No. 661,323. Patented Nov. 6, 1900.

W. E. RICHARDSON.

OIL FEEDING MECHANISM.

(Application filed Aug. 20, 1900.)

(No Model.)

Fig. 1.

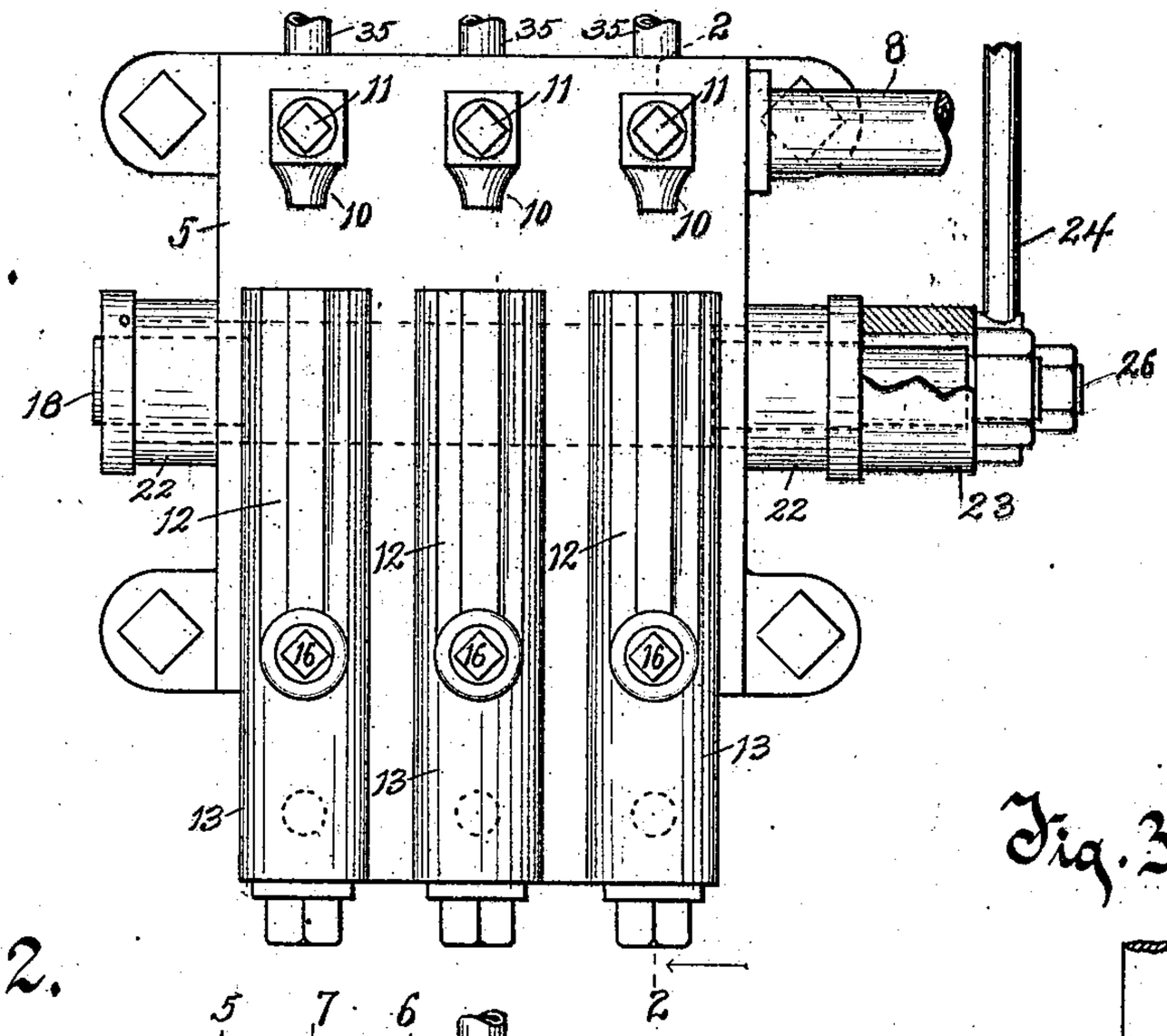


Fig. 2.

