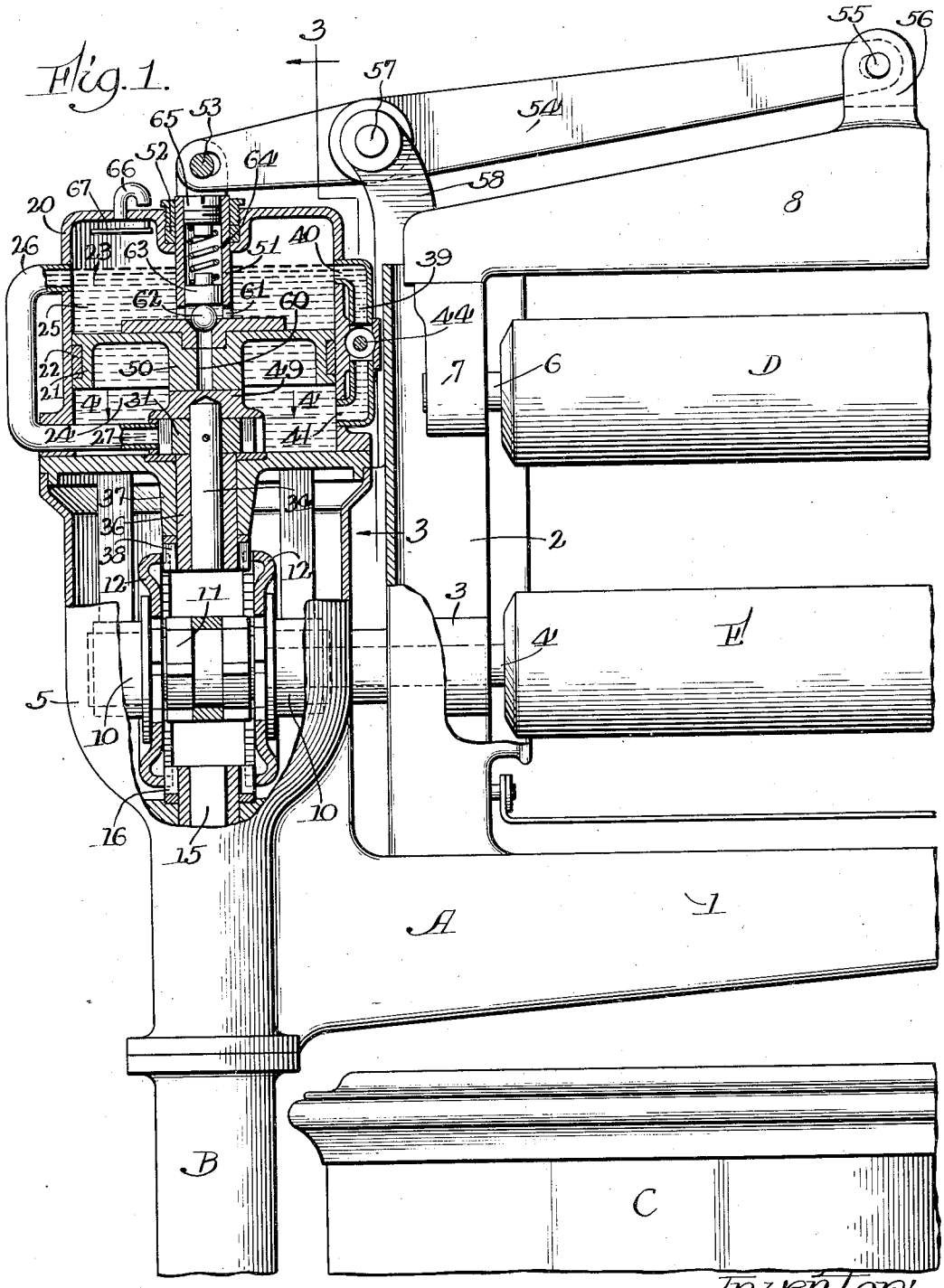
Feb. 11, 1936. J. T. HUME 2,030,256

HYDRAULIC ACTUATING MECHANISM FOR DOMESTIC LAUNDRY APPLIANCES

Filed May 10, 1933 