

Dec. 9, 1952

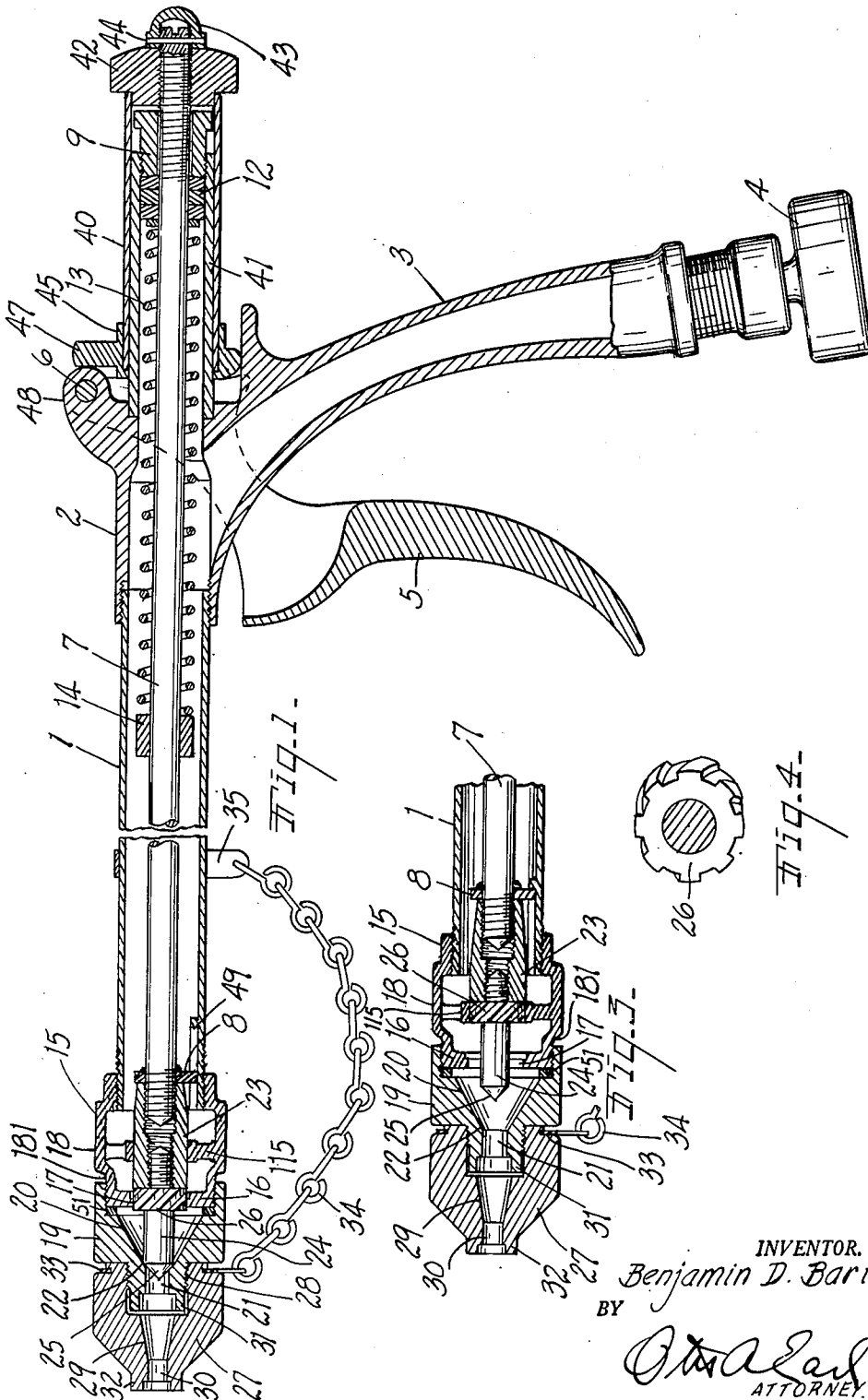
B. D. BARTON

2,621,076

SPRAY GUN FOR FIRE APPARATUS AND THE LIKE

Filed June 7, 1948

2 SHEETS—SHEET 1



INVENTOR.
Benjamin D. Barton
BY
Otis A. Earl
ATTORNEY.

