

Feb. 13, 1962

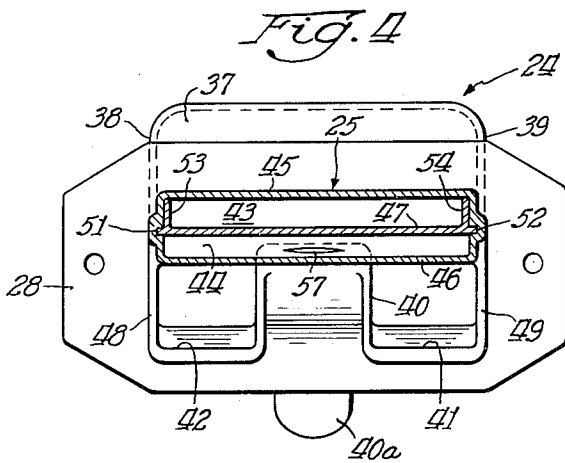
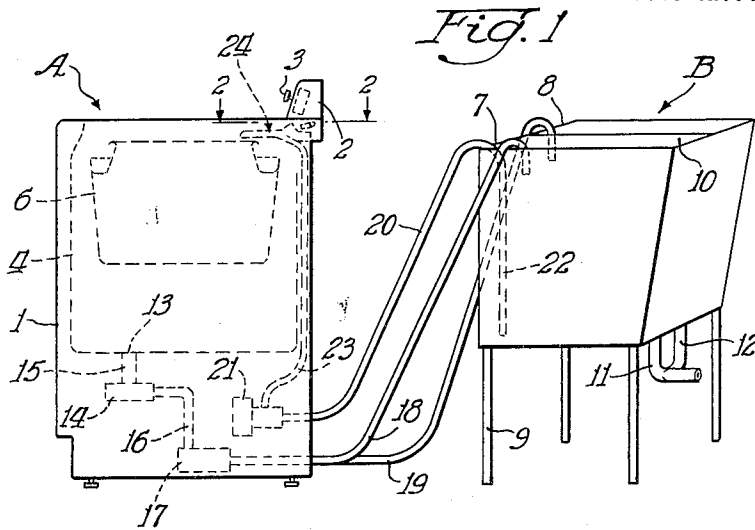
C. R. WALDROP

