pivot pin 25 carried by the bearing brackets 26 which are bolted to the bench, and the lower portion of the lever 24 extends downward and then laterally to a point adjacent the lower end of the lever 17. The free end of the lever 24 is connected to a contractible spring 27 in turn connected to the bench in any suitable manner so that this spring 27 urges the lower end of the lever 24 upward and the forked end 23 outward away from the casting 11. The lower end of the lever 24 is provided with a depending portion 28 carrying a pedal 29 so that when the workman places his foot upon the pedal 29, the upper end of the lever 24 will be forced toward the casting 11 and will force the ram 22 through the aperture 12 and toward the opposite side wall of the casting 11.

The ram 22 has a longitudinally extending bore 30 which extends from the rear end of the ram nearly to the forward end thereof and communicates with the radial perforations 31 which open upon the exterior face of the ram. The rear end of the ram 22 is connected by a coupling 32 to an oil line pipe 33. This extends to an oil tank 34 which is preferably connected at its upper end to an air pressure line 35 having therein the pressure gauge 36 and the valve 37. The pipe 33 has therein the cut-off valve 38. The upper

end of the tank is provided, of course, with a filling opening and plug designated 39. I do not wish to be limited to the use of a pressure feed for the oil, as the oil might feed by gravity.

Disposed at the rear end of the bore 30 and controlling flow from the oil line 33 into this bore is a valve 40. This valve has a radially projecting arm 41 urged to a position closing the valve by means of the contractible spring 42. Extending from the ram 22 and communicating with the bore 30 is a nipple 43 with a coupling 44 whereby the nipple is connected to a flexible pipe 45 which extends to the left side of the mechanism, as shown in Figure 1, and is connected by a coupling 46 to a nipple 47 and discharges into a passage 48 which in turn discharges into an annular chamber 49. The steel bushing 21 of this wall of the piston holder or casting 11 is provided with two or more sets of circumferentially disposed oil holes 50 for the purpose of oiling the wrist pin of the piston as the latter is being forced out of the piston.

For the purpose of opening the valve 41 automatically as the ram 22 is advanced, I provide an angular pawl or valve actuating member 51 mounted upon the bench and having the form of a bell crank lever with its upwardly extending arm disposed in the path of movement of the valve arm 41. The horizontal arm of this lever 51 cannot move downward beyond its horizontal position but the vertical arm of this bell crank lever can move rearward. This valve pawl or trip is yieldingly held in its normal position against the stop 52 by means of a spring 53. It will be seen that as the ram 22 is moved forward that at the proper time the valve arm 41 will engage with the upwardly extending arm of the valve actuating device and the valve arm 41 will be moved rearward to permit oil to be supplied to the bore 30 and ejected through the perforations 31. As the ram moves further along, the arm 41 will pass the upwardly extending arm of the trip 51 and then the valve will be closed by the spring 42. Upon a reverse movement of the ram when the arm 41 contacts the upwardly extending arm of the trip 51, this trip lever 51 will turn against the action of the spring 53 to permit the valve arm 41 to pass.

Depending from the bench and just above the lower end of the lever 17 is an angular detent 54 and attached to the lower end of the arm 17 adjacent is extremity is a latch 55 angular in form, there being a spring 56 urging the latch in a direction to carry the beveled head 55*a* of the latch immediately beneath the angular horizontal portion of the detent 54. The pedal 29 is provided with a part 57 which normally extends beneath the horizontal portion or arm of the latch 51, so that when the lower end of the lever 24 is raised by the spring 27, this trip member 57 will engage the latch 55 and release it from its engagement with the detent 54.

Attached to the bench is a member 58 having two opposed limiting stop screws 59. These screw stops 59 are adjustable through lugs 60 carried by the member 58 and thus adjustably limit the movement of the lever 24.