Dec. 9, 1952

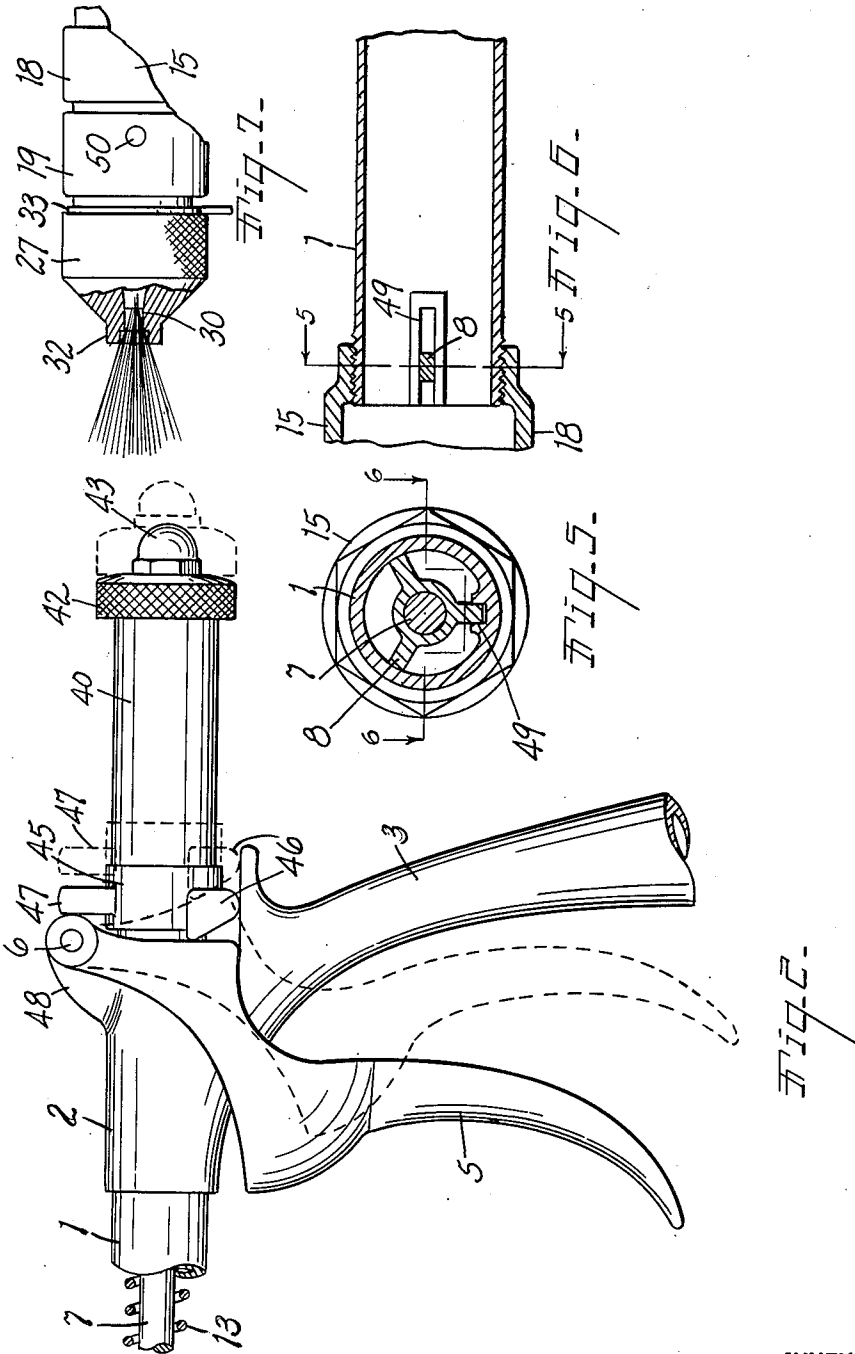
B. D. BARTON

2,621,076

SPRAY GUN FOR FIRE APPARATUS AND THE LIKE

Filed June 7, 1948

2 SHEETS—SHEET 2



INVENTOR.
Benjamin D. Barton
BY *Arthur Earl*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,621,076

SPRAY GUN FOR FIRE APPARATUS
AND THE LIKEBenjamin D. Barton, Battle Creek, Mich., assignor
to American Marsh Pumps, Inc., Battle Creek,
Mich.