3,020,741

WATER SUPPLY MEANS FOR WASHING MACHINE

Filed Dec. 31, 1959

2 Sheets-Sheet 1



Inventor:
Charles R. Waldrop
By: H. J. Schmid *Att.*

Feb. 13, 1962

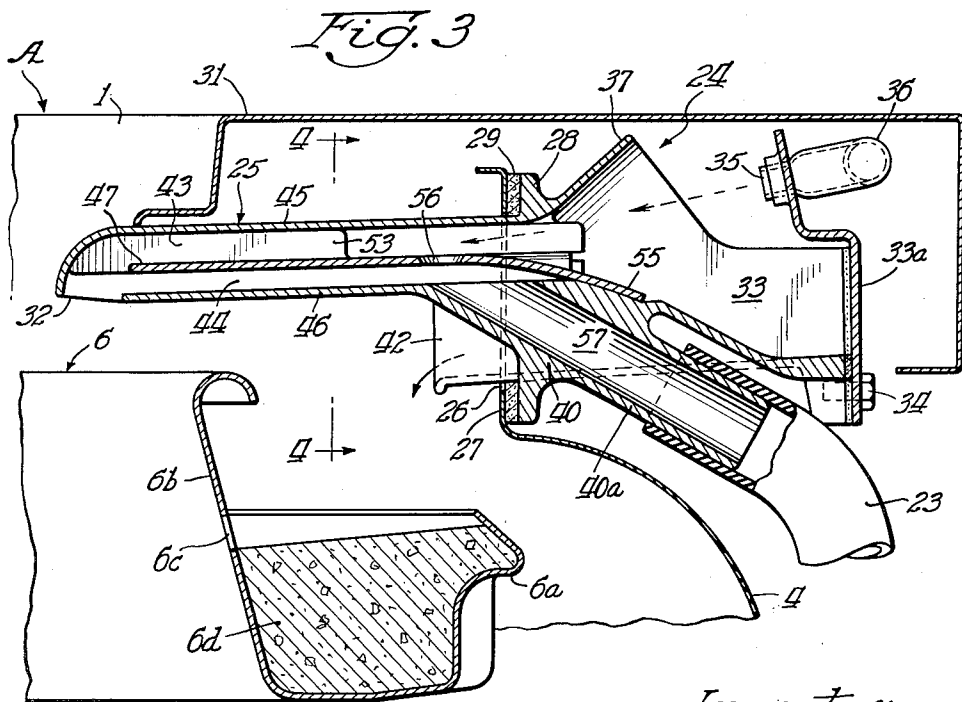
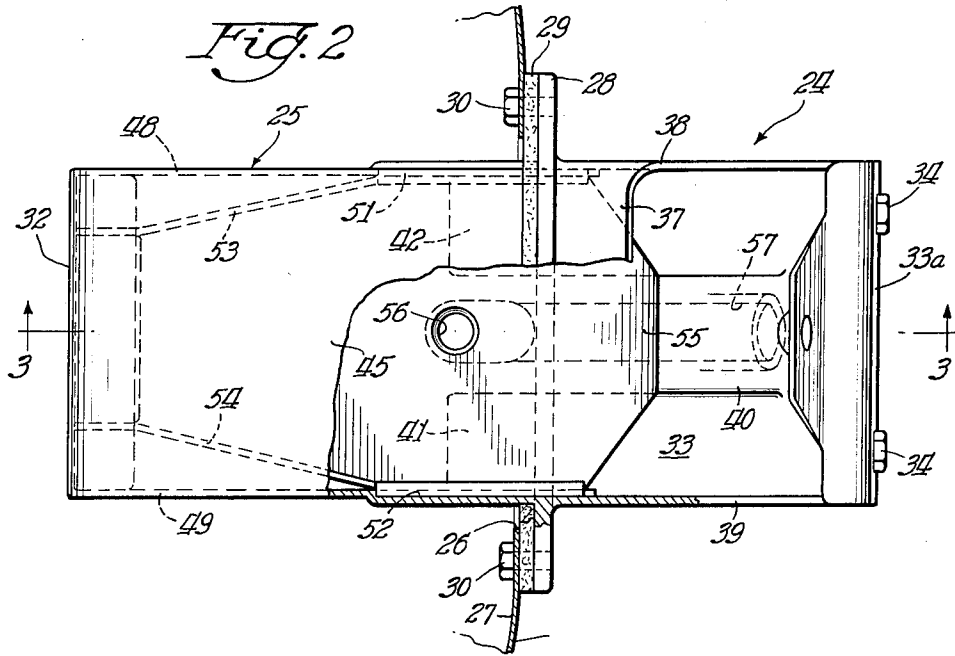
C. R. WALDROP

3,020,741

WATER SUPPLY MEANS FOR WASHING MACHINE

Filed Dec. 31, 1959

2 Sheets-Sheet 2



Inventor:
Charles R. Waldrop
By: H. J. Schmid *Att.*

1

3,020,741

WATER SUPPLY MEANS FOR WASHING MACHINE

Charles R. Waldrop, Herrin, Ill., assignor to Borg-Warner Corporation, Chicago, Ill., a corporation of Illinois
 Filed Dec. 31, 1959, Ser. No. 863,169
 8 Claims. (Cl. 68—23)

This invention relates to automatic clothes washing machines and particularly to a fresh water supply and suds water return device for washing machines.

Automatic clothes washing machines are customarily provided with a backguard extending above the automatic washing machine and in which are disposed manually-settable electric controls for the automatic cycles of the washing machines, and also fresh water supply and suds water return devices or flumes. Several disadvantages are realized by disposing the flumes within the interior of the backguard for supplying fresh water and also suds return water to the basket of the automatic washing machine. One serious disadvantage is that, should dripping or leaking of water be had in the backguard, the water may contact and short-circuit the electrical control apparatus in the backguard with consequent malfunctioning or damage to the electric controls. A further disadvantage is in servicing such automatic clothes washing machines as it may be necessary to remove the backguard, and thereby the controls, from the machine in order to properly service the water supply system of the machine. A further factor is that, due to design and control changes of automatic washing machines, it is frequently necessary to relocate the flumes with attendant rearranging of the fresh water and suds water return supply conduits to the flumes.

It is an object of the present invention to provide an improved fresh water supply means for automatic washing machines in which the water supply means is confined entirely within the casing of the washing machine.

It is another object of the invention to provide an improved fresh water supply and suds water return device for automatic washing machines.