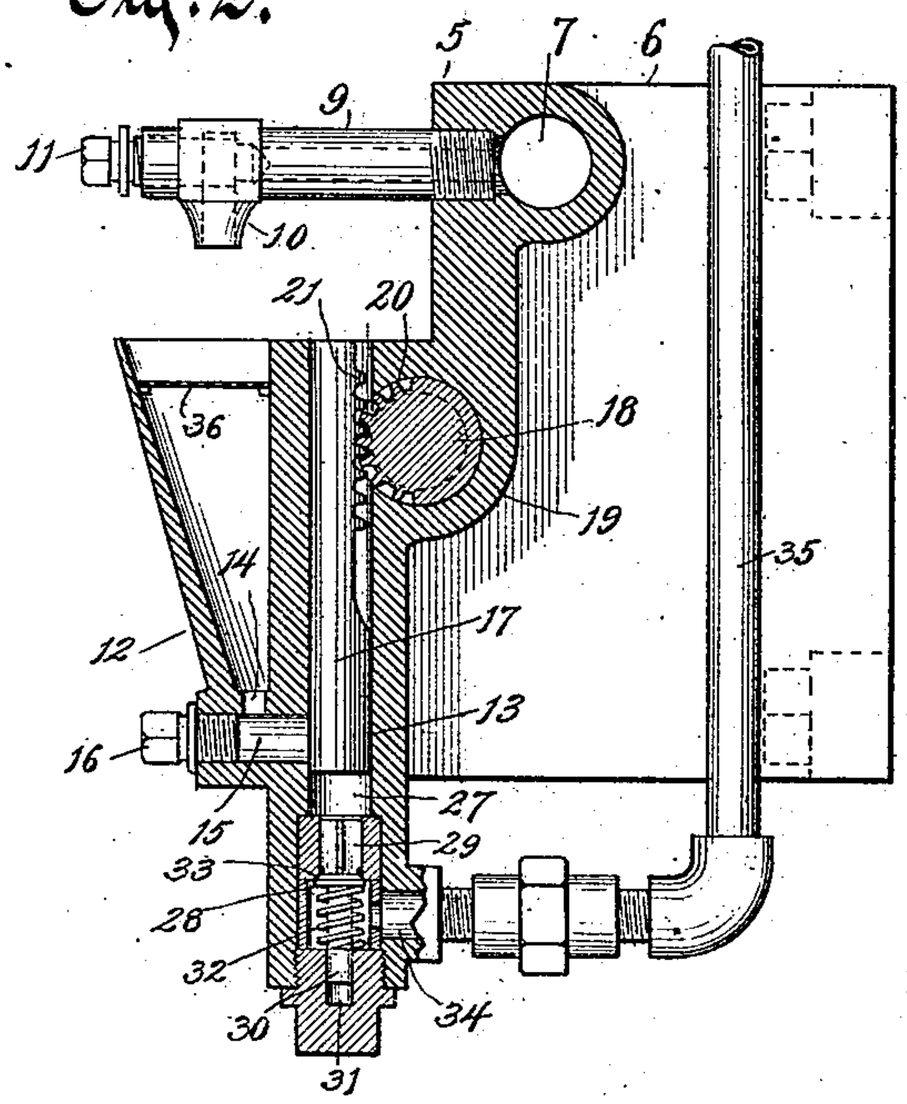


Fig. 3.