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

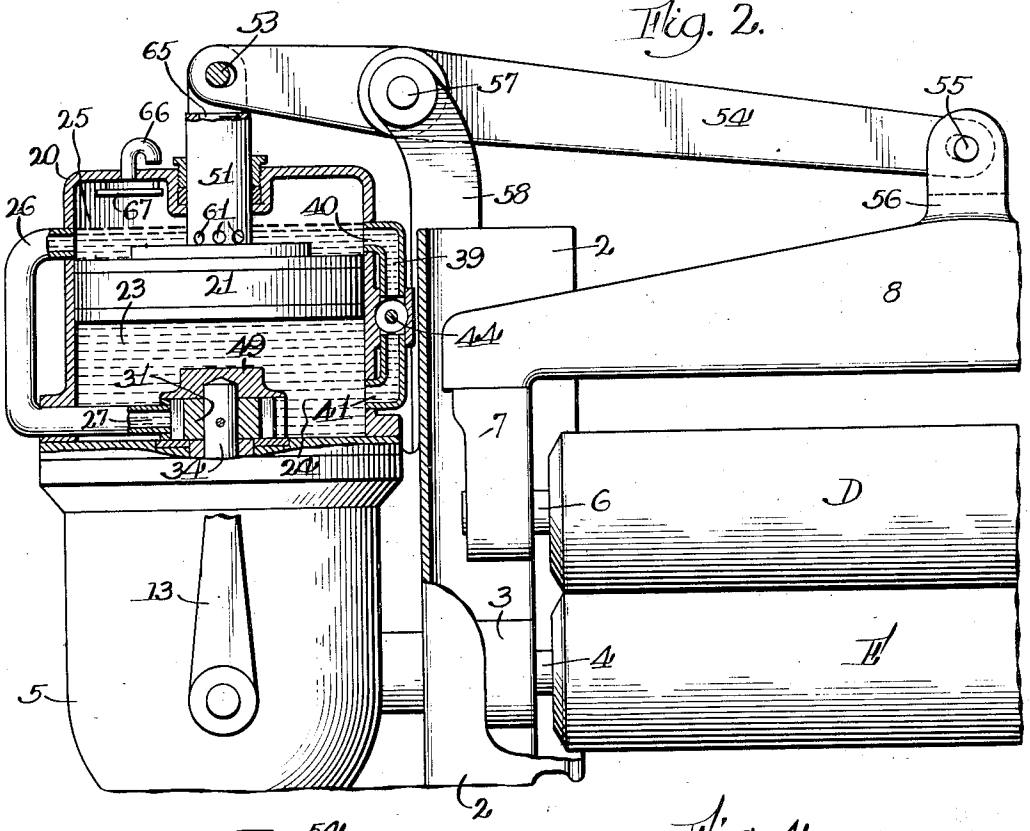


Fig. 3.

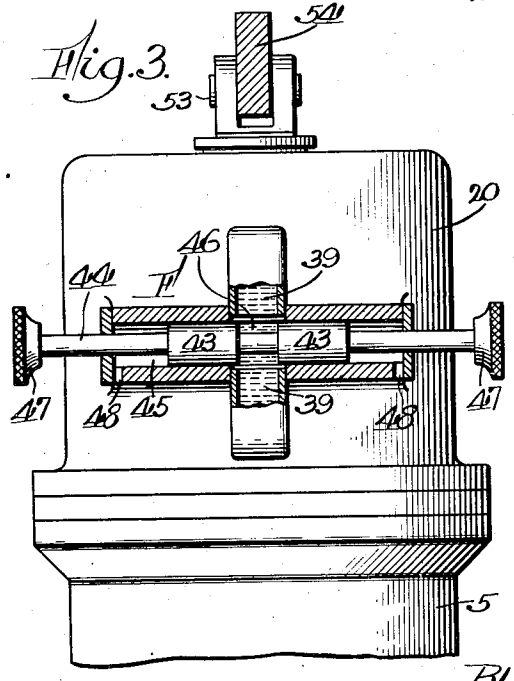
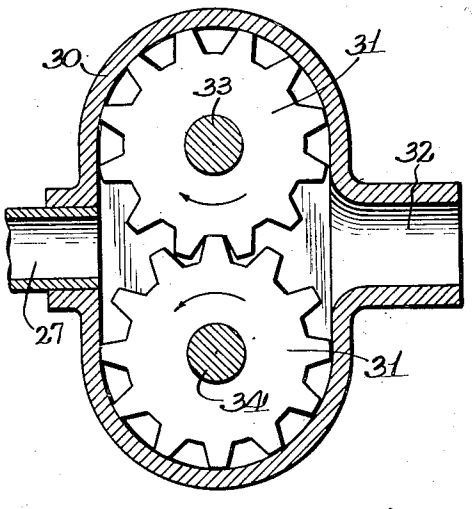