It is another object of the invention to provide an improved water supply means for automatic washing machines in the form of a flume of unitary structure located within the casing of the washing machine and having provision for supplying fresh water under high pressure and exceptionally low pressure to the automatic washing machine and also having means for providing water to a suds return pump for priming the pump.

Another object of the invention is to provide an improved fresh water and suds water return device in the form of a flume having passage respectively supplying fresh water under high and exceptionally low water pressures into the basket of the washing machine, the flume also having conduit means providing for water supply to a suds return pump for priming the pump and also for the return of suds wash water into the basket of the washing machine from a storage compartment.

Additional objects, features, and advantages of the invention disclosed herein will be apparent to persons skilled in the art.

It is preferred to accomplish the objects of this invention and to practice the same in substantially the manner as hereinafter more fully described and as more particularly pointed out in the appended claims. The invention is illustrated in the accompanying drawings forming a part hereof and wherein:

FIG. 1 is a side elevation of an automatic clothes washing machine embodying the water supply flume of the present invention and situated beside a pair of laundry tubs with fluid conduits disposed between the machine and the tubs;

2

FIG. 2 is a top plan view of the water supplying flume, taken on line 2—2 of FIG. 1;

FIG. 3 is a longitudinal sectional view showing details of the flume, said section being taken on line 3—3 of FIG. 2;

FIG. 4 is a cross sectional view of the flume, shown in FIGS. 2 and 3, said view being taken on line 4—4 of FIG. 3.

Referring to FIG. 1, the letter A identifies an automatic washing machine and the letter B denotes storage facilities for sudsy wash water. The washing machine A comprises a cabinet or casing 1 having a backguard or control panel 2 at the top thereof, the backguard containing a control mechanism or timer 3. The timer 3 is provided with electrical apparatus (not shown) for causing automatic operation of the different cycles of the washing machine. A tub or receptacle 4 is disposed within the cabinet 1. A vertically disposed rotatable basket or container 6, receiving the clothes to be washed, is disposed within the tub 4. The basket 6 has an agitator therein (not shown) which is adapted to oscillate for the clothes washing operation and the basket 6 is rotatable for removal of water from the clothes by driving means (not shown). For a further and more complete description of the automatic washing machine, reference should be made to Gerhardt et al., Patent No. 2,679,741 issued June 1, 1954.

The suds water supply storage facility B is a unitary structure and comprises a pair of laundry tubs 7 and 8 supported on a base 9 and having a dividing partition 10 in the center thereof. The tubs 7 and 8 are provided with bottom drain openings in communication respectively with drain pipes 11 and 12 connected to the usual household sewer system, the drain opening of the tub 7 being closed by a removable plug for suds water storage.

Referring to the washing machine A, means are provided for transferring sudsy wash water from the washing machine tub 4 to the tub 7 of the storage facilities B, or to the tub 8 and through its drain 12 to the sewer. Means are also provided for transferring the sudsy water from the storage tub 7 to the basket 6 for reuse. Fig. 1 illustrates that the tub 4 has a drain opening 13 at the bottom thereof, and a motor-operated pump 14 is connected by a pipe 15 to the opening 13 for transferring water from the tub 4 to a conduit 16. The conduit 16 is provided with a valve, generally indicated at 17, having means for selectively directing water from the tub 4 into either a conduit 18 or 19, the conduit 18 leading into the tub 7 for storage of the sudsy water and the conduit 19 leading into the tub 8 for discharge of rinse water into the drain and then to the sewer. As the plug is positioned to close the drain opening in the tub 7, sudsy wash water is stored in the tub 7 for reuse in a subsequent washing operation. If it is not desired to reuse the wash water, the plug is merely removed so that the water can pass through the drain opening in the tub 7 to the sewer.

Means for returning the sudsy water from the tub 7 to the washing machine comprises a flexible conduit 20 having one end connected to a motor-driven pump 21 and provided at its other end with an extension 22 extending downwardly to the bottom tub 7. The pump 21 has an intake port connected to the conduit 20 and a discharge port connected to a conduit 23 connected to my improved fresh water supply and suds water return device generally indicated at 24 and disposed entirely within the casing or cabinet 1 of the washing machine and beneath and in spaced relation to the backguard 2 of the machine.