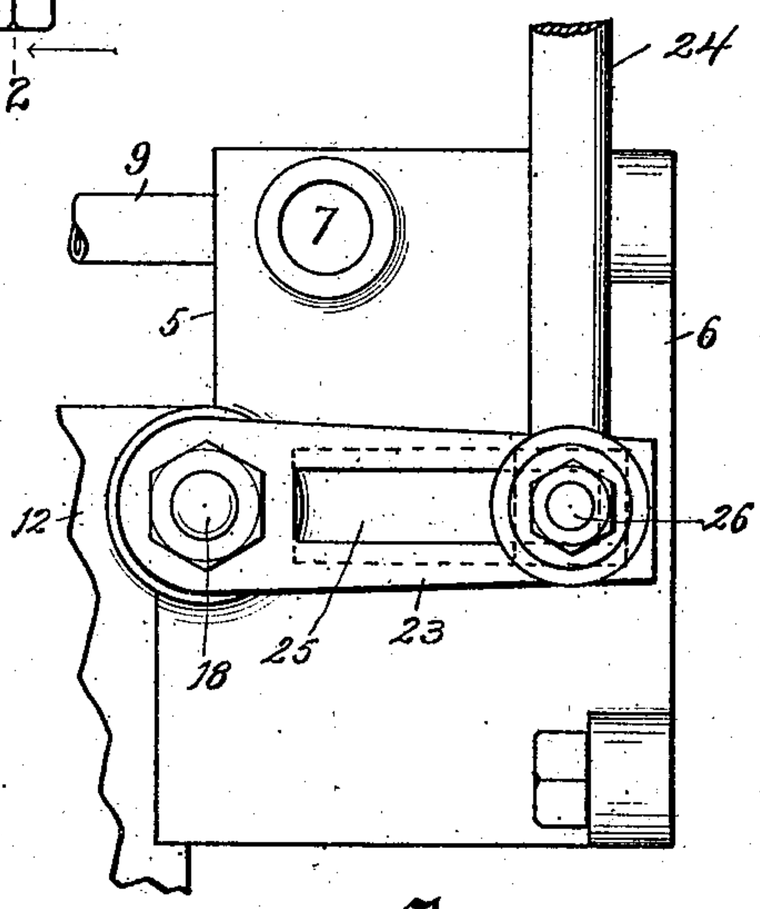
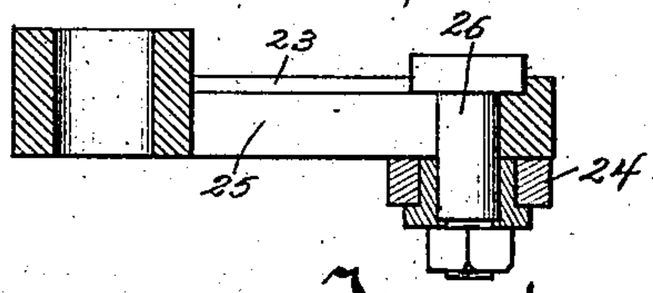


Fig. 4.



Witnesses.
C. A. Keeney.
Anna V. Faust.

Inventor.
Wilber E. Richardson.
By Benedict & Morsell.
Attorneys.

UNITED STATES PATENT OFFICE.

WILBER E. RICHARDSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF TO WILLIS S. SHERMAN, OF SAME PLACE.

OIL-FEEDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 661,323, dated November 6, 1900.

Application filed August 20, 1900. Serial No. 27,446. (No model.)

To all whom it may concern:

Be it known that I, WILBER E. RICHARDSON, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Oil-Feeding Mechanism, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in oil-feeding mechanism, more especially adapted, although not necessarily, for supplying lubricating-oil to the cylinder or cylinders of steam-engines. In this class of devices it is important that a force-feed should be provided for forcing the oil to the cylinders, and inasmuch as at certain times it is necessary to change the quantity of the feed it is of course desirable that the engineer should always be able to see and be positive as to the amount of oil which is being fed, and thereby enable him to change the quantity of feed at the proper time.

It is therefore the primary object of my invention to provide oil-feeding mechanism for the cylinders of steam-engines which shall combine in one structure a combination force-feed and sight-feed, the sight-feed enabling the operator to determine the actual amount of oil which is being fed.

With the above primary object in view the invention consists of the devices and parts or their equivalents, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a front elevation of the invention. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is an elevation of one end of Fig. 1, and Fig. 4 is a detail sectional view.

Referring to the drawings, the numeral 5 indicates a front plate of required thickness, and 6 6 rearwardly-extending flanges from the plate, the said flanges being bolted or otherwise secured to the frame of the engine. Across the upper portion of the plate extends a passage 7, and communicating with this passage is an oil-supply pipe 8, said pipe extending from any suitable source of oil-supply. Projecting out horizontally from the front of the plate and communicating at their inner ends with the passage 7 are short pipes 9, (three being shown in the accompanying drawings,) said pipes provided near their outer ends with discharge-nozzles 10, which nozzles are controlled by means of needle-valves 11. The plate is provided with a series of passage-ways 12, preferably in the form of oil cups or receivers. One of these cups or receivers is provided for each nozzle 10, and each cup is located below a nozzle, so as to receive the drippings from the nozzle. From the fact that the nozzles are located above the upper receiving ends of the oil cups or receivers it is evident that the quantity of oil dripping from the nozzles is plainly visible to the eye. The plate 5 is also provided with a series of pump-cylinders 13, corresponding in number to the number of oil cups or receivers and located, respectively, just back of and in communication with the oil-cups. In order to provide communication between each oil-cup and the pump-cylinder relating thereto, I prefer to provide the bottom of each oil-cup with an opening 14, which is in communication with a port or passage 15, the inner end of said port or passage communicating with the pump-cylinder near the lower end of said cylinder. In order to provide for gaining ready access to the port or passage 15 for the purpose of cleaning the same, I prefer to provide a screw-cap 16 for the outer end thereof. Communication between the oil-cup and cylinder may of course be provided for in any other desirable manner—as, for instance, a single passage may connect the lower end of each oil-cup directly with each cylinder. Within each cylinder is arranged a plunger or piston 17. Suitable means must be provided for reciprocating the several plungers simultaneously, and for this purpose I prefer to provide a rock-shaft 18, supported in a circular bearing 19 in the plate 5. This shaft has arranged thereon a series of teeth 20 of sufficient length to engage teeth 21 on the rear side of each plunger. The teeth 20, as shown, are arranged segmentally on the shaft. Means of course are necessary for imparting to the shaft 18 a rocking motion, and for this purpose I prefer to employ the construction shown in the accompanying drawings. As shown in the drawings, the ends of the shaft 18 extend beyond the ends proper of the plate, and for these extended ends of

