Dec. 1, 1942. J. M. WILLOWS 2,303,872

STOKER MOTOR

Filed Jan. 12, 1940 2 Sheets-Sheet 1

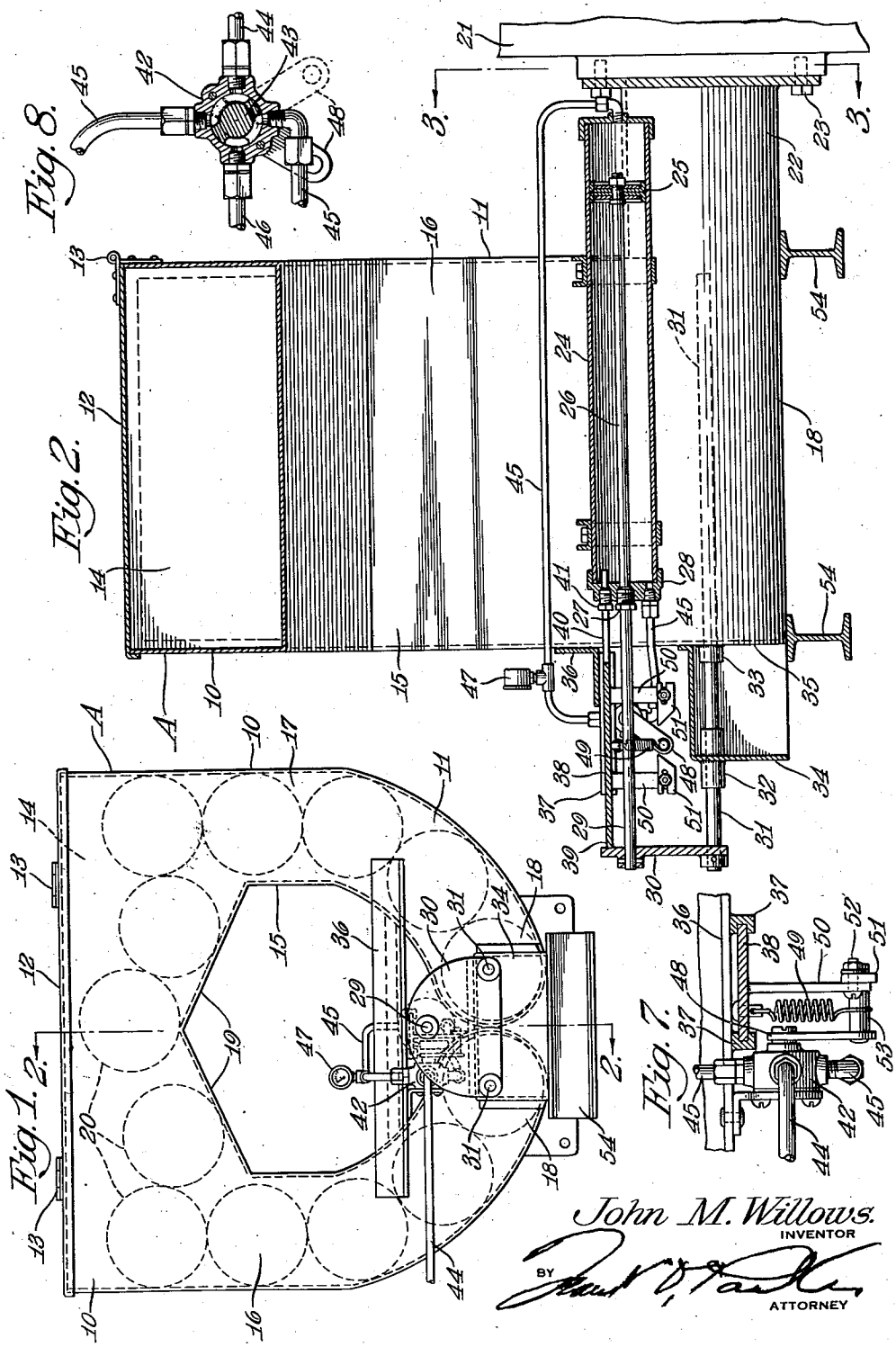


Fig. 8.

Fig. 2.

Fig. 1.

Fig. 7.