Fig. 4.



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Patented Feb. 11, 1936 2,030,256

UNITED STATES PATENT OFFICE

2,030,256

HYDRAULIC ACTUATING MECHANISM FOR DOMESTIC LAUNDRY APPLIANCES

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Application May 10, 1933, Serial No. 670,263

7 Claims. (Cl. 68—32)

My invention relates to improvements in domestic laundering appliances such as ironing machines and wringers for domestic washing machines.

Domestic laundering appliances employ pressure elements between which the clothes are placed and by which pressure is applied to the clothes in accordance with the particular operation. In the wringers of washing machines, these pressure elements are in the form of parallel rolls which are relatively rotatable for squeezing the water from the clothes placed therebetween and which are relatively movable toward and from each other whereby the rolls can be separated during normal operating conditions or under emergency conditions as when the operator's fingers or hands become caught between the rolls. In domestic ironing machines the pressure elements are represented by a rotating roll and a shoe movable towards and from the roll and adapted to apply ironing pressure to the clothes placed between the roll and the shoe.

The purpose of my invention is to provide hydraulically actuated mechanism for the application of pressure between the pressure elements.

A further object of the invention is to provide a hydraulically actuated mechanism capable of adjustment to and maintenance of any desired degree of pressure between the pressure elements and capable of being quickly released either under normal or emergency conditions.

Another object of the invention is to provide a simple hydraulically actuated device, rigid and self-contained, in a construction enclosed in a completely sealed, non-leakable housing and especially adapted for the operation of the movable pressure element of domestic appliances.

A further object is to provide a simple control device for bringing the mechanism into and out of operation and which is so positioned and arranged as to serve as a release device if the occasion requires that the pressure be released either under normal or emergency conditions.

Other objects of the invention will appear hereinafter.

My invention is embodied in the combination and arrangement of parts exemplified by the structure illustrated in the drawings and hereinafter described and claimed.

In the accompanying drawings the invention is illustrated as embodied in the wringer mechanism of a domestic washing machine.

Referring to the drawings,

Fig. 1 is a view in elevation of a portion of the wringer and hydraulic actuating mechanism, the housing of the hydraulic mechanism being broken away and interior operating parts being shown in section to better illustrate the construction and operation thereof;

Fig. 2 is a view similar to Fig. 1, showing the hydraulic actuating mechanism and wringer rolls in a different position;

Fig. 3 is a detail sectional view substantally on the line 3—3 of Fig. 1, illustrating the construction of the control valve; and

Fig. 4 is a horizontal detail section on the line 4—4 of Fig. 1, illustrating the interior of the pressure pump.

In the structure shown in the drawings, the wringer, including its frame, may be of the type generally associated with domestic washing machines. The wringer frame A extends laterally from a standard B positioned vertically alongside of the tub C of the washing machine, this wringer frame A being mounted on the upper end of the standard B to swing to different positions relatively to the tub. The lower frame member 1 of the wringer frame has two upright channeled standards or members 2 spaced apart and between which the rolls D and E are positioned, although the drawings illustrate only one of these standards 2. It is to be understood, of course, that the other upright 2 is a duplicate of the one shown and is positioned at the outer end of the horizontal member 1 of the wringer frame. The uprights 2 have bearings 3 in which the shaft 4 of the lower wringer roll E is mounted. This shaft extends into the head or housing 5 which is formed as a part of the wringer frame.