As shown in FIGS. 2, 3, and 4, the device 24 for supplying sudsy and/or fresh water to the washing machine

3

is a flume comprising a flat elongated spout 25 having its forward end extending over the edge of the basket 6 for discharging water into the basket. The spout 25 extends through an opening 26 in the top cylindrical wall 27 of the tub 4 and the device is provided with a laterally extending flange 28 adapted to seat against an annular gasket 29 surrounding the opening 26 in the tub wall 27, the flange being secured to the tub wall by bolts 30 extending through the wall and gasket and threaded into the flange 28. It will be noted from an inspection of FIG. 3 that the device 24 is thus disposed and located beneath the top wall 31 of the washing machine casing 1. The spout 25 projects inwardly above the basket 6 and has its water discharge end 32 extending over the clothes-receiving opening of the basket and beyond the annular L-section top of the basket 6 for directing water into the basket.

Referring now more particularly to the construction of the flume for performing its fresh water supply and suds water return functions, the flume comprises a trough 33 of channel section having its rear open end closed by a plate 33a secured thereto by bolts 34, the upper end of the plate supporting an injector tube 35 connected to a pressurized fresh water inlet pipe 36 and supplying a stream of water under high or low pressure through an air gap into the trough. As shown in FIG. 2, the front end of the trough is provided with the laterally extending flange 28 secured to the tub as previously described. The trough is formed with an upwardly diagonally extending hood 37 merging with the side walls 38, 39 of the trough and functioning to confine the injected water in the trough and to direct the stream of water from the tube 35 into the spout 25. The trough is formed with a block-like portion 40 having a passage therein terminating at its upper end in a passage in the spout 25, the portion 40 being formed integral with the bottom wall of the trough and is located between and spaced from the side walls 38 and 39 of the trough, the portion 40 extending diagonally upwardly through the bottom wall and merging at its upper end with the spout 25. It will be noted that a tube 40a extends downwardly of the portion 40 and communicates with the passage in the portion 40. The portion 40 defines, with the side walls of the trough, spaced channels 41 and 42 having their front ends disposed beneath the spout 25. Accordingly, in the event water is ejected from the tube 35 at such low pressure as to fail to enter the spout 25, the water will flow into the trough and through the channels 41 and 42 of the trough and from the flume into an annular flange 6a surrounding and forming an upper portion of side wall 6b of the basket and thence through peripheral openings 6c in the wall 6b into the basket. The flange 6a provides an annular receptacle at the top of the basket and contains a balance ring 6d of concrete with its upper surface inclined toward the openings 6c in the basket.

The flume has the spout portion 25 thereof formed as a flattened tube divided into upper and lower fluid passageways 43 and 44 by a top wall 45 which merges at its rear end with the hood 37 at the flange 28, a bottom wall 46 merging with the portion 40, and a wall 47 dividing the spout portion into the upper and lower passages, the passages being further defined by side walls 48 and 49 merging with the top and bottom walls. The wall 47 is in the form of a plate inserted between the top and bottom walls and has parallel side edge portions inserted within slots 51 and 52 in the opposed surfaces of the side walls. As seen in FIGS. 2 and 3, the plate has upwardly projecting lateral flanges 53 and 54 engaging the top wall and converging toward the downwardly extending curved end of the top wall forming a portion of the discharge end of the spout. The rear portion of the plate is curved, as shown in FIG. 3, and engages at 55, a complementary curved surface of the trough portion 40. As shown in FIGS. 2 and 3, the plate is pro-

4

vided with an opening 56 for transferring water from the upper passage 43 to the lower passage 44 of the spout and into a passage 57 defined by the portion 40 of the trough.

During operation of the automatic washing machine, fresh water at the proper preselected temperature is supplied to the washing machine by the injector tube 35. In the event water under high pressure is ejected from the tube, the water will flow across the air gap, and into and through the upper passage 43 of the spout 25 to the discharge end 32 of the spout and into the basket 6. Concurrently, a certain portion of the water in the passage 43 will be diverted through the opening 56 in the dividing wall or plate 47 and flow into the passage 57 and downwardly into the conduit 23 and the outlet port of the pump 21 to prime the pump. When the conduit 23 has been filled with water, the diverted water will then flow through the lower passage 44 of the spout and directly into the clothes-receiving opening in the basket. In the event the pressure of the fresh water is exceptionally low, the water flowing from the injector tube 35 will be unable to cross the air gap between the tube and the upper passage of the spout and, accordingly, the water will flow slowly downwardly into the trough 33 and through the channels 41 and 42 into the annular receptacle defined by the flange 6a of the basket and then through the peripheral openings 6c of the side wall 6b of the basket into the basket.

