

March 10, 1925.

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J. F. WILLIAMS

PUMPING DEVICE FOR OIL FUEL BURNERS

Filed Oct. 30, 1922

2 Sheets-Sheet 1

Fig. 1.

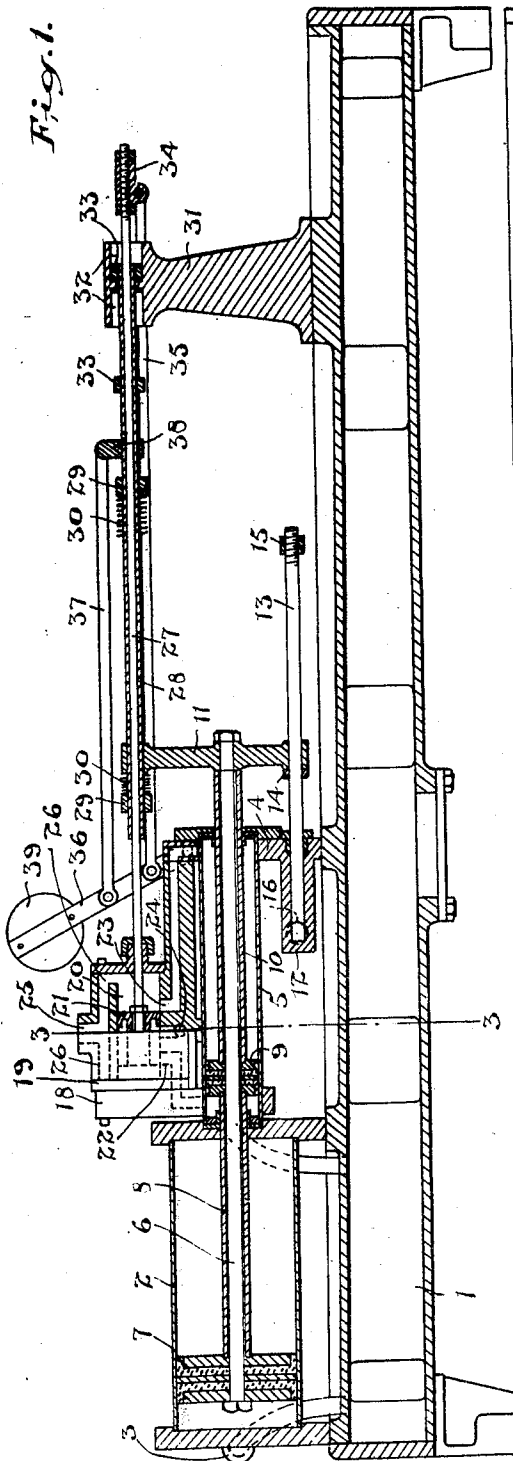
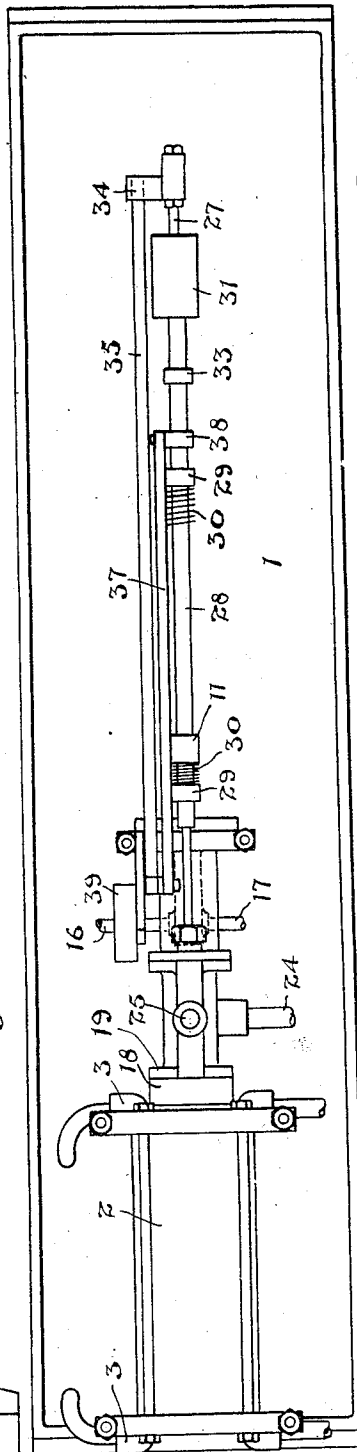


Fig. 2.