The upper roll D has a shaft 6 which is journaled at its ends in the hanger members 7 of a yoke 8, and this roll, by means of the yoke 8, is adapted to be bodily moved into and out of pressure relation with the lower roll E, whereby the rolls can be widely separated. The end portions of the yoke 8 and the hanger members 7 are guided vertically by means of the channeled uprights 2 of the wringer frame.

In the housing or head 5, the roll shaft 4 is journaled in suitable bearings 10 spaced apart to provide for a clutch member 11 and a pair of gears 12. The clutch is movable in either direction between the two gears 12 and connects the shaft 4 with whichever one of the gears the clutch engages so that the roll E may be driven in either direction. Outside of the housing 5 is a clutch lever 13 by which the clutch member may be shifted as desired.

A power shaft 15 extends upwardly in the standard B into the head 5 and carries at its

upper end a gear 16 which constantly meshes with and drives both of the gears 12. Since the gear 16 is positioned between and meshes with both gears 12, the gears 12 will be rotated in opposite directions and impart opposite directions of rotation of the roll E, depending upon whichever gear 12 is connected by the clutch to the roll shaft 4. The power shaft 15 may be driven by any suitable means, such as an electric motor (not shown) which is generally used for machines of this type and which is generally positioned beneath the tub C.

Mounted upon the upper end of the head 5 is an upright cylindrical casing 20 forming in effect a cylinder in which a vertically movable piston 21 is positioned. This piston is provided with suitable sealing rings 22 and forms a movable partition which divides the cylinder casing into upper and lower compartments 23 and 24, the lower compartment 24 comprising a pressure compartment and the upper one an overflow or reserve compartment for the body of fluid 25 such as oil which is utilized as the medium for applying pressure to the piston.

A conduit pipe 26 is connected at its upper end to a port in the wall of the upper compartment of the casing and forms an outlet for said upper compartment. The lower end of the conduit 26 extends into the casing and connects with the inlet 27 of a rotary pressure pump positioned in the lower compartment. This pump is preferably of the gear type and comprises a casing 30 in which a pair of tooth members or gears 31 are rotatable. The ends of the casing are rounded to conform to the periphery of the gears and closely fitted to the gears so that when the gears are rotated, as in pumps of this type, the fluid which enters the casing through the inlet port 27 is carried around by the gears and discharged under pressure from the outlet 32 of the pump casing. The pump gears are mounted upon shafts 33 and 34 which are journaled in suitable bearings in the pump casing 30.

In the present structure the pump is disposed horizontally and the gears rotate in a horizontal plane and the shaft 34 is extended downwardly into the head 5 through a suitable sleeve 36 which is keyed to the shaft 34 and which is journaled in an elongated bearing 37 formed on the upper wall of the head 5. At its lower end, the sleeve 36 carries a pinion 38 which meshes with and is driven by the constantly rotating gears 12 hereinbefore described, so that as long as the main power shaft 15 is rotating, the shaft 34—and consequently the gears of the pump—would be maintained constantly in operation.

The outlet 32 of the pressure pump discharges into the lower or pressure compartment 24 of the cylinder beneath the piston 21, and the pump is constantly withdrawing oil from the upper compartment and discharging it into the lower compartment under pressure, thus forcing the piston upwardly in the cylinder. A by-pass 39, formed in an enlargement at the side of the cylinder casing 20, connects with the upper and lower compartments through the ports 40 and 41, respectively, these ports communicating with the respective compartments beyond the range of movement of the piston so that they will not be covered at any time by the piston.

Since the by-pass connects the upper and lower compartments of the cylinder, the fluid under pressure which is discharged by the pump into the lower compartment, will flow through the by-pass to the upper compartment and the pump will simply circulate the oil or fluid through the two compartments around the piston and no pressure will be applied to the piston. However, when pressure is to be applied to the piston to force it upwardly in the cylinder, the by-pass 39 can be closed and the fluid thereby prevented from circulating into the upper compartment. The pressure developed in the lower compartment therefore causes the piston to rise in the cylinder and, through the medium of mechanism hereinafter described, operates to bring the upper wringer roll D down into pressure relation with the lower roll E.