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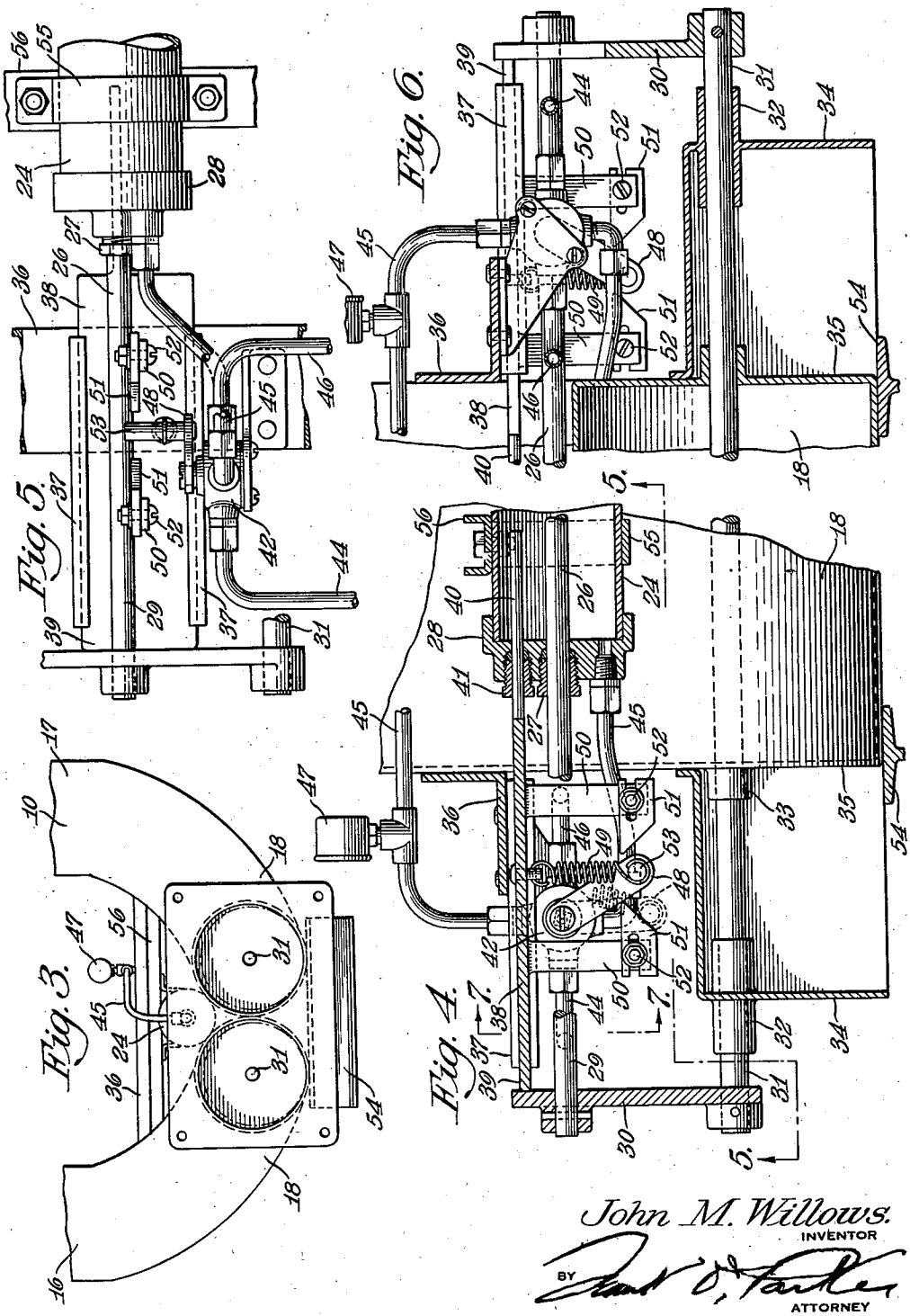


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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STOKER MOTOR

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Application January 12, 1940, Serial No. 313,618

3 Claims. (Cl. 121—164)

The invention relates to a stoker apparatus and more especially to a briquette fuel stoking machine for furnaces or the like.

The primary object of the invention is the provision of a machine of this character, wherein the fuel magazine thereof delivers concurrently several units of fuel to the fire box or the like, of a furnace for the burning of such fuel, the delivery being continuous and automatically performed, so that hand feeding of fuel is entirely dispensed with when the furnace is in operation and the machine working.