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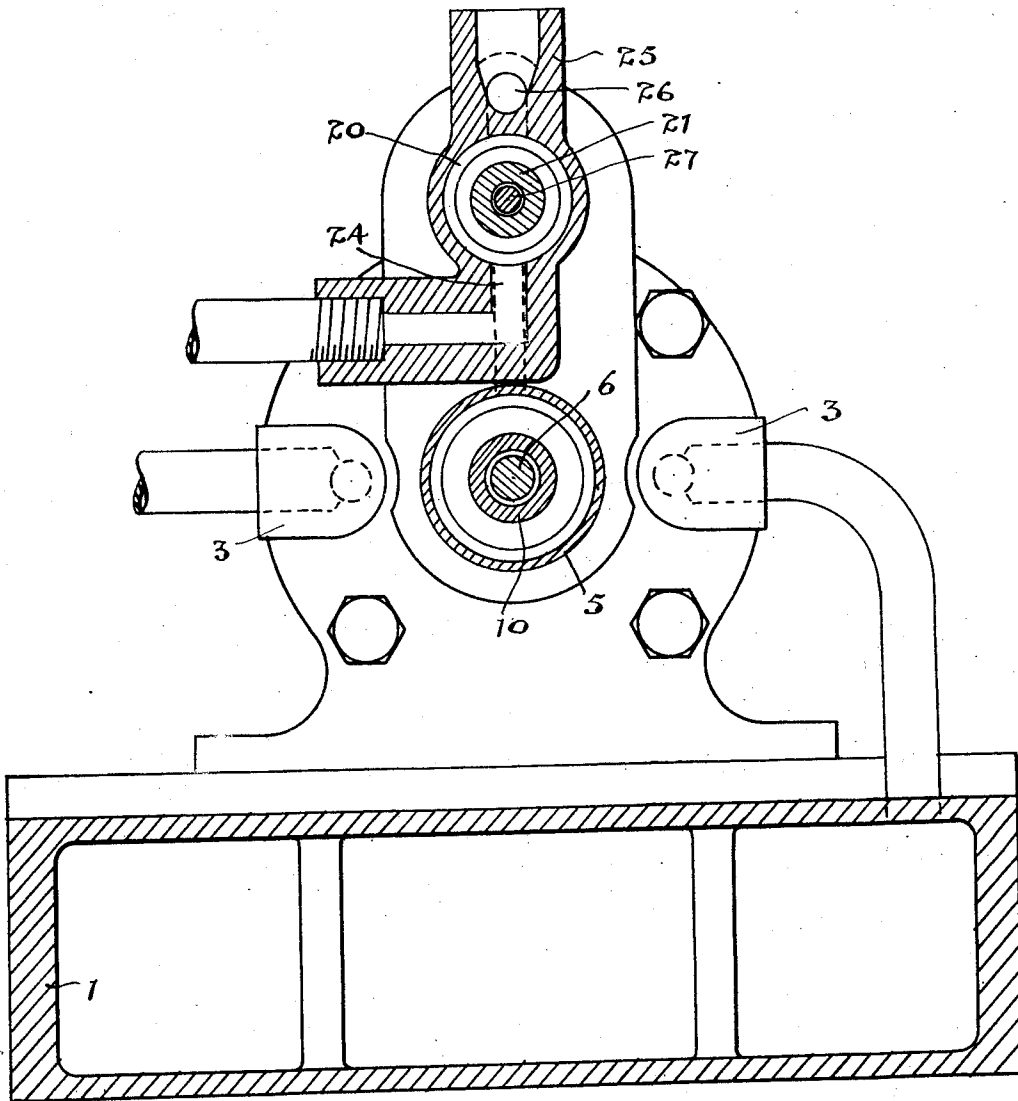


Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## PUMPING DEVICE FOR OIL-FUEL BURNERS.

Application filed October 30, 1922. Serial No. 598,049.

*To all whom it may concern:*

Be it known that I, JAMES FLEMING WILLIAMS, a citizen of the United States of America, and resident of the city of Hamilton, county of Wentworth, Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in a Pumping Device for Oil-Fuel Burners, described in the following specification and illustrated in the accompanying drawings that form part of the same.

The principal objects of this invention are, to produce a device which will operate an oil burner with high efficiency providing a ratio of oil and air supply to produce perfect combustion at various speeds of operation.

The principal feature of the invention consists in the synchronous operation of a reciprocating oil pump and a reciprocating air pump to deliver oil and air in a fixed ratio of volume to a burner.

A further important feature consists in the novel construction and arrangement in a unit structure of the air and oil pumps with a reciprocating water motor.

In the drawings, Figure 1 is a longitudinal mid-sectional view of the unit structure.

Figure 2 is a plan view.

Figure 3 is a cross section through the line 3-3 of Figure 1.

In the unit construction herein shown I have provided a hollow base 1 which forms an air receiver. On this base is mounted a reciprocating air pump 2 the ends of which are provided with suitable connections 3 to the base receiver.

A rigid support 4 secured to the base 1 and spaced from the air pump carries between it and the head of the air pump, the cylinder 5 of the water motor.

A piston rod 6 is rigidly secured to the air piston 7 and a spacing tube 8 encircles the rod and extends into the water motor cylinder abutting the piston 9.

A spacing tube 10 extends from the piston 9 through the head of the water motor and abuts the cross head 11, the piston rod extending therethrough and being secured to the outer side of said cross head.

