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J. F. BROWN
SELF-CLOSING NOZZLE

2,730,274

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FIG. 1.

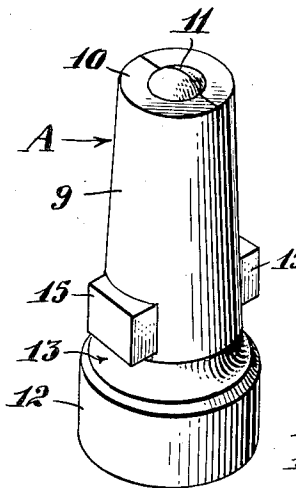


FIG. 2.

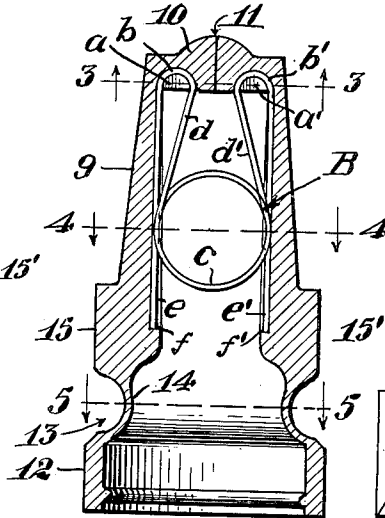


FIG. 3.

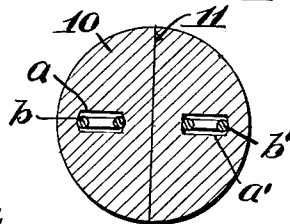


FIG. 4.

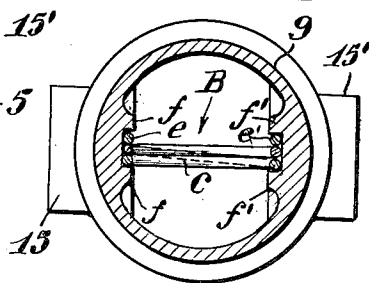


FIG. 6.

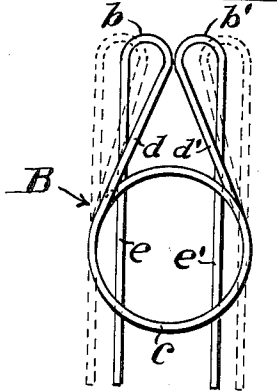


FIG. 7.

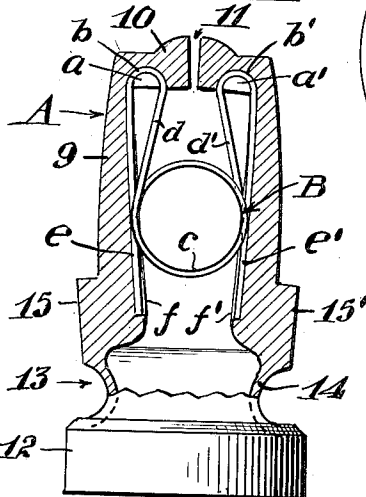


FIG. 5.

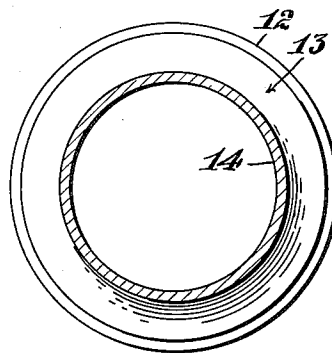
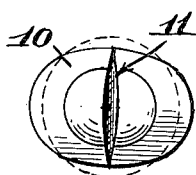


FIG. 8.



Inventor
John F. Brown;

By

R. S. Barry

Attorney

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SELF-CLOSING NOZZLE

John F. Brown, Los Angeles, Calif.

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3 Claims. (Cl. 222-490)

This invention relates to a nozzle and has as its primary object the provision of a nozzle which on being manually opened to permit the passage of fluid therethrough will automatically close when released to cut off the flow of fluid therethrough and then be maintained in its closed position under spring pressure until manipulated to effect opening thereof.