Another object of the invention is the provision of a machine of this character, wherein the same is operated hydraulically, and included in the system thereof is a four-way valve which is controlled by a trip and in this manner, the automatic action of a stoker is assured with a certainty of operation.

A still further object of the invention is the provision of a machine of this character, wherein the construction thereof assures adaptation to different makes of furnaces, stoves, or other fuel burning apparatuses, the machine being novel in its entirety.

A still further object of the invention is the provision of a machine of this character, wherein its construction is such to permit of the fueling of briquettes in the form of logs composed of pressed sawdust known as "Pres-To-Logs," two of these at a time successively fed into the furnace, stove, or the like apparatus from the machine during the working thereof.

A still further object of the invention is the provision of a machine of this character, which is simple in its construction, thoroughly reliable and efficient in operation, requiring little or no attention, automatically operated, and inexpensive to manufacture and install.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, which disclose the preferred embodiment of the invention, and pointed out in the claims hereunto appended.

In the accompanying drawings—

Figure 1 is an elevation of the machine constructed in accordance with the invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is an enlarged fragmentary sectional view, similar to Figure 2.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4, looking in the direction of the arrows.

Figure 6 is a sectional view similar to, but reversed from that in Figure 4.

Figure 7 is a sectional view, taken on the line 7—7 of Figure 4, looking in the direction of the arrows.

Figure 8 is a sectional view directly through the valve plug and casing showing by full lines one position of the plug and by dotted lines another position thereof.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail A designates generally the machine constructed in accordance with the invention, which comprises a fuel magazine forming a hopper 10 provided with a rounded lower portion 11 and an open top closed by a cover or lid 12, preferably hinged at 13 for opening and closing movements.

This hopper 10 effects interiorly thereof, a chamber 14, which by a tubular core 15 arranged horizontally therethrough approximately at the center of the magazine A creates gravity supply throats or shoots 16 and 17 respectively. These shoots are brought together curvilineally at their lower ends into terminal parallel juxta-relation to each other at 18. The upper portions of said throats or shoots are communicative continuous of the chamber 14.

The tubular core 15 at its top is formed with reveresly sloping crown or roof portions 19 so that fuel units in log form 20, known as "Pres-To-Logs" will gravitate into the shoots or throats 16 and 17 for location at the terminals 18, and there are fed as fuel into a furnace or the like, a portion of the furnace or the like being indicated at 21 for the stoking of the same.

The terminals 18 at the extensions 22 of the same are suitably joined at 23 with the furnace or the like 21 for the delivery of the logs 20 therein in the stoking operation of the machine as will be hereinafter fully described.

Arranged at the core 15 is a piston cylinder 24 being located mid-way with relation to the terminals 18 and parallel thereto. In the cylinder 24 is a reciprocator piston 25, its stem 26 being extended outwardly through a packing gland 27 in the end 28 of the cylinder 24 so that an end 29 will be wholly without the cylinder. This end 29 carries a stoker head 30.

Fixed to the head 30 is a pair of feed plungers 31 which operate within the terminals 18 of the shoots or throats 16 and 17 to contact and move the logs 20 in single order from the said terminals into the furnace or the like 21. The plungers 31 work through guides 32 and 33 respectively. The guide 32 is a part of a hood 34 on the outer closed ends 35 of the terminals 18, while the guides 33 are a part of the said ends 35.

Above the end 29 of the stem 26 and fixed to the magazine A is a bracket 36, having spaced tracks 37 interfitted with a movable carriage 38, the outer end 39 of which is in the path of travel of the head 30 for the displacement of the carriage 38 thereby when the piston 25 shifts in one direction within the cylinder 24. The carriage 38 at the other end is formed with a pusher rod 40 extending through a packing gland 41 into the cylinder 24 in the path of the piston 25 when shifting in the other direction within the said cylinder.

Supported close to the tracks 37 at one side thereof is a valve casing 42 having therein a four-way valve 43 for water discharge under pressure from a supply pipe 44 into the cylinder 24 alternately at opposite sides of the piston 25 therein through leads 45, the waste water being delivered from the cylinder 24 by a pipe 46. A pressure gauge 47 is included in the water control system just referred to.