The operation of this wrist pin oiler and rod connecter is as follows, it being understood that the left side bearing sleeve 21 is large enough in internal diameter to permit the wrist pin of the piston to clear the wall of the bearing, and it being also understood that the ram 22 on the right side must have a smaller diameter than the wrist pin in order to clear the bushing of the piston. The ram 15 can be allowed to project a little past the wall of the casting and then the piston would be slid in sideways to allow this ram to engage in the hole or recess in the end of the wrist pin or the ram 15 may be urged outward by a spring 15*a* stronger than spring 20 so that it will be slightly retracted to permit the piston to be readily slid into place. After the piston has been put in place within the holder or casting 11 with the ends of its wrist pin immediately opposite the bores 12 and 13, the operator forces downward on the pedal 29. This forces the ram 22 inward, this ram being of such length and the lever 24 having such stroke, that the ram 22 is forced entirely across the opening in the casting 11 and forces the wrist pin into the bore 13. This, of course, forces the ram 15 rearward against the action of the spring 20, and as this ram 15 is forced rearward, the lower end of the lever 17 moves upward and the latch head 51 engages over the angular detent 54, thus holding the ram 15 in its retracted position. Upon the forward movement of the ram 22, the valve 40 is opened and oil, therefore, flows out through the perforations 31, oiling the right hand bearing in the piston while at the same time oil is forced out through the apertures 50 in bearing sleeve 21 onto the wrist pin, thus oiling the entire length of the wrist pin. As soon as the lever 24 has reached the lower stop 59, the operator knows that the wrist pin has been forced fully outward and has been fully oiled and he releases the pressure upon the pedal 57. The spring 27 then draws the lower end of the lever 24 upward, retracting the ram 22. As the pedal 29 moves upward, the trip 57 strikes the annular end of the latch 55, releasing the head 55*a* from engagement with the detent 54, and the spring 20 then retracts the lower end of the lever 17, forcing the ram 15 toward the right in Figure 1, forcing the wrist pin back again into its bearings in the piston. The bearing on the right hand side of the piston in Figure 1 has been oiled through the apertures 31 in the ram and the bearing on the left hand side of the piston is oiled by lubricant applied to the wrist pin itself through the apertures 50 in bushing 21. When the lever 24 has struck the upper limiting stop 59, the wrist pin has been forced fully back into the piston in its proper position. During the operation above described, the operator picks up the connecting rod and when the wrist pin has been fully forced into the opposite hub by the ram 22 and after the ram 22 has been sufficiently retracted, the connecting rod is put in position inside the piston, then the left hand lever 17 is released by the trip 57 and forces the wrist pin back into position, as before described.

It will be understood that in the operation of this mechanism oil is spurted out through the perforations 31 and perforations 50 when the valve arm 41 strikes the trip 51, and only during this period. As soon as the valve arm is past the trip, the valve 40 closes and remains closed, therefore, for only a portion of the travel of the wrist pin is the oil spurted out. This oil spurts out as soon as the perforations 31 are opposite the right hand bushing of the piston. At this moment, the middle portion of the pin is in register with the openings 50 and oil is spurted out upon the middle portion of the pin. Upon the reverse movement, this pin is carried back and the oil on the middle portion of the pin is wiped off by the bushing in the piston and thus the

remainder of the pin becomes oiled. There is, therefore, oil on the middle of the pin and oil on the left hand side of the pin when the pin has returned to the position shown in Figure 1, while the right hand end of the pin has been oiled by the oil on the right hand bushing.

While I have illustrated a construction in which the pin B is only shifted to a position with the right hand end of the wrist pin in Figure 1 disposed inward of the inwardly projecting portion of the left hand piston bushing, yet it will be understood that by changing the throw of the ram operating levers, the wrist pin might be forced entirely into the left hand hub 14, this left hand hub, under these circumstances, acting to guide the pin back properly through the left hand hub of the piston.

It will be seen that by the means described, a single operator is enabled to remove the wrist pin from the piston, oil it, put the connecting rod in position and again project the wrist pin into proper place within the piston, thus doing away with the necessity of using three or four operations for this purpose with the corresponding workmen. Of course, it is obvious that a valve may be connected in the oil line which will control the amount of oil feed at each opening of the valve 40 so that only the proper and requisite amount of oil may be applied to the wrist pin at each operation of the machine.

I have illustrated a piston A disposed within the piston holder or casting 11 and I have shown for the purpose of elevating this piston to exactly the proper height for the rams to operate upon the wrist pin B, several piston rings, shims or like elements designated C, which may be disposed upon the bench, thus making the device adaptable to pistons of different lengths.

While I have illlustrated certain details of construction and the desired arrangement of parts, I do not wish to be limited thereto except as defined in the appended claims, as many minor changes may be made from the lay-out illustrated and described without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A wrist pin inserting and piston rod connecting mechanism including a piston holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings of the piston, opposed rams movable through said bores and means for forcing one ram inward to force the wrist pin through the wall of the piston and into the opposite bore containing the other ram and force this last named ram outward and successively retracting this first named ram while holding the second named ram from projection and then projecting the second named ram to force the wrist pin inward into its normal position in the piston.

2. A wrist pin oiling and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings of the piston, opposed rams movable through said bores, one of said rams having an oil containing chamber having perforations opening on the peripheral face of the ram and adapted to oil the wrist pin bearing of the piston as the ram passes therethrough, the wall surrounding the opposed bore for the other ram having oil inlet openings connected to a source of oil, and means for forcing the first named ram inward to force the wrist pin through the wall of the piston and into the bore containing the second named ram and thus force the second named ram outward to thereby uncover the oil openings therein to thus oil the wrist pin and successively retracting the first named ram while holding the second named ram from projection and then projecting the second named ram to return the oiled wrist pin to its normal position in the piston.