the shafts tubular bosses 22 22 project outwardly from the ends of the plate. To one of the extended ends of the shaft 18 is connected an arm 23, and to this arm in turn is connected one end of a link 24, the opposite end of said link being connected to the rod (not shown) which actuates the counter or to any other suitable moving part of the engine or to any suitable portion of any other mechanism. The arm 23 is preferably provided with an elongated slot 25, and the connection between the link 24 and the arm is made by a pin 26, extending through the link and through the elongated slot of the arm. By the provision of this form of connection the link may be properly connected to the arm, so as to obtain the required throw of said arm at the time the parts are first assembled together.

The lower end of each pump-cylinder communicates with a valve-chamber 27, and in each valve-chamber is fitted a valve, which preferably consists of a disk portion 28, having wings 29 extending from the upper surface thereof and a stem 30 depending from the lower surface thereof and extending into a guide-recess 31. Each stem is surrounded by a coiled spring 32, which exerts an upward pressure against the under side of the disk and normally holds said disk against a valve-seat 33, formed in each valve-chamber. Each valve-chamber has extending therefrom a port or passage 34. A pipe 35 is connected to each port 34, and one of these pipes leads to the high-pressure cylinder of the engine, another of said pipes to the low-pressure cylinder, and the remaining pipe to the intermediate-pressure cylinder.

It is generally customary when an engine is first started to feed at about the rate of twenty drops of oil per minute to the cylinders and then after the engine is fairly started to reduce the feed to about seven drops per minute. In the operation of my invention, therefore, the needle-valves 11 are first adjusted, conveniently by means of a wrench, so as to feed the proper amount of oil, which, as just stated, should be about twenty drops at the start. The drippings of course are clearly visible by reason of the location of the nozzles. The oil first drops onto a perforated plate 36, which plate serves to hold back any foreign matter. The oil then passes through the perforations of the plates into the bottoms of the oil-cups 12 and through the openings 14 to the ports 15. When the engine is started, a rocking motion of course is imparted to the rock-shaft through the mechanism hereinbefore described. This rocking motion of the shaft causes the plungers to reciprocate continuously simultaneously, and on their upward movement the ports 15 are opened and the oil in the oil-cups, or so much thereof as is required to fill the cylinders below the plungers, is free to flow from the cups or will be sucked by the upstroke of the plungers into the cylinders, and by the succeeding downward movement of the plungers the ports 15 are closed and the oil in the cylinders below the plungers is forced into the valve-chambers 27 and through them and the pipes leading therefrom into the engine-cylinder. On the down movements of the plungers the ports 15 are gradually closed, and the oil beneath the plungers is forced against the valves 28 and against the steam-pressure in the engine-cylinders, the force overcoming the upward pressure of the springs 32 and causing said valves to move away from their seats. The oil now passes into the ports 34 and is forced upwardly in the pipes 35 to the respective cylinders. On the return upstrokes of the plungers the valves 28 are closed by the recoil of the springs 32, the suction of the plungers, and the steam-pressure in the cylinders, and the ports 15 are gradually opened by the plungers 17, and after this the operation described is continued as long as the engine continues to run. Now by the arrangement described the engineer is enabled at all times to see the amount of oil dripping from the nozzles, and hence if the needle-valves were adjusted in the first instance to feed a certain quantity—say twenty drops—the said engineer can at the proper time change the adjustment of said needle-valves so as to feed a diminished quantity of oil—say seven drops. In fact, any desired feed can be obtained at any time by simply changing the adjustment of the valves referred to, and the pumps will at all times feed whatever quantity the nozzles supply provided the supply is not greater than the capacity of the pumps.