It is contemplated that the automatic washing machine, employing the flume structure of the present invention, be of the suds-saver type in which the used suds water may be transferred after a washing operation to storage facilities, such as the tub 7, for later return to the washing machine for a subsequent washing operation. Accordingly, the used wash water may be drained from the tub 4, after the conventional basket spinning operation to remove the wash water from the clothes, and caused to flow by the pump 14 through the conduit 16 and be directed by the valve 17 through the conduit 18 into the tub 7. For a subsequent washing operation, the pump 21 is operated to cause the suds water to flow from the tub 7 through the conduits 22 and 20 to the pump and through the pump and conduit 23 into the trough of the flume and then through the lower passage 44 into the clothes-receiving opening of the basket 6.

It will be apparent from the foregoing description that my improved water supply structure for clothes washing machines may be mounted internally of and contained completely within the washing machine cabinet casing and in spaced relation to the control backguard conventionally employed with such machines. As the structure can be handled as a complete unit, it may be readily installed in the machine, and also easily removed for servicing, the entire structure being connected and disconnected rapidly from the machine and without interference with the electrical control assembly. As the structure is in spaced relation to this control assembly, in the use of the machines, there is no possibility of short-circuiting the electrical control components. In addition, there is considerable advantageous utility in the unitary character of the structure for supplying fresh water under either high or low pressure, return of suds water, and for insuring proper priming of the suds return pump. A further important feature is that the structure is positioned and cooperates with the basket of the washing machine to insure that fresh water at high pressure and pump-supplied suds water flow directly into the basket of the washing machine, and fresh water at low pressure is caused to flow indirectly into the basket by its novel cooperative construction.

While a preferred embodiment of the invention has been illustrated and described, modifications may be made without departing from the spirit of the invention and, accordingly, the invention is not to be limited to the precise details of construction set forth and it is contem-

5

plated that all such modifications shall be covered by the appended claims.

I claim:

1. In a washing machine comprising a cabinet containing a basket having a top clothes-receiving opening; a backguard extending upwardly of the top of said cabinet at the rear thereof; and means, including a flume, for supplying fresh water under high and low pressures directly to the basket and disposed within said cabinet in spaced relation to said backguard, said basket having an annular receptacle surrounding and disposed adjacent the top thereof and said receptacle also having apertures therein communicating with said basket for flow of water from the receptacle into the basket, said flume including separate passages for respectively directing fresh water under high pressure into the clothes-receiving opening in said basket and directing fresh water under low pressure into said receptacle and flow through said apertures into the basket.

2. In a washing machine comprising a cabinet containing a basket having a top clothes-receiving opening; a backguard extending upwardly of the top of said cabinet at the rear thereof; and means, including a flume, for supplying fresh water under high and low pressures directly to the basket and disposed within said cabinet in spaced relation to said backguard, said basket having an annular receptacle surrounding and disposed adjacent the top thereof and said receptacle also having apertures therein communicating with said basket for flow of water from the receptacle into the basket, said flume including separate passages for respectively directing fresh water under high pressure, and also suds water, into the clothes-receiving opening in said basket and directing fresh water under low pressure into said receptacle and flow through said apertures into the basket.

3. Water supplying means for a washing machine comprising a first conduit connected to a source of fresh water under pressure; suds water supplying means; a second conduit connected to said suds water supplying means; and a flume having a trough portion in spaced relation to the first conduit and adapted to receive fresh water under low pressure therefrom and having an outlet for the fresh water, a spout portion in spaced relation to said first conduit and disposed above said trough portion, said spout portion having an upper passage with an inlet spaced from but aligned with the outlet of said first conduit to receive fresh water under high pressure from said first conduit for flow through said spout portion and having a lower passage connected to said second conduit and adapted to receive suds water therefrom for flow through said spout portion.

4. Water supplying means for a washing machine comprising a flume having a spout portion of flattened tubular shape having upper and lower passages receiving water at one end of said spout portion and discharging water at the other end of said spout portion, said passages being defined by a wall disposed between the top and bottom walls of the spout portion and having an opening therein permitting a portion of the water in the upper passage to flow into the lower passage, a trough portion disposed beneath and connected to said spout portion at the fluid-receiving ends of said passages, said trough portion having one end in spaced relation to the fluid discharge ends of the passages in the spout portion and having an outlet for the discharge of water received in the trough portion, and a tubular portion extending upwardly through said trough portion and having a passage communicating with the lower passage of said spout portion for delivery of water to said lower passage of said spout portion.

