

Nov. 17, 1942.

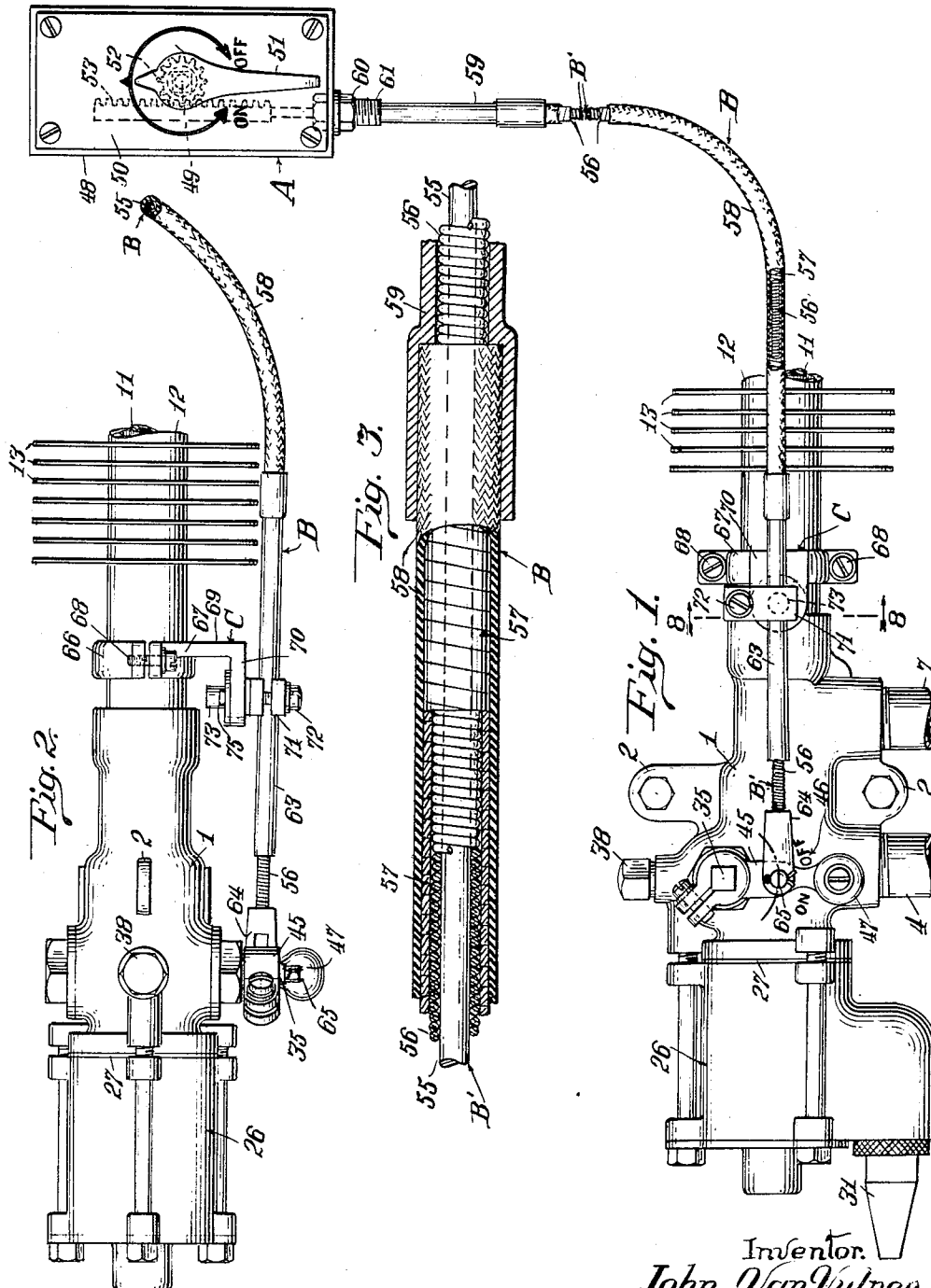
J. VAN VULPEN

2,302,158

MANUALLY OPERABLE REMOTE CONTROL FOR RADIATOR INLET VALVES

Filed June 6, 1940

3 Sheets-Sheet 1



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