Application June 7, 1948, Serial No. 31,547

7 Claims. (Cl. 299—117)

1

This invention relates to improvements in a spray gun for fire apparatus and the like.

The main objects of this invention are:

First, to provide a spray gun or nozzle structure for fire apparatus which is efficient for delivering the so-called fog or mist and for other types of spray up to a substantially stream delivery.

Second, to provide a structure of the class described which permits a long range delivery of a fog or mist type of spray.

Third, to provide an apparatus of this character which can be operated with a minimum of effort on the part of the operator and without shocks or so-called water hammer likely to throw the operator or to subject the operator to severe strain and manual effort.

Fourth, to provide a nozzle structure for fire apparatus which minimizes resistance to the flow of water passing through the nozzle and at the same time permits a wide variation of the character of delivery of the nozzle.

Fifth, to provide a nozzle structure having these advantages in which little manual effort is required to hold the valve in open position against the water pressure passing therethrough.

Sixth, to provide a fire fighting apparatus nozzle structure which may be quickly adjusted to meet varying conditions as to water pressure and the character of the spray desired for the particular condition.

Seventh, to provide a nozzle for a fire fighting gun which may be used to batter through a door or wall without injury to the spray delivery passages.

Eighth, to provide a structure of the class described which produces an effective spray designed to meet the particular condition and at the same time conserving water and minimizing water damage.

Further objects relating to details and economies of the invention will definitely appear from the description to follow. The invention is pointed out in the claims.

A preferred embodiment of the apparatus for carrying out the method of the invention is clearly illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view mainly in longitudinal section of a spray gun or apparatus of the class described embodying the features of my invention, the discharge valve being in fully closed position.

Fig. 2 is a fragmentary side elevation of the rear portion of the structure illustrating details of the operating and control means, the fully

2

actuated position of the operating lever being indicated by dotted lines.

Fig. 3 is a fragmentary view mainly in longitudinal section with the valve in fully open position.

Fig. 4 is a perspective view of the swirl producing member and a view in section of the valve stem for supporting said member.

Fig. 5 is a transverse section on line 5—5 of Fig. 6 showing details of the control rod support.

Fig. 6 is a fragmentary longitudinal section on a line corresponding to line 6—6 of Fig. 5.

Fig. 7 is a fragmentary view partially in longitudinal section illustrating certain details of the spray nozzle.

The embodiment of my invention illustrated comprises a tubular barrel 1 of the desired length having a butt portion 2 provided with a pistol type grip 3 constituting a supply conduit. A hose connection for the supply conduit is shown at 4. The control lever 5 is pivotally mounted at 6 on the butt member 2, the lever being forked to embrace the butt member 2 and being positioned trigger like to be engaged by the hand grasping the grip.

The plunger rod 7 is slidably supported by the spider like member 8 and extends through the packing gland 9. Packing gaskets are illustrated at 12. The spring 13 is in thrust engagement with these packings and acts on the thrust collar 14 to bias the control rod forwardly or to valve closing position.

In the embodiment of my invention illustrated I not only provide means for controlling through the control lever 5 but I provide means for adjustably holding the valve associated with the control in open position or partially open position. This comprises the sleeve 40 slidably mounted on the rear extension 41 of the barrel, this extension extending rearwardly from the barrel butt 2. The rear end of this sleeve engages the adjusting member 42 which is threaded upon the rear end of the plunger rod, the plunger rod being provided with a stop nut 43 for the member 42. This stop nut 43 is held in its adjusted positions by the pin 44. The adjusting member 42 is knurled for convenience in adjustment or to facilitate grasping. The sleeve 40 is provided with a head portion 45 having laterally projecting lugs 46 with which the control lever engages, as best shown in Fig. 2. This head is provided with a stop 47 which engages the pivot ear 48 on the butt member 2 when the sleeve is in its forward position.

By adjustment of the adjusting nut or adjusting member 42 the forward movement of the

3

plunger rod and consequently the parts carried thereby may be determined or controlled thereof. To prevent turning of the plunger rod and the parts carried thereby the supporting spider 3 at the forward end thereof is provided with a guide 49, as is best shown in Figs. 5 and 6.