5. Water supplying means for a washing machine comprising a flume having a first passage for fresh water under high pressure entering and discharged from the flume, a second passage for fresh water under low pressure entering and discharged from the flume, and a third

6

passage for suds water entering and discharged from the flume, said first passage having an opening communicating with said third passage; a pump disposed beneath the flume; and a conduit connecting said pump to said third passage for flow of suds water to said third passage during operation of said pump, and said conduit also receiving a portion of the fresh water under high pressure in said first passage flowing through said opening into said third passage and said conduit for priming the pump.

6. Water supplying means for a washing machine comprising a flume having a first passage for fresh water entering and discharged from the flume, and a second passage for suds water entering and discharged from the flume, said first passage having an opening communicating with said second passage; a pump disposed beneath the flume; and a conduit connecting said pump to said second passage for flow of suds water to said second passage during operation of said pump, and said conduit also receiving a portion of the fresh water in said first passage flowing through said opening into said second passage and said conduit for priming the pump.

7. In a washing machine, a cabinet containing a tub; a clothes-receiving basket in said tub; an annular receptacle surrounding and disposed adjacent the top of said basket, said receptacle having apertures for flow of water from the receptacle into the basket; a backguard extending upwardly of the top of the cabinet; a first conduit in said cabinet and connected to a source of fresh water under pressure; a second conduit in said cabinet and connected to a source of suds water; a pump for delivering suds water to said second conduit; and a flume mounted on said tub in spaced relation to and beneath said backguard and comprising a spout portion of flattened tubular shape including a plate disposed between the top and bottom walls of said spout to provide upper and lower passages in said spout having their forward ends opening above said basket, said plate having an opening therein connecting said passages, a trough portion positioned beneath said spout portion and having an outlet over said receptacle, and a tubular portion extending through said trough portion and providing a passage connected to the pump and to the lower passage in said spout portion for conducting suds water through said spout portion into the basket, said first conduit being positioned relative to said flume to discharge fresh water at high pressure into said upper passage of the spout portion for flow there-through into said basket and also through the opening in said plate into said lower passage of the spout portion and the passage in the tubular portion to prime the pump, and also to discharge fresh water at low pressure into the trough portion for flow into the receptacle and through said apertures into the basket.

8. In a washing machine, a cabinet containing a tub; and a clothes-receiving basket in said tub; a backguard extending upwardly of the top of the cabinet; a first conduit in said cabinet and connected to a source of fresh water under pressure; a second conduit in said cabinet and connected to a source of suds water; a pump for delivering suds water to said second conduit; and a flume mounted on said tub in spaced relation to and beneath said backguard and comprising a spout portion of flattened tubular shape including a plate disposed between the top and bottom walls of said spout to provide upper and lower passages in said spout having their forward ends opening above said basket, said plate having an opening therein connecting said passages, a trough portion positioned beneath said spout portion and having an outlet over said basket, and a tubular portion extending through said trough portion and providing a passage connected to the pump and to the lower passage in said spout portion for conducting suds water through said spout portion into the basket, said first conduit being positioned relative to said flume to discharge fresh water at high pressure into said upper passage of the spout portion for flow therethrough into said basket and also through the

7

opening in said plate into said lower passage of the spout portion and the passage in the tubular portion to prime the pump, and also to discharge fresh water at low pressure into the trough portion for flow from the outlet thereof into the basket.

References Cited in the file of this patent

UNITED STATES PATENTS

1,067,891	Wagner	July 22, 1913	
1,304,197	Nyquist	May 20, 1919	10

2,422,897	
2,498,179	
2,523,799	
2,552,398	
2,638,112	5
2,655,804	
2,813,413	
2,885,879	
2,896,436	
2,920,469	10

8

Hebard	June 24, 1947
Oliver	Feb. 21, 1950
Woodson	Sept. 26, 1950
Briggs	May 8, 1951
Shelton	May 12, 1953
Clark	Oct. 20, 1953
Leach	Nov. 19, 1957
Bloom	May 12, 1959
Buechler	July 28, 1959
Henshaw	Jan. 12, 1960