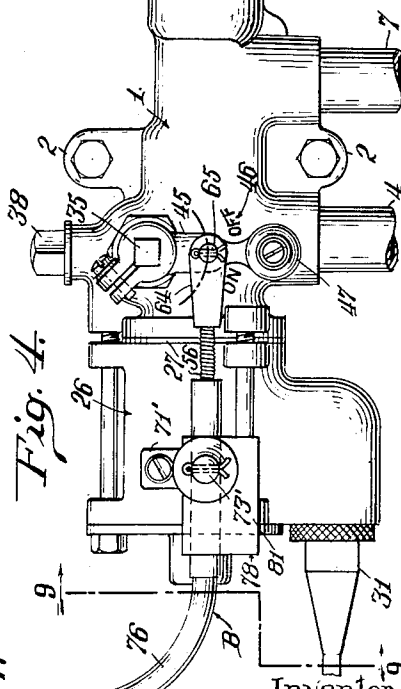
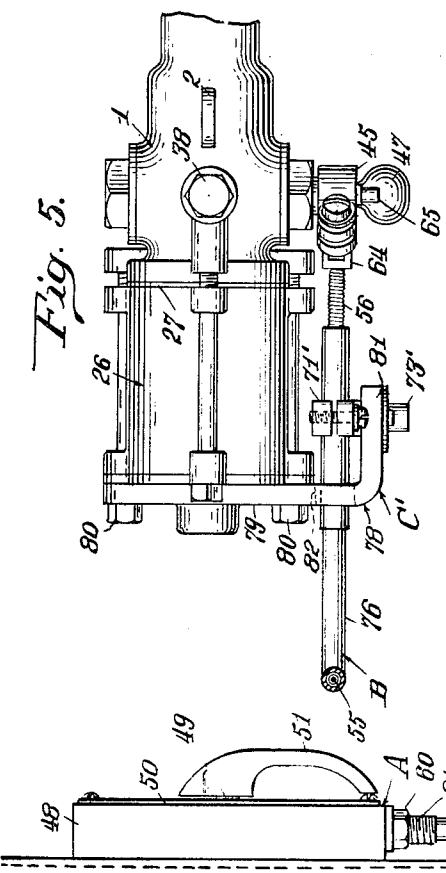
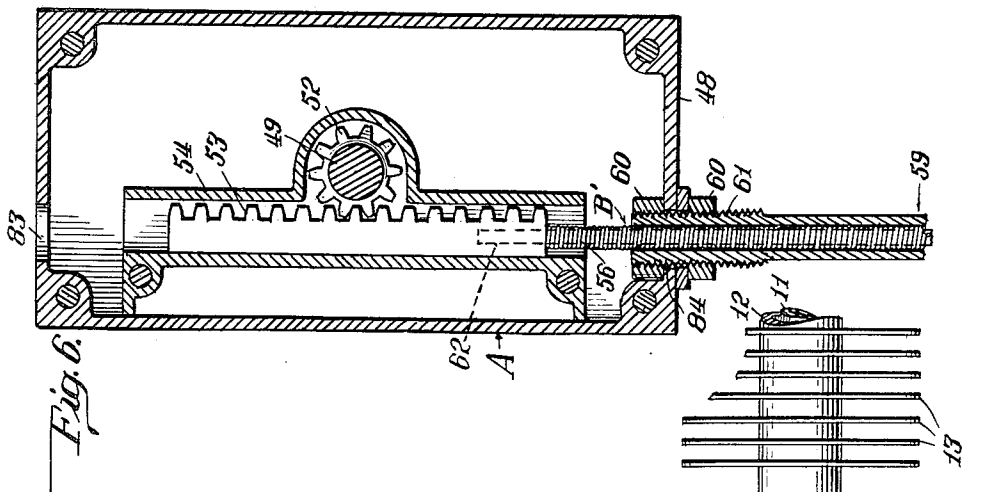
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MANUALLY OPERABLE REMOTE CONTROL FOR RADIATOR INLET VALVES