The barrel is provided with a head member 15 which is threaded thereon and provided with a front wall 16 having a central port 17 therein provided with an enlarged inner portion 18. The barrel head member 15 is of a substantially larger internal diameter than the internal diameter of the barrel so that in effect it provides an expansion chamber which coacts with other parts, to be described, in minimizing shock or water hammer. The outer end of the barrel head member is reduced at 181 and externally threaded to receive the inner or main nozzle member 19. This nozzle member 19 is provided with an outwardly tapered chamber 20 terminating in an elongated discharge port 21 surrounded at its inner end by a valve seat 22.

The plunger rod is provided with a head member 23 having an internally threaded stepped bore, the inner portion of which threadingly receives the end of the plunger rod as is illustrated. The barrel head member 15 is provided with an annular hub or support 115 for slidably supporting the plunger rod head member. This annular hub or support is supported by spider-like members or arms integral with the hub and barrel as shown in Figs. 1 and 3. The valve 24 is provided with a threaded stem portion threaded into the outer end of the head member 23. This valve is provided with a conical tip 25 adapted to engage or coact with the valve seat 22 and to project into the discharge port of the nozzle member 19 to regulate to some extent the flow therethrough.

The inner end of the chamber in the nozzle member 19 is preferably of a diameter substantially exceeding the diameter of the discharge port of the barrel head member so that this chamber reduces back pressure or water hammer and is also a fog or mist producing chamber resulting from the spiraling or swirling discharge thereto of the water through the spirally grooved swirl producing member 26 and coacting port 17. When the valve is closed the member 26 lies within the port 17 and remains therein through a substantial degree of retracting movement of the plunger rod. That is, this swirl or mist producing position or condition is maintained after the valve is substantially opened. The swirl member 26 is formed as a separate element, as shown in Fig. 3 and is secured in position by passing the valve stem therethrough, it being clamped upon the end of the plunger rod head by the valve.

It will be noted that when the valve is in fully open position the member 26 is within the annular hub or support 115 which provides a shield-like member into which the member 26 is retractible to prevent passage of the water through the member 26 and thereby prevent swirling of the water as it passes outwardly through the discharge port 17. This provides a perfect straight stream performance. The enlargement of the barrel head portion permits a substantially free flow of water therethrough when the valve is in this position and this provides for a substantially solid long range stream or jet. The structure provides for a wide variation in the character of the spray delivered from such long range stream to a fog or mist

4

type of spray. The structure is also adapted to provide a wide range or variation in discharge for the mist or fog type of spray. The use of the auxiliary nozzle substantially contributes to this wide range.

The delivery port of the main nozzle member is surrounded by an outwardly offset guard or flange 31 while the auxiliary nozzle member has a corresponding outwardly offset flange or guard 32 surrounding its delivery port or discharge. The purpose of this is two-fold, one important purpose in function being to control the delivery of the spray, that is, the flanges or guards materially reduce the spread or flare of the sprays delivered as they issue from the nozzle and consequently at the point of delivery. A further purpose of these flanges is to permit the gun to be used as a battering tool for battering openings through a wall or door and to protect the delivery ports or openings from being distorted or having their edges battered which would affect the delivery.

When the valve is in fully open position, as shown in Fig. 3, the apparatus is adapted to deliver a long range stream.

It is frequently desirable that the sprayer or gun be maintained in operation without the necessity for the operator to hold the control valve open. This may be effected by adjusting the adjusting member to the desired position. Occasions frequently arise where the operator desires to lay down the gun or position it to discharge in a pre-determined relation or position without attention from the operator and this adjusting means permits that type of use. To facilitate the variable use and adjustment of the apparatus the auxiliary nozzle 27 is peripherally knurled, as indicated, to facilitate grasping. However, the main nozzle member 19 has a smooth periphery so that it is not likely to be removed or loosened without the aid of a wrench, a hole 50 adapted to receive a spanner wrench being provided. The gasket 51 permits the main nozzle member 19 being clamped or tightened securely so that it is not likely to be inadvertently loosened or removed by the removal of the auxiliary nozzle member. An operator may have occasion to remove the auxiliary nozzle or place it in use one or more times during the progress of a fire.