The control of the by-pass passage 39 is accomplished by means of a slide valve F shown more clearly in Fig. 3. This control valve comprises two small cylinders 43 mounted upon a control rod 44 and arranged to slide horizontally in a cylindrical valve chamber 45 formed in an enlargement of the cylinder casing 20. The valve members 43 are spaced apart on the valve rod 44 so that when said valve members are positioned as shown in Fig. 3, with the space 46 in alignment with the by-pass 39, it forms a continuation for the by-pass whereby the fluid can circulate through said by-pass. The valve is provided with two valve members 43 so that it can be shifted in either direction to close or open the by-pass as desired. The valve rod 44 extends at either end beyond the valve casing, and at each end is provided with a push button 47. These buttons are positioned on opposite sides of the wringer so as to be convenient for the operator. They are positioned relatively close to the wringer roll so that for normal control of the wringer or in the event of an emergency the valve is immediately accessible from either side of the wringer. The end portions of the valve chamber 45 are provided with outlets 48 to the atmosphere to prevent air pressure accumulating in the valve chamber which would interfere with the movement of the valve.

The pump casing 30 is provided on its upper side with a flat raised portion 49 which is engaged by a central boss 50 formed on the piston and serves as a stop for the lower position of the piston. The upper end of the piston carries a hollow piston rod 51 which extends to the exterior of the casing 20 through suitable packing glands 52 in the upper head of the casing. The upper end of the piston is pivotally connected at 53 with an operating lever 54 the opposite end of which is pivotally connected at 55 with the lugs 56 extending upwardly from the center of the roll-carrying yoke 8, for the purpose of transmitting the power from the piston to the roll-carrying yoke 8. This lever is fulcrumed at 57 intermediate its ends on a fixed upstanding bracket 58 on the wringer frame upright 2. Thus, when pressure is applied to the underside of the piston, the upward movement of the piston will be transmitted through the operating lever 54 to the roll-carrying yoke 8 and carry the upper roll D downwardly into pressure relation with the lower roll E, as indicated in Fig. 2, and this pressure will be maintained on the rolls.

Means are provided by which the pressure may be adjusted as desired, and this means also acts as a pressure relief device in the event that the pressure exceeds that for which the mechanism is adjusted. The central boss 50 of the piston has a passage 60 which communicates at its lower end with the pressure compartment 24 of the cylinder. At its upper end, it communicates with the upper compartment 25 of the cylinder through the ports 61 which are provided in the hollow pis-

ton rod **51**. The upper end of the relief passage **60** has a seat for a ball valve member **62** which normally closes the passage **60** and prevents the flow of oil through the passage **60** to the upper cylinder compartment. This ball is held yieldingly seated by a small bearing member **63** in the piston rod **51**, by means of a spring **64**. The pressure exerted by the spring upon the ball member can be adjusted by means of the screw plug **65** in the upper end of the piston rod **51**. Thus the ball valve member will maintain the passage **60** closed to the extent to which the pressure on the ball is adjusted, and this adjustment can be made to correspond to the normal operating pressure required between the wringer rolls. If for any reason, such as an extra wad of clothes being positioned between the wringer rolls, causing the pressure on the piston to become excessive, the valve **62** will unseat and relieve this excess pressure by permitting the oil to flow into the upper cylinder compartment. This relief device thus makes it impossible to jam the wringer rolls or impose an undue load thereon and at the same time automatically restores the normal operating pressure as soon as the abnormal condition is removed.

A breather pipe **66**, open to the atmosphere, is provided for the upper cylinder compartment. This pipe is curved and its end opens downwardly to permit ingress and egress of air, but to prevent entrance of dirt or water to said compartment. A guard **67** prevents oil from leaving the compartment through the breather pipe.

It is obvious that changes in the construction, arrangement and operation of the parts may be made without departing from the spirit of the invention, and it is undertood that I contemplate such changes as are fairly embraced within the scope of the appended claims.