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3 Sheets-Sheet 2



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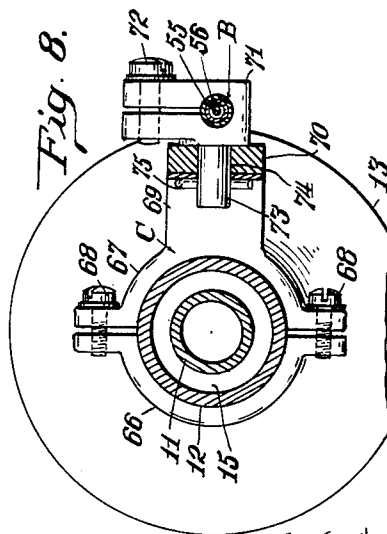
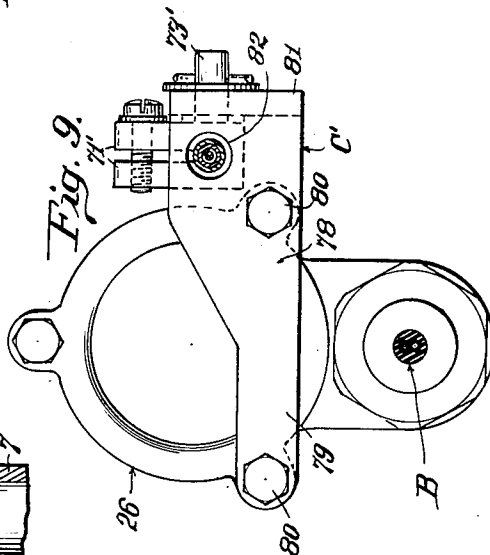
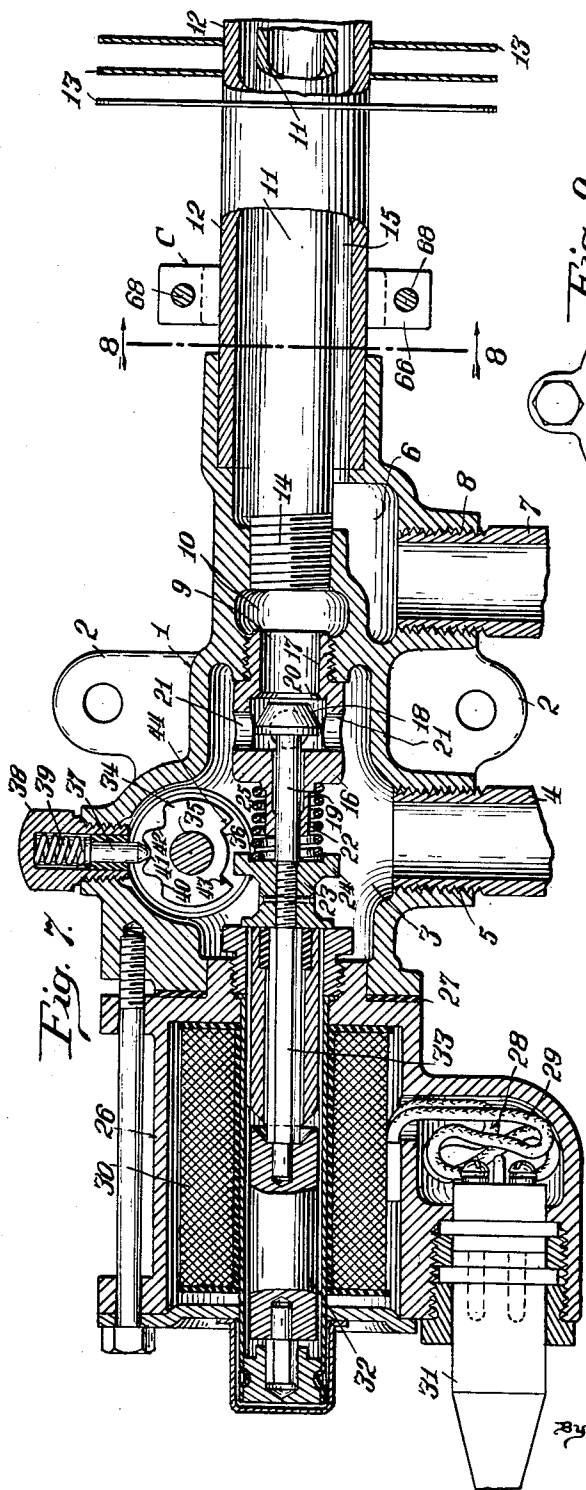
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MANUALLY OPERABLE REMOTE CONTROL FOR RADIATOR INLET VALVES