While I have shown the several parts in triplicate, so as to feed the oil to three cylinders, yet I do not wish to be understood as restricting myself specifically thereto, inasmuch as the device may be adapted for feeding oil only to one cylinder or to two cylinders or to more than three cylinders without departing from the spirit and scope of my invention. It is also not absolutely necessary that the discharge-nozzles should be located above the cups or reservoirs 12 in order to make the quantity of oil which is being fed visible to the eye, inasmuch as the oil cups or reservoirs may be of transparent material and the nozzles extended directly therein.

The springs 32 not only serve to assist in returning the valves to closed positions, but also they act against any vacuum which might be in the space below the valves.

What I claim as my invention is—

1. In oil-feeding mechanism, the combination of a chamber, a visible feeding mechanism adapted to feed oil into the chamber, forcing mechanism adapted to act on the oil in the chamber, a conduit leading from the chamber, and through which conduit the oil is forced, said conduit leading to the mechanism to be lubricated, and a valve for preventing backflow of the oil.

2. In oil-feeding mechanism, the combina-

tion with a visible feeding mechanism for the oil, a receiver adapted to receive the oil from the feeding mechanism, a chamber in communication with said receiver, forcing mechanism adapted to act on the oil in the chamber, a conduit leading from the chamber, and through which conduit the oil is forced, said conduit leading to the mechanism to be lubricated, and a valve for preventing backflow of the oil.

3. In oil-feeding mechanism, the combination of a visible valve-controlled oil-feeding pipe, means for feeding oil to said pipe, a receiver to receive the oil from the oil-pipe, a chamber in communication with said receiver, forcing mechanism adapted to act on the oil in the chamber, and a conduit leading from the chamber, and through which conduit the oil is forced, said conduit extending to the mechanism to be lubricated; and a valve for preventing backflow of the oil.

4. In oil-feeding mechanism, the combination, of a visible oil-feeding pipe, means for feeding oil to said pipe, a receiver to receive the oil from the pipe, a plunger working in a suitable cylinder, said cylinder being in communication with the receiver, means for reciprocating the plunger, whereby the amount of oil which is visible is forced to the mechanism to be lubricated, a conduit leading from the cylinder of the pump mechanism to the mechanism to be lubricated, and a valve in the conduit, said valve adapted to move away from its seat upon one stroke of the plunger, in order to permit the oil to be forced through the conduit into the mechanism to be lubricated; and to move toward and against its seat on the reverse stroke of the plunger.

5. In oil-feeding mechanism, the combination of a plate having a series of pump-cylinders therein, valve-chambers in communication with the pump-cylinders, means for feeding oil to the pump-cylinders, plungers in the pump-cylinders, each plunger provided with a series of teeth, a rock-shaft having a series of teeth engaging the teeth of the plungers, said teeth on the rock-shaft being segmentally arranged and continuous along the shaft so as to engage the teeth of the different plungers, the untoothed portions of the shaft presenting a smooth bearing-surface, means for rocking the rocking shaft, valves within the valve-chambers, said valves adapted to move away from their seats upon one reciprocation of the plungers, and to move toward and against their seats upon the opposite reciprocation of the plungers. and conduits leading from the valve-chambers to the mechanism to be lubricated.

6. In oil-feeding mechanism, the combination of a plate formed with a passage into which oil is fed from any suitable source of supply, said plate also formed with an oil-receiver independent of said passage and with a pump-cylinder in communication with said receiver, and said plate further provided with a valve-chamber in communication with the cylinder, a plunger adapted to reciprocate in the pump-cylinder, a visible oil-dripping pipe extending from the feed-passage of the plate and adapted to drip the oil into the receiver, whereby the amount of oil which is visible is forced to the mechanism to be lubricated, a valve in the valve-chamber, and adapted upon one reciprocation of the plunger to move away from its seat, and upon the opposite reciprocation of said plunger to move toward and against said seat, and a conduit leading from the valve-chamber to the mechanism to be lubricated.

7. In oil-feeding mechanism, the combination of visible feeding mechanism for the oil, an open-top receiver to receive the oil from the feeding mechanism, a chamber in communication with said receiver, forcing mechanism adapted to act on the oil in the chamber, a conduit leading from the chamber, and through which conduit the oil is forced, said conduit leading to the mechanism to be lubricated, and a valve for preventing backflow of the oil.

In testimony whereof I affix my signature in presence of two witnesses.

WILBER E. RICHARDSON.

Witnesses:
WILLIAM C. LILLEY,
LUCINDA A. RICHARDSON.