To further control the character of the spray or the discharge of the nozzle I provide an auxiliary nozzle member 27 which is demountably threaded upon the nipple like projection 28 on the outer end of the main nozzle member. It will be understood that I use the term main and auxiliary nozzle members largely as a matter of convenience in description. The auxiliary nozzle member is provided with an elongated outwardly tapered passage 29 terminated in a delivery orifice 30 which is of substantially less diameter than the delivery port of the main nozzle member.

In the embodiment illustrated the auxiliary nozzle 27 is provided with a supporting ring 33 connected by the chain 34 to the clip 35 on the barrel. The purpose being that the auxiliary nozzle member may be removed from the main nozzle member when the conditions indicate that that is desirable. If desired, the fireman may be provided with more than one of the auxiliary nozzles so that they may be selectively used.

One of the objects of my present invention is to provide an apparatus which is particularly desirable for use in fire fighting equipment in which

5

a tank is the source of the water supply, for example, in regions where there is no water supply system under pressure. It will be appreciated that in such conditions conserving of water is highly important and it is, of course, recognized that it is highly important to use a minimum of water to avoid unnecessary water damage in fighting of fire.

The arrangement of the chambers or orifices in the barrel head and nozzle members further minimizes the water hammer or shock, in fact, substantially eliminates it so that a minimum of effort is required on the part of the operator to hold the valve open and in any adjusted position which enables the continued delivery of the kind of a stream or spray deemed most efficient for the particular conditions upon which it is directed or designed to meet.

I am aware that fire fighting apparatus of the so-called fog gun type have been used but in my invention I have overcome objections which are incident to all of such apparatus, so far as they have come to applicant's knowledge.

I have illustrated and described my improvements in a highly practical embodiment thereof. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A structure of the class described comprising, a barrel provided with a grip adapted as a supply conduit, a control lever pivotally associated with said grip, a plunger rod slidably supported in said barrel and operatively connected with said control lever, a barrel head member mounted on the outer end of said barrel and having a chamber of an internal diameter substantially exceeding that of the barrel, said head member having an end wall provided with a central port having an enlarged inner end portion, a main nozzle member removably threaded on said head member and having an outwardly tapered chamber terminating in an elongated discharge port, there being a valve seat at the inner end of said port, the diameter of said main nozzle member chamber at its inner end substantially exceeding that of said barrel head port, an auxiliary nozzle member connected to the outer end of said main nozzle member and having an outwardly tapered passage therein terminating in an elongated delivery orifice, the diameter of the delivery orifice of the auxiliary nozzle member being less than the diameter of the discharge port of the main nozzle member, a plunger rod head member threaded on said plunger rod and reciprocable within said barrel head member, a tapered valve threaded into the outer end of said plunger rod head member to engage said main nozzle member valve seat to close the main nozzle member discharge port, a spirally grooved swirl member mounted at the outer end of said plunger rod and reciprocable into and out of said discharge port of said barrel head member, and a spring acting to bias said plunger rod to valve closing position.

2. A structure of the class described comprising, a barrel provided with a grip adapted as a supply conduit, a control lever pivotally associated with said grip, a plunger rod slidably supported in said barrel and operatively connected with said control lever, a chambered barrel head member

6

mounted on the outer end of said barrel and having an end wall provided with a central port having an enlarged inner end portion, a main nozzle member removably threaded on said head member and having a chamber terminating in an elongated discharge port, there being a valve seat at the inner end of said port, an auxiliary nozzle member connected to the outer end of said main nozzle member and having an outwardly tapered passage therein terminating in an elongated delivery orifice, the diameter of the delivery orifice of the auxiliary nozzle member being less than the diameter of the discharge port of the main nozzle member, a plunger rod head member threaded on said plunger rod and reciprocable within said barrel head member, a tapered valve threaded into the outer end of said plunger rod head member to coact with said main nozzle member valve seat to close the main nozzle member discharge port, a spirally grooved swirl member mounted at the outer end of said plunger rod head member and reciprocable into and out of said discharge port of said barrel head member, and a spring acting to bias said plunger rod to valve closing position.