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,302,158

MANUALLY OPERABLE REMOTE CONTROL
FOR RADIATOR INLET VALVESJohn Van Vulpen, Chicago, Ill., assignor to Vapor
Car Heating Company, Inc., Chicago, Ill., a cor-
poration of New York

Application June 6, 1940, Serial No. 339,105

1 Claim. (Cl. 137—139)

This invention relates to new and useful im-
provements in a manually operable remote con-
trol mechanism for a radiator inlet valve, more
particularly to a manually operable mechanism
located at a position spaced considerably away
from the valve, and comprising a flexible push
and pull connection extending to a position ad-
jacent the valve, for moving the valve to either
open or closed positions. When this manually
operable mechanism is in a central "neutral"
position the valve may be moved to or from open
or closed position by a separate automatically
operating means, preferably electrically actu-
ated. Locking means is also provided, cooperat-
ing with the manually operable means, for yield-
ably holding the valve in either open or closed
positions, or for holding the manually operable
means yieldably in the central neutral position
while the valve is entirely under automatic con-
trol.

The manually actuated mechanism forming
the particular subject matter of this application
is designed particularly for controlling a radiator
inlet valve of the type disclosed and claimed in
the co-pending application of Parks and Peter-
son, Serial No. 335,719, filed May 17, 1940, al-
though it will become apparent as this disclosure
progresses that this remote control mechanism
could be used to operate other types of valves
than the one disclosed in said copending appli-
cation and disclosed herein by way of example.

Briefly described, the valve is automatically
moved to open or closed positions by an electric
motor mechanism (preferably a solenoid) and an
opposed spring. The manual operating means
comprises a lever oscillatable outside of the valve
casing and having a lost-motion connection with
the automatic valve-actuating means so that
when this lever is in a central "neutral" position
the valve can be moved from open to closed po-
sition or vice versa without necessitating any
movement of the manual operating lever. How-
ever, if this lever is moved in either a clockwise
or counter-clockwise direction to certain limiting
positions in which the lever is yieldably held by a
locking mechanism, the valve will either be
moved to or held in an open or a closed position,
according to the direction in which the lever is
oscillated. This lever may be swung to any of its
three positions by direct manual movement of
the lever by a person standing adjacent the valve,
but the present improvements relate particularly
to a cooperating means for swinging the lever
from a remote location. Preferably means com-
prising a swinging lever is located in a more ac-

cessible position, usually on one wall of the com-
partment in which the radiator is located. This
lever is designed to be readily gripped by the
fingers and is mounted for swinging movement
on a dial suitably inscribed to indicate the cor-
responding position to which the valve is moved.
A suitable push and pull element of substantially
constant length extends from a position adjacent
the manual operating lever just described to a
position adjacent the valve, and suitable con-
necting means are provided between the ends of
this flexible element and the two levers so that
a swinging movement of one lever will cause a
swinging movement of the other lever.

The principal object of this invention is to pro-
vide an improved remote control mechanism for
a radiator inlet valve of the type briefly de-
scribed hereinabove and disclosed more in detail
in the specification which follows.

Another object is to provide improved support-
ing and guide means for the flexible connecting
element.

Other objects and advantages of this invention
will be more apparent from the following de-
tailed description of certain approved forms of
mechanism constructed and operating according
to the principles of this invention.

In the accompanying drawings:

Fig. 1 is an elevation, with parts in section, of
the assembled valve and remote control mecha-
nism.

Fig. 2 is a plan view of the valve and adjacent
portions of the mechanism as shown in Fig. 1.

Fig. 3 is a detail, partially broken away, of a
section of the flexible operating element.

Fig. 4 is an elevation (similar to Fig. 1) but
showing a modified form and positioning of the
remote-control mechanism.

Fig. 5 is a partial plan view of the assembly
shown in Fig. 4.

Fig. 6 is a vertical section, on a larger scale, of
the manually operated actuating member at the
remote location, as shown in Fig. 1.

Fig. 7 is a central vertical section through the
valve.

Fig. 8 is a transverse vertical section taken
substantially on the line 8—8 of Fig. 1 or 7.

Fig. 9 is a transverse vertical section taken sub-
stantially on the line 9—9 of Fig. 4.