The turn valve 43 is fitted with a throw arm 48 to which is connected a snap acting spring 49, the latter being also connected with the carriage 38. The carriage 38 has depending therefrom at opposite sides of the axis of movement of the throw arm 48, hangers 50 fitted with adjustable trips 51. The adjustment of each trip 51 is had at 52 for regulating the action of the valve 43. These trips 51 are in the path of a striker lug 53 so as to move the turn valve for its proper adjustment in control of the water let into the cylinder 24 and delivered therefrom in the working of the piston within said cylinder.

The piston operating within the cylinder 24 actuates the plungers for the feed of a pair of logs from the terminals 18 into the furnace for the stoking thereof.

The alternate movement of the carriage 38 which is actuated by the piston 25 in the said cylinder 24, controls the operation of the plungers. This movement of the carriage 38 with the trips 51 thereon assures positive valve movement at proper intervals and the feed valve 43 automatically operated for the stoking operation of the machine. The spring 49 effects quick action of the throw arm 48 after the latter has moved past the axis of the valve 43 for the control of the operation of the piston 25 in the working of the stoking machine.

The flow of water in the supply pipe 44 may be shut off in any suitable manner as well as in the restoring of the flow of such water.

In the operation of the machine when the water under pressure is discharged into the piston cylinder 24 the piston 25 is reciprocated and through its connection with the plungers 31 these operate to continuously deliver a pair in single order of the logs 20 into the fire box of the furnace or the like 21 for the stoking of the latter. The carriage 38 is moved by the piston which reciprocates within said cylinder 24. With the carriage 38 move the trips to actuate the valve plug 43 for the control of the flow of water to opposite sides of said piston 25 for its operation. In this manner the machine is active for the continuous stoking of the logs within the furnace or the like.

The machine magazine A is sustained on a foundation 54, the cylinder 24 being hung at 55 from cross pieces 56 within the core or otherwise.

What is claimed is:

1. In a stoker mechanism, a cylinder, supporting means for said cylinder, a reciprocal piston in said cylinder and including a stem extending from said cylinder, a reciprocal carriage slidably supported by said means, a head secured to the stem and extending in the path of the carriage for slidably moving the said carriage in one direction and connected to a ram for the reciprocation thereof, a pusher rod secured to the carriage and extending into the cylinder to be engaged by the piston for sliding the carriage in an opposite direction, a fluid pressure pipe system connected to opposite ends of the cylinder, a control valve connected in said system for alternately admitting and exhausting fluid pressure to and from the ends of the cylinder for reciprocating the piston, and means for operating said valve by the reciprocation of the carriage.

2. In a stoker mechanism, a cylinder, supporting means for said cylinder, a reciprocal piston in said cylinder and including a stem extending from said cylinder, a reciprocal carriage slidably supported by said means, a head secured to the stem and extending in the path of the carriage for sliding the said carriage in one direction and connected to a ram for the reciprocation thereof, a pusher rod secured to the carriage and extending into the cylinder to be engaged by the piston for sliding the carriage in an opposite direction, a fluid pressure pipe system connected to opposite ends of the cylinder, a control valve connected in said system for alternately admitting and exhausting fluid pressure to and from the ends of the cylinder for reciprocating the piston, and including an operating arm, a coil spring connected to said arm and to said carriage to provide a snap action to the valve, and trip means carried by said carriage for coaction with the arm to operate the valve by reciprocation of the carriage.

3. In a stoker mechanism, a cylinder, supporting means for said cylinder, a reciprocal piston in said cylinder and including a stem extending from said cylinder, a reciprocal carriage slidably supported by said means, a head secured to the stem and extending in the path of the carriage for slidably moving the said carriage in one direction and connected to a ram for the reciprocation thereof, a pusher rod secured to the carriage and extending into the cylinder to be engaged by the piston for sliding the carriage in an opposite direction, a fluid pressure pipe system connected to opposite ends of the cylinder, a control valve connected in said system for alternately admitting and exhausting fluid pressure to and from the ends of the cylinder for reciprocation of the piston, and including an operating arm, a coil spring connected to said arm and to said carriage to provide a snap action to the valve, hangers secured to the carriage, and trip elements adjustably secured to said hangers to alternately engage said arm during the reciprocation of the carriage for operating the valve.

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