Another object is to provide a flexible nozzle embodying an end wall formed with a discharge outlet comprising a slit the sides of which are adapted to abut each other to close the outlet and to be spread apart to open the outlet and in which spring means are provided and arranged to impose yieldable pressure upon the side walls of the slit to maintain it in a closed position and also to provide a construction whereby the spring means may be manually actuated in opposition to tension thereof to spread the side walls of the slit apart.

A further object is to provide a spring for the purpose above set forth which may be readily formed and assembled in its operative position within the nozzle and which is so formed that a portion of the spring will serve as a fulcrum on which end portions thereof may be rocked in effecting manipulation of the nozzle to open it to discharge.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed and as illustrated by way of example in the accompanying drawing in which:

Fig. 1 is a perspective view of the nozzle;

Fig. 2 is a view of same in cross section showing the nozzle in its closed position;

Fig. 3 is a horizontal section taken on the line 3-3 of Fig. 2 as seen in the direction indicated by the arrows;

Fig. 4 is a horizontal section taken on the line 4-4 of Fig. 2 as seen in the direction indicated by the arrows;

Fig. 5 is a view in cross section as seen on the line 5-5 of Fig. 2 as seen in the direction indicated by the arrows;

Fig. 6 is a view in elevation of the spring element showing it as detached;

Fig. 7 is a sectional view similar to Fig. 2 showing the nozzle in its open position; and

Fig. 8 is an end view of the nozzle shown in Fig. 7 depicting the discharge end of the nozzle in its open position.

In the drawing A indicates generally a tubular nozzle embodying an annular side wall 9 fitted with an outer end wall 10 formed with a transverse slit 11 constituting a discharge outlet. The inner inlet end of the nozzle comprises an annular collar 12 by which the nozzle is attached in any suitable conventional fashion to a container, as by a snap-on, screw, or permanent connection. The nozzle is formed of a pliable, flexible or resilient material, such as rubber or a plastic, so that it may be flexed to contract the side wall 9 and to distort the end wall 10 to open the slit 11. In order to facilitate contrac-

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tion or distortion of the side wall 9 the latter is formed at its juncture with the collar 12 with a peripheral channel 13 the wall of which constitutes a thin pliable web 14 adapted to flex under inward pressure being imposed on the lower portion of the side wall and to return to normal on relief of such pressure. Finger engaging lugs 15-15' are formed on diametrically opposite sides of the nozzle contiguous with the web 14; the lugs being disposed perpendicular to the length of the slit 11.

The end wall 10 is formed interiorly thereof with aligned elongated recesses *a-a'* disposed at opposite sides of the slit; and mounted within the nozzle is a spring B having end portions *b-b'* extending into the recesses *a-a'* and tensioned to urge the sides of the slit 11 against each other to close the nozzle outlet; the end portions *b-b'* exerting an inward thrust against the adjacent ends of the recesses at opposite sides of the slit.

The spring B comprises a length of resilient wire formed with a bend or coil *c* intermediate its ends having extended terminals *d-d'* which converge toward each other and terminate in return bends forming the end portions *b-b'*; the end portions *e-e'* of the spring wire extending in spaced parallel relation toward and projecting past or beyond the bend or coil *c* and constituting arms which when the spring is assembled in the nozzle extend along and bear against the opposed inner faces of the wall 9 opposite the lugs 15. The opposite side portions of the coil *c* also bear against the wall 9 contiguous with the arms *e-e'* so as to form an abutment to hold the portion of the nozzle engaged thereby against collapse and also to serve as a fulcrum on which the opposite sides of the nozzle will rock on advancing the lugs 15 toward each other.

The spring B is formed as shown in full lines in Fig. 8 with the end portions *b-b'* abutting, and is placed under tension by spreading the end portions *b-b'* apart as indicated in dotted lines and as shown in Figs. 2 and 7, on mounting the spring in the nozzle. The side wall of the nozzle being formed of a pliable material is capable of being flexed and accordingly in order to insure opening of the slit 11 in the nozzle end wall by compressing the inner end portion of the nozzle, the side wall is formed with longitudinally extending diametrically opposed stiffening ribs *f-f'* arranged only on the side portions of the nozzle perpendicular to the slit, that is on the side portions carrying the finger engaging lugs 15-15' and against which portion the end portions *e-e'* of the spring B abut. The ribs *f-f'* impart sufficient stiffness to the opposed sides of the nozzle that on pressing the lugs 15-15' inwardly this longitudinally reinforced portion of the nozzle wall will rock slightly on the abutment afforded by the coil *c* of the spring so as to elongate or distort the end wall 10 transversely of the slit 11 from opposite sides thereof so as to effect spreading of the sides of the slit relative to each other thus opening the nozzle.