The preferred form of valve and radiator with
which this control mechanism is associated will
first be described, referring more particularly to
Figs. 1 and 7. The main valve casing 1 provided
with supporting brackets 2 encloses a main steam
chamber 3 to which steam is furnished by supply

pipe 4 threaded into casing 1 at 5. Casing 1 also encloses a return or discharge chamber 6 from which condensate and other fluids are discharged through return or drain pipe 7 threaded into the casing at 8. A valved steam passage 9 leads from steam chamber 3 into the feed-chamber 10 from which steam is delivered into the radiator. The preferred form of radiator here shown is of the "inner-feed" type comprising a pair of concentric or coaxial pipes 11 and 12, the outer pipe 12 being provided with a plurality of radiating fins 13, this outer pipe being closed at its outer end (not here shown). Steam flows from feed-chamber 10 of the valve into and through the receiving end of inner pipe 11, which is threaded at 14 into the valve casing.

• The inner pipe 11 terminates short of the closed end of outer pipe 12, and the steam then flows back through the annular space 15 between the pipes 11 and 12 into the discharge chamber 6 and thence out through pipe 7. A cage structure 16 has a hollow nipple 17 threaded into casing 1 between chambers 3 and 10 and enclosing the passage 9. A movable valve member 18 carried by valve stem 19 and guided in cage 16 is adapted to engage valve seat 20 in the cage and cut off the flow of steam from supply chamber 3 through passage 9 to the radiator. When the valve 18 is moved back (as shown in Fig. 7) away from seat 20, steam will flow from chamber 3 through the passages 21 in the cage and passage 9 to feed-chamber 10 and thus into and through the radiator. The valve stem 19 extending rearwardly from valve 18 is slidably guided through the rear head portion 22 of cage 16, and the valve stem carries at its outer end a collar member 23 comprising an outstanding flange or projection 24 which forms a portion of the manually operated valve-moving mechanism hereinafter described. A compression spring 25 is confined between the end of cage 16 and collar 23, this spring normally functioning to move valve 18 to the open position shown in Fig. 7. A solenoid assembly indicated generally at 26 is fitted at one end into casing 1 against gasket 27 so as to close this end of chamber 3. The circuit wires 28 and 29 extending from the opposite ends of the solenoid coil 30 lead out through the conduit indicated generally at 31. The movable core 32 of the solenoid will be drawn in (toward the right Fig. 7) when the solenoid is energized, and the bearing rod 33 extending from one end of core 32 will engage the end of valve stem 19 and force the valve 18 to closed position against the opposition of spring 25. The valve will be held in this closed position as long as the solenoid 30 remains energized. When the energizing circuit is broken, the spring 25 will automatically open the valve.

It will be understood that the circuit for energizing solenoid 30 is automatically made and broken by a thermostatically controlled mechanism operating so that the thermostat will be energized to automatically close the valve when a certain predetermined maximum temperature is reached in the space heated by the radiator, while the energizing circuit will be automatically broken and the valve opened by spring 25 when the space temperature falls and more heat is required. A suitable control mechanism for thermostatically operating the solenoid is disclosed in the Parks and Peterson application, Serial No. 335,719, hereinabove referred to.

The valve can also be manually operated. Referring more particularly to Fig. 7, a disc 34 is

fixed on an operating shaft 35 extending transversely through the upper portion of steam chamber 3. An arcuate recess 36 is formed within one peripheral portion of disc 34, and the flange or projection 24 on collar 23 of the valve stem assembly extends into the arcuate recess 36. When disc 34 is in the central position indicated in Fig. 7 the core 32 and valve 18 can be reciprocated longitudinally so as to open or close the valve under the electrical control hereinabove described. A locking detent 37 is guided for longitudinal movement within the screw plug 38 and is urged downwardly by spring 39 into yielding engagement with one of the series of recesses 40, 41 and 42 formed in the upper peripheral portion of disc 34. When detent 37 engages the central recess 41, the disc will be held in the intermediate position shown in Fig. 7 and the valve will be under electrical control. When disc 34 is swung through a suitable arc in a counterclockwise direction, the shoulder 43 at one end of recess 36 will engage the projection or flange 24 and shift the movable assembly consisting of collar 23, stem 19 and valve 18 toward the right (Fig. 7) against the opposition of spring 25, until detent 37 is moved over into recess 42 thus yieldably locking the valve in closed or "off" position. On the other hand, if the disc 34 is swung through an equal arc in the clockwise direction, shoulder 44 at the other end of recess 36 will be moved into proximity to flange 24 and the detent 37 will be snapped into the other recess 40 thus locking the valve in open position (as shown in Fig. 7) even though solenoid 30 should be energized. A crank or lever 45 (Fig. 1) is secured on the outer end portion of shaft 35 outside casing 1 and is adapted to shift the disc 34 from one to another of the three positions hereinabove described, these three positions of the valve being suitably indicated by lever 45 on a dial 46 formed on the outer surface of the valve casing. A knob or handle 47 is provided on the lower end of lever 45, and this handle 47 may be grasped by a person standing adjacent the valve in order to manually shift the valve to its different positions. All of this structure as thus far described is also disclosed in the co-pending application of Parks and Peterson, Serial No. 335,719, hereinabove referred to.