3. A structure of the class described comprising, a barrel, a manually actuated plunger rod slidably supported in said barrel, a barrel head member mounted on the outer end of said barrel and having a central discharge port, a main nozzle member mounted on said head member and having a discharge port adjacent its outer end and having a valve seat at the inner end of said port, an auxiliary nozzle member detachably mounted upon said main nozzle member and having an outwardly tapered passage therein terminating in an elongated delivery orifice of less diameter than that of said main nozzle member discharge port, a valve on said plunger rod to coact with said valve seat to close said main nozzle member discharge port, and a swirl producing member mounted at said plunger rod and reciprocable into and out of said discharge port of said barrel head member.

4. A spray structure of the class described comprising, a barrel, a manually actuated plunger rod slidably supported in said barrel, a barrel head member mounted on the outer end of said barrel and having a central discharge port, a main nozzle member mounted on said head member and having a discharge port adjacent its outer end, there being a valve seat at the inner end of said main nozzle member discharge port, said main nozzle head member being provided at its outer end with a guard spaced outwardly from its said port, an auxiliary nozzle member detachably mounted upon said main nozzle member and having an outwardly tapered passage therein terminating in an elongated delivery orifice, said auxiliary nozzle being provided with a guard spaced outwardly from its delivery orifice, a valve mounted on said plunger rod to coact with said main nozzle member valve seat, and a swirl producing member mounted on said plunger rod and reciprocable into and out of said discharge port of said barrel head member.

5. In a structure of the class described, the combination of a barrel provided with a head portion having an internal diameter exceeding that of the barrel and provided with a central discharge port, a manually actuated plunger rod slidably supported in said barrel, a main nozzle member mounted on said head and having a chamber terminating in a discharge port, there being a valve seat at the inner end of said port,

7

the diameter of said main nozzle member chamber at its inner end substantially exceeding that of said barrel head port, an auxiliary nozzle member removably mounted upon said main nozzle member and having an outwardly tapered passage therein terminating in an elongated delivery orifice of less diameter than that of said discharge port, a valve mounted on said plunger rod to coact with said main nozzle member valve seat, and a swirl producing member mounted at the outer end of said plunger rod head and reciprocable into and out of said discharge port of said barrel head portion.

6. A structure of the class described comprising, a barrel provided with a head portion, a plunger rod reciprocable within said barrel, a spider like support for the forward end of said plunger rod slidable within said barrel, said barrel being provided with longitudinal guides coacting with said support to prevent rotation of the rod while permitting reciprocating movement thereof, a nozzle for said barrel head portion, a valve operatively connected to said plunger rod for controlling said nozzle, a control lever for said plunger rod, a member reciprocatingly mounted on said barrel and operatively associated with said control lever to be actuated thereby, and an adjusting member threaded upon said rod for adjustment relative thereto and operatively associated with said reciprocating member whereby said plunger rod may be adjusted to limit the closing movement of the valve while permitting further opening from the adjusted position by said control lever.

7. A structure of the class described comprising, a barrel provided with a head portion, a

8

non-rotatably supported plunger rod reciprocable within said barrel, means for preventing rotation of said plunger-rod relative to the barrel, a nozzle for said barrel, a valve operatively connected to said plunger rod for controlling said nozzle, a control lever for said plunger rod, an adjusting member threaded upon said rod for adjustment relative thereto and operating connections between said adjusting member and control lever whereby said control member may be adjusted to limit the closing movement of the valve while permitting further opening from position by said control lever.

BENJAMIN D. BARTON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
615,434	Cunningham	Dec. 6, 1898
1,081,102	Dyke	Dec. 9, 1913
1,509,671	Fish et al.	Sept. 23, 1924
1,686,885	Trisler	Oct. 9, 1928
1,716,195	Stockstrom	June 4, 1929
1,763,687	Chadwick et al.	June 17, 1930
1,813,083	Pyankow	July 7, 1931
2,225,759	Strout	Dec. 24, 1940
2,238,521	Gustafson	Apr. 15, 1941
2,520,824	Barton	Aug. 29, 1950

FOREIGN PATENTS

Number	Country	Date
460,331	Great Britain	Jan. 26, 1937