The spring terminals *e-e'* also effect a stiffening action in cooperating with the ribs *f-f'*. The arcuate portions of the side wall 9 extending between the stiffening ribs *f-f'* being pliable and when formed of ribbon being elastic will distort or stretch circumferentially sufficiently to permit relative outward or spreading movement of opposed outer end portions of the nozzle on the complementary inner end portion being pressed inwardly through the lugs 15-15', while the inner end portions of nozzle extending circumferentially between the lugs will slightly buckle as will the thin web 14 of the channel 13 on inward movement of the lugs 15-15' toward each other.

In effect, the reinforced or stiffened opposed side portions act as levers with the abutments afforded by the loop

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serving as a fulcrum, such portions being rocked in one direction in opposition to the spring on pressing inwardly on the lugs and being moved in the opposite direction under the urge of the spring on release of the lugs after depression thereof.

In the operation the spring B normally acts to hold the sides of the slit 11 in abutting relation under pressure thus closing the nozzle outlet as shown in Fig. 2. To open the nozzle the lugs 15—15' are pressed toward each other thereby moving the side portions of the nozzle abutted by the spring arms *e—e'* toward each other which with the sides of the nozzle tube abutting the bend or coil *c* will move inwardly and thereby spring the end portions *b—b'* slightly outward sufficiently to open the slit 11 as indicated in Fig. 8 and thereby opening the nozzle to permit the passage of fluid therethrough. Manifestly on releasing the lugs 15—15' the spring B will restore the nozzle to its closed position.

I claim:

1. A nozzle comprising a flexible annular side wall and an end wall formed with a transverse slit having sides adapted to abut each other and to be spread apart, stiffening ribs extending longitudinally of said side wall on diametrically opposed side portions thereof perpendicular to said slit, a spring in said nozzle embodying a coil diametrically opposed portions of which abut the side wall contiguous with said ribs intermediate the ends thereof, said coil having a pair of end portions projecting from one side thereof and engaging said end wall on opposite sides of said slit in spaced relation to said coil and being tensioned to normally close the sides of said slit against each other; the side wall of said nozzle having an inner end portion extending from the side of said coil opposite said projecting spring end portions, said coil having arms projecting from the other side thereof and bearing against

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opposed inner faces of said ribbed portions, said ribbed portions of said side wall being adapted to rock on said coil on diametrical compression of the inner end portion of the nozzle to move the arms of said coil toward each other and thereby expand said slit to an open position.

2. The structure called for in claim 1 in which said spring has terminal portions leading from said end portions longitudinally of the nozzle side wall and abutting thereagainst adjacent said ribs.

3. A nozzle comprising a tubular body having a resilient side wall and a wall at one end formed with a transverse slit providing the outlet for the nozzle and having recesses on the opposite sides of said slit, said body having means at the other end for attachment to a container and provided exteriorly thereof on diametrically opposite sides with finger-engaging lugs; opposed stiffening ribs extending longitudinally of said wall; a coil centrally disposed in said body and engaging said ribs at opposite sides thereof, said coil having end portions extending from one side of said coil and disposed in said recesses to close the sides of said slit against each other, said coil having spaced end portions extending from the other side of said coil and lying against the inner faces of said opposed stiffening ribs, said stiffening ribs being adapted, by pressure on the lugs of said body, to fulcrum on said coil and move the end portions of said coil toward each other and thereby expand the slit.

References Cited in the file of this patent

UNITED STATES PATENTS

1,531,245	Ozanne	Mar. 24, 1925
1,738,080	Smith	Dec. 3, 1929
1,964,860	Rabe et al.	July 3, 1934
2,261,310	Sullivan	Nov. 4, 1941