According to the particular improvements of this present invention manually operable means are provided located at a remote location for moving the lever 45 and thus moving the valve to its different operative positions. This remote control means comprises generally (see Fig. 1) a manually operable controller A fixedly supported at the remote location, a partially flexible push and pull device B for transmitting power from the controller A to the valve lever 45, and a supporting means C for carrying that portion of the power transmitting element B located adjacent the valve.

The manually operable control member A (see Figs. 1, 4 and 6) comprises a casing 48 adapted to be mounted on or in one of the walls or partitions enclosing the space heated by the radiator. In the form of the invention shown in Fig. 1 this controller is mounted on the adjacent side wall back of the radiator and valve, while the alternative form shown in Fig. 4 discloses the controller on one of the end partition walls extending at right angles to the radiator. In the casing 48 is journaled a horizontal shaft 49 which extends through the cover plate 50 of the casing and carries at its outer end the fix-

edly secured operating lever 51 which is adapted to be swung to the same operative positions as the lever 45 at the valve, and which indicates these positions on the dial marked on cover plate 50. A pinion 52 is secured on shaft 49 within the casing 48, this pinion meshing with a rack 53 vertically slidable within the guideway 54 mounted within the casing. It will now be apparent that as lever 51 is rotated to either of its extreme positions, the rack 53 will be raised or lowered, and through the operating connection B will impart a swinging movement to the lever 45 at the valve.

The power transmitting element B may take different forms, but is preferably of the known form shown more in detail in Fig. 3 and comprising the inner longitudinally movable operating element B' comprising the inner pull or tension member 55 in the form of a flexible metallic cable which is closely enclosed by the outer push or compression member 56 in the form of a closely wound wire spring, the turns of which normally engage one another. This push and pull element will be of substantially constant length but is sufficiently flexible to move through curved paths when the radius of curvature is not excessively short. Flexible push and pull element B', is supported and guided within a tubular casing which may be either rigid or flexible, or as in the present instance, is in part rigid and in part flexible. The flexible portion of the casing (as shown at the left in Fig. 3) comprises an inner metallic portion 57 formed of flat coiled wire, enclosed by a braided fabric casing 58 that is preferably treated to resist gasoline or oil and water. Some portions of this guide member may be in the form of rigid metallic tubing, for example brass. As shown in Figs. 1 and 6, the upper portion of the power transmitting element B' is guided in the rigid tubing 59 extending through the bottom wall of casing 58 and held in place by nuts 60 threaded at 61 on the upper end portion of tubing 59. The upper end of the inner push and pull element B' extends from the upper end of guide tube 59 and is suitably secured at 62 within the lower end portion of rack 53.

The lower end portion of power transmitting member B adjacent the valve, comprises the straight rigid guide tube 63, this lower end portion of the inner push and pull element B' projecting from guide tube 63 and being anchored in a clevis 64 which is pivotally secured by a pivot pin 65 to an intermediate portion of valve-operating lever 45.

It will now be apparent that as lever 45 is swung to its different operative positions by the reciprocation of flexible element B', the pivot pin 65 will swing about the center of operating shaft 35 through the arc indicated in broken lines, Fig. 1. As a consequence the rigid guide tube 63 must be permitted to swing through a small arc in a vertical plane, and for this reason the special supporting means indicated generally at C is provided.