I claim:

1. In a structure of the class described, the combination of a suitable frame, a pair of horizontally disposed pressure rolls mounted in said frame, a suitable support, a wringer head swingably mounted on said support and forming a housing to which said frame is attached, said housing forming a fluid reservoir and including a cylinder, a piston vertically movable in said cylinder, lever means pivotally mounted on said frame and connecting the piston with one of said pressure rolls for applying pressure thereto, a fluid pump positioned within said head beneath the piston for supplying fluid under pressure to said cylinder to actuate the piston therein, and a power shaft in said support for driving said pump.

2. In a structure of the class described, the combination of a suitable frame, a pair of horizontally disposed pressure rolls mounted in said frame, a swingable wringer head supporting said frame, said wringer head having a cylinder formed therein and secured thereto, a piston movable in said cylinder at right angles to the axis of said rolls, a piston rod extending through the cylinder upper wall, a lever extending from said piston rod to the upper roll connecting the piston rod with said roll for applying pressure thereto, a fluid pressure pump within said head for supplying fluid under pressure to the cylinder to actuate said piston, and means for driving said pump.

3. In a structure of the class described, the combination of a supporting standard, a wringer head swingably mounted on said standard and having a cylinder and a fluid reserve compartment formed therein, a piston movable in said cylinder, means forming a passage connecting the reserve compartment with the cylinder, a pump positioned in the head within said pressure compartment and beneath the piston, said pump being connected with said passage for receiving fluid from said reserve compartment and delivering it under pressure in said cylinder, a piston rod for said piston extending through the top wall of the head, a frame secured to and extending laterally from the head, a pair of horizontally disposed relatively movable wringer rolls mounted in said frame, and means connected with and actuated by said piston rod for applying pressure to the upper one of said rolls.

4. In a structure of the class described, the combination of a supporting standard, a wringer head swingably mounted on said standard and having formed therein a vertically disposed cylinder and a fluid reserve compartment, a vertically movable piston within said cylinder, a pressure pump positioned within the reserve compartment and adapted to deliver fluid under pressure to said cylinder, means forming a passage connecting the reserve compartment with the inlet of said pump, a piston rod actuated by the piston and extending to the exterior of the head, a frame extending laterally from said head, a pair of wringer rolls mounted in said frame and relatively movable therein toward and from each other, and a lever extending from said piston above the frame for applying pressure to the upper one of said rolls.

5. The combination of a supporting column having a power driving shaft therein, a wringer head swingably mounted upon said column, a wringer frame carried by said head and having wringer rolls therein, means in said head connected with said shaft for driving one of said rolls, said head having a cylinder formed therein, a fluid operated piston in said cylinder, a fluid pump within the head and connected with said driving shaft for supplying fluid under pressure to the cylinder, and means connecting said piston with the other wringer roll for applying pressure thereto.

6. The combination of a supporting column, a wringer head swingably mounted thereon, a power drive shaft in said column extending into said wringer head, a wringer supported of said head and having wringer rolls mounted therein, means within the head driven by said shaft for driving one of said rolls, a fluid actuated reciprocating motor within the head, means connecting the said motor with the other of said wringer rolls for applying pressure thereto, and a fluid pump within the head and connected with said power shaft for supplying fluid under pressure to said reciprocating motor.

7. The combination of a supporting column having a wringer head swingably mounted thereon, a wringer including a frame and wringer rolls therein mounted on said head, a power shaft in said column, gearing in said head driven by said power shaft for driving one of the wringer rolls, a shaft in said housing driven by said gearing, a fluid pump connected with and driven by said shaft, a fluid actuated piston within said head, and means connecting said piston with said other wringer roll for applying pressure thereto.

JOHN T. HUME.

CERTIFICATE OF CORRECTION.

February 11, 1936.

Patent No. 2,030, 256.

JOHN T. HUME.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 61, claim 2, strike out the words "and secured thereto"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day March, A. D. 1936.

Leslie Frazer

Acting Commissioner of Patents.

(Seal)