An oil pump cylinder 12 is supported in the rigid support 4 below the water cylinder and the pump plunger 13 arranged parallel with the piston rod 6 extends through the

lower end of the cross head 11 being provided with a stop 14 intermediate of its length and a nut 15 forming an adjustable stop on the outer end.

The oil pump is provided with a suction pipe 16 leading to an oil supply and a discharge pipe 17 leading to a burner mechanism, suitable check valves being arranged in such pipes. These valves are not shown as they are of a common construction.

A water head 18 is arranged upon the water cylinder at the end adjacent to the air pump, it being rigidly secured to the air pump head.

A valve chest 19 is secured to this water head and is provided with a cylindrical valve chamber 20.

In the valve chamber 20 is arranged a piston valve 21 and this valve cooperates with the ports 22 and 23 leading to opposite ends of the water cylinder and the inlet port 24 arranged centrally therebetween.

The port 23 leads through the rigid support 4.

A water outlet 25 leads from the top of the valve chest 19 being connected with the valve chest by the ports 26 leading from the ends.

The piston valve is secured to the valve rod 27 which extends parallel with the pump rod 6 and said rod is encircled by a sleeve 28 which is slidable thereon and which extends through and is slidable in the cross head 11.

29 are collars secured on the sleeve 28 one each side of the cross head and spiral springs 30 are arranged at the inner sides of the collars and formed shock absorbers to relieve the shock of the cross head.

The sleeve 28 is slidably supported in a standard 31 and each side of the sliding support within the standard are arranged dash pots 32.

Pistons 33 are secured to the sleeve each side of the standard 2 to operate in the dash pots.

At the outer end of the valve rod is adjustably secured a valve rod clevis 34. To this clevis is pivotally connected a link 35 which extends substantially parallel with the valve rod and is pivotally connected to the control arm 36 pivotally mounted at one side of the valve chest.

A link 37 is pivotally connected to the control arm 36 above the link 35 and extends forwardly substantially parallel with the

valve rod and is connected to a clevis 38 secured to the sleeve 28 mounted on the valve rod 27.

5 A control weight 29 is adjustably mounted on the arm 36.

In the operation of this device, the water under pressure is fed to the valve chest and is directed by the valve to either end of the water motor cylinder. The pressure acting  
10 against the piston moves the piston rod longitudinally thereby operating the piston of the air pump to compress the air therein forcing it through the conduits provided into the receiver, which is here shown and  
15 described as a hollow base.

Concurrently the cross head 11 is operated and as the piston approaches the end of its stroke the cross head engages either of the stops on the oil pump plunger moving the  
20 plunger in or out as the case may be. The cross head also slides upon the sleeve 28 encircling the valve rod and striking either of the springs 30 it carries the sleeve with it, said sleeve sliding upon the rod and in  
25 its bearing in the standard 31. The pistons 33 enter the dash pots 32 to cushion the stroke. The clevis 38 moving with the sleeve 28 through the link 37 operates the control arm 36 swinging it upon its pivot.

30 The operation of the control arm operates the link 35 which is connected to the valve rod 27 and the position of the valve is shifted in the valve chest to change the direction of flow of the water and thus reverse  
35 the movement of the entire mechanism.

The reciprocating action of the pumping unit thus described may be regulated by the adjustment of the flow of the water to the valve chest and concurrently as the flow is  
40 increased so is the speed of operation accelerated.

It is extremely important to note that the oil pump and air pump are connected together to operate in unison and when their  
45 relative dimensions have been properly fixed the increase in the speed of operation does not alter the conditions of combustion of the oil fuel because the flow of air to the

burner is increased proportionately with the flow of oil.

The device is extremely compact and easy to operate. The parts are of the simplest nature, cheap to construct but strong and durable and owing to the slow speed of the mechanism the parts will operate practically indefinitely without necessity for renewal or repair and owing to the slow speed of the apparatus there will be no detrimental noise such as is found in high speed units.

The unit herein shown illustrates a reciprocating water motor as operating reciprocating air and oil pumps but it must be understood that other types of motors may be substituted without departing from the spirit of the invention which is to manipulate the air and oil pumps in synchronism.

What I claim as my invention is:

1. A pumping device for oil fuel burners, comprising an air pump, an oil pump arranged in parallel relation to the air pump, a piston rod extending from the air pump, means for reciprocating the piston rod, a plunger extending from the oil pump, a cross head carried by the air pump, piston rod engaging the oil pump plunger, and stops arranged upon the oil pump plunger to engage the cross head carried by the air pump.

2. A pumping device for oil fuel burners comprising a base, air and water cylinders arranged in axial alignment on said base, a piston rod extending through said air and water cylinders and having pistons thereon, a cross head secured to the piston rod, an oil pump operatively connected with said cross head, a valve controlling the flow of water to the water cylinder, a valve rod extending from said valve, a sleeve encircling the valve rod and slidably engaging the cross head, stops arranged upon said sleeve to be engaged by said cross head, a pivotal arm, a link connecting said pivotal arm with said sleeve, and a link connecting said arm with said valve rod.

JAMES FLEMING WILLIAMS.