This supporting device C includes a fixed bracket comprising two similar semi-circular bracket members 66 and 67 clamped together by screw bolts 68 about an adjacent portion of the valve or radiator, for example about the outer pipe 12 of the radiator at one end of the valve. A radially extending bracket arm 69 projects outwardly from supporting member 67 and terminates in a portion 70 extending parallel to the face of the valve and the adjacent guide

tube 63. An intermediate portion of the guide tube 63 is fixedly held in place within the split clamping member 71 by means of the clamping screw 72. A pivot pin or stud 73 projecting laterally from the clamping block 71 is rotatably mounted in a bearing opening 74 in the bracket member 70 and held in place by cotter pin 75. It will now be apparent that while the lower portion of the power transmitting member B is securely supported by the member C, the extreme lower end of this member will be permitted to swing up and down through a small angle in order to accommodate the similar movement of pivot pin 65 through which the clevis 64 is attached to the valve lever 45.

In the modification shown in Figs. 4, 5 and 9, the operating device A is located at the left of the valve assembly instead of at the right and consequently the flexible operating device B must extend in the opposite direction from the valve lever 45. In this modified form the lower portion of the guide member is in the form of a curved rigid tube 76 the upwardly projecting left-hand end portion of which connects through the flexible portion 77 of the guide with the upper rigid guide tube 59 connected with the manually operable device A. The lower horizontally extending end of the rigid guide tube 76 is rigidly secured in a clamping member 71', similar to the clamping member 71 previously described and shown in Fig. 8. However, the supporting bracket 78 of this modified supporting means C' comprises a transversely extending arm 79 which is secured to the end of the solenoid assembly by a pair of the bolts 80 which secure the solenoid assembly to the main valve casing 1. The longitudinally extending arm 81 at one end of bracket 78 is formed with a bearing opening to receive the pivot pin 73' of the clamp 71'. The bracket arm 79 is formed with an opening 82 through which the guide tube 76 extends, this opening 82 being of greater diameter than the tube so as to permit the necessary vertical swinging movement of this guide tube. The operation of this supporting mechanism is substantially the same as that of the supporting mechanism C already described.

It will be apparent that in the form of the device first described (see Fig. 1) a clockwise movement of the manual operating lever 51 will cause the rack 53 to move upwardly and thus will result in swinging the valve lever 45 in a counter-clockwise direction. On the contrary, if the manually operable lever 51 of Fig. 4 is swung in a clockwise direction, a similar upward movement of rack 53 would cause the valve lever 45 to also be swung in a clockwise direction.

This situation is taken care of by making the member A reversible, that is when used in the combination of Figs. 4 and 5 the casing 48 is reversed end for end, but the dial or cover plate 50 is kept in the same position as shown in Fig. 1. This will bring the rack 53 at the other side of pinion 52 so that when the pinion is rotated in a clockwise direction the rack 53 will be lowered instead of raised. Consequently the valve lever 45 will still be swung in a counter-clockwise direction as in the Fig. 1 modification. As shown in Fig. 6, a second hole 83 is provided in the upper wall of casing 48 in line with the hole 84 in the bottom wall through which the guide tube 59 now projects. It will be obvious that this will permit a simple reversal of the parts, since the

rack 53 can have its position changed end for end within the guide 54.

I claim:

Means for operating a flow control valve from locations remote from the valve and at either side thereof, comprising a casing adapted to be fixedly supported in a vertical position at either remote location, a shaft horizontally journaled in the casing, a pinion fixed on the shaft within the casing, a rack meshing with the pinion, a guide for the rack within the casing, a cover and dial plate removably mounted on the front of the casing, a manually operable lever secured on the outwardly projecting end portion of the shaft and movable across the dial to valve-operating positions indicated on the dial, a power-

transmitting member comprising an inner flexible push and pull element secured at one end to one end of the rack, and a tubular guide for the element secured at the lower end to one end wall of the casing in line with the reciprocable rack, the casing being reversible end for end and the dial plate being reversible end for end on the casing so that the rack can be moved from one side of the pinion to the other as the means is mounted in one or the other of the remote positions thus reversing the direction of movement of the push and pull element caused by the selected operating movement of the manually operable lever.

JOHN VAN VULPEN.

CERTIFICATE OF CORRECTION.

Patent No. 2,302,158.

November 17, 1942.

JOHN VAN VULPEN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 4, in the claim, for "the lower end to one end" read --one end to the lower end--; 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 29th day of December, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.