3. A wrist pin oiling and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings in the piston, opposed rams movable through said bores, one of said rams having an oil containing chamber, the chamber having perforations opening on the peripheral face of the ram, an oil inlet pipe conducting oil into said chamber, an oil pipe leading from said chamber in the first named ram, the wall surrounding the opposed bore having oil inlet openings with which said second named pipe communicates, and means for forcing the first named ram inward to force the wrist pin through the wall of the piston and into the bore containing the second named ram and thus force the second named ram outward to thereby uncover the oil openings therein and thus oil the wrist pin and successively retracting the first named ram while holding the second named ram from projection and then projecting the second named ram to return the oiled wrist pin to its normal position in the piston.

4. A wrist pin oiling and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings in the piston, opposed rams movable through said bores, one of said rams having an oil containing chamber, the chamber having perforations opening on the peripheral face of the ram, an oil inlet pipe conducting oil into said chamber, an oil pipe leading from said chamber in the first named ram, the wall surrounding the opposed bore having oil inlet openings with which said second named pipe communicates, means for forcing the first named ram inward to force the wrist pin through the piston wall and into the bore containing the opposed ram and thus force the last named ram outward to thereby uncover the oil openings therein and oil the wrist pin and successively retracting the first named ram while holding the second named ram from projection and then projecting the second named ram to return the oiled wrist pin to its normal position in the piston, and means for automatically opening communication between the chamber in the first named ram and the oil supply pipe thereto for a predetermined time on the forward movement of the second named ram.

5. A wrist pin inserting and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings of the piston, opposed rams movable through said bores, levers operatively connected to said rams at one end, one of said levers having a pedal whereby it may be depressed and the ram projected, means connected to the other lever for urging said lever in a direction to project its ram, means acting when the last named ram has been pushed outward by a wrist pin shifted by the action of the first named ram to hold the second named ram from projection under the action of its urging means, and means acting automatically upon the return of the lever of the first named

ram to its retracted position to automatically release the lever of the second named ram to permit this ram to be projected and the wrist pin returned to its normal position in the piston.

6. A wrist pin inserting and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings of the piston, opposed rams movable through said bores, levers operatively connected to said rams at one end, one of said levers having a pedal whereby it may be depressed and the ram projected, means urging the ram to its retracted position, means connected to the other lever for urging said lever in a direction to project its ram, means acting when the last named ram has been pushed outward by a wrist pin shifted by the action of the first named ram to hold the second named ram from projection under the action of its urging means, said means including a latch pivotally mounted upon the lever of the second named ram, a fixed keeper with which said latch is adapted to engage when the lever has been shifted to a position fully retracting the ram attached thereto, and means carried by the lever of the first named ram adapted to release said latch when the lever of the first named ram has been returned to its initial position.

7. A wrist pin oiling and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings of the piston, opposed rams movable through said bores, means for projecting one of said rams through its bore to force a wrist pin from the piston and simultaneously force out the opposed ram, means for oiling the bearing in the piston from which the wrist pin has been forced out and oiling the wrist pin as it is forced past the opposed bearing in the piston, means for retracting the first named ram and retaining the second named ram in its retracted position, and means successively acting to release the second named ram to permit it to return the wrist pin to its initial position.

8. A wrist pin oiling and piston rod connecting mechanism including a holder formed to receive a piston and having opposed bores adapted to register with the wrist pin openings of the piston, opposed rams movable through said bores, one of said rams having an oil containing chamber, the chamber having perforations opening on the peripheral face of the ram, an oil supply chamber containing oil under fluid pressure and connected to the chamber of the ram, the wall surrounding the opposed bore for the other ram having oil inlet openings and a tubular connection connecting said inlet openings with the oil containing chamber, a valve in said connection between the oil supply chamber and the oil containing chamber, the valve being carried by the first named ram and having an arm, the valve being urged to a closed position, means disposed in the path of movement of the valve arm and adapted to shift the valve arm to move the valve into open position until the valve arm has passed said means, said means being constructed to permit the reverse movement of the valve arm without affecting the valve, and manually operable means for forcing the first named ram inward to force the wrist pin through the wall of the piston and into the bore containing the second named ram to thereby force the second named ram outward, said means successively retracting the first named ram while retaining the second named ram from projection and then releasing the second named ram to permit it to return the wrist pin to its normal position in the piston.

CARL ADLER.