J. R. GAMMETER.

FIRE EXTINGUISHER.

APPLICATION FILED JUNE 15, 1915.

1,207,534.

Patented Dec. 5, 1916.

3 SHEETS—SHEET 1.

FIG. 1.

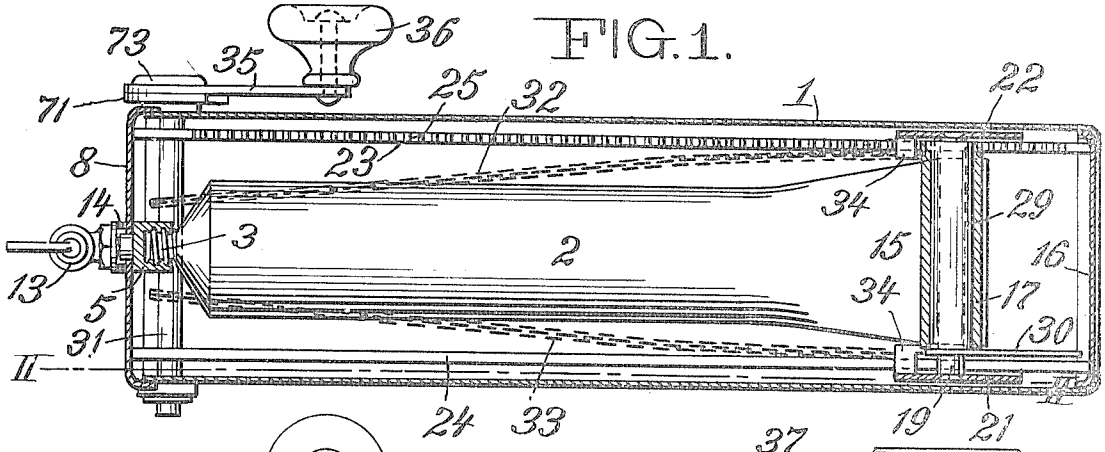
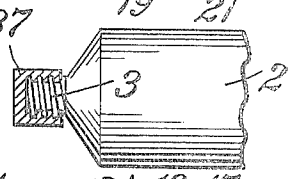


FIG. 2.



FIG. 3.



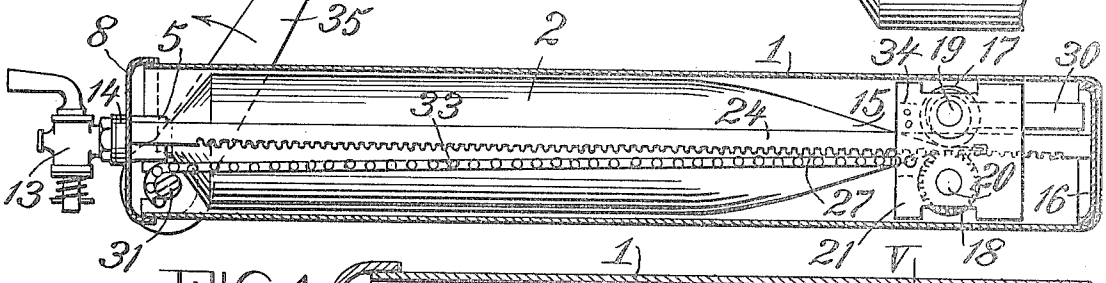


FIG. 4.

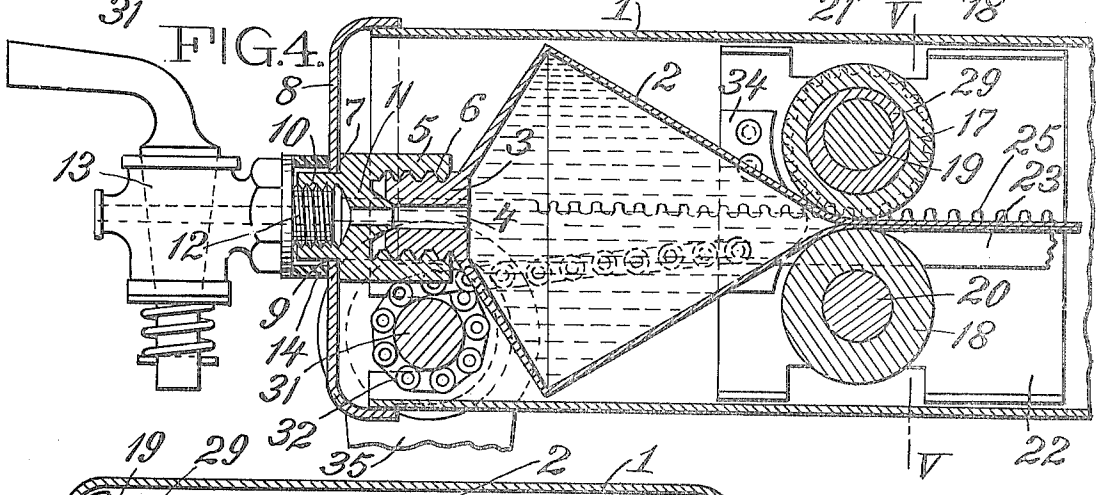
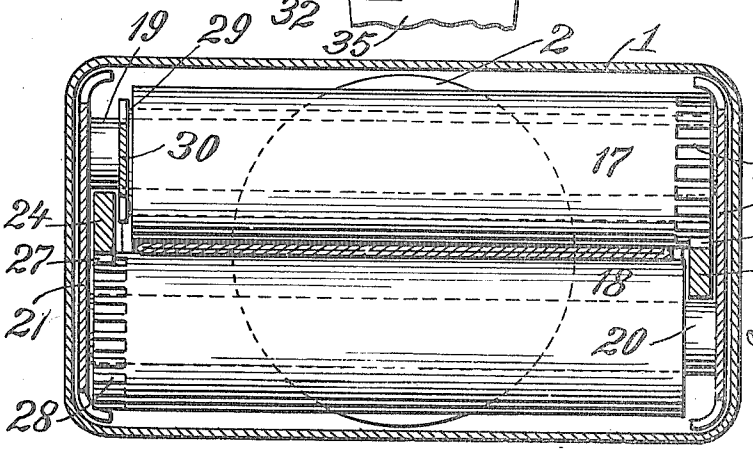


FIG. 5.



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3 SHEETS-SHEET 2.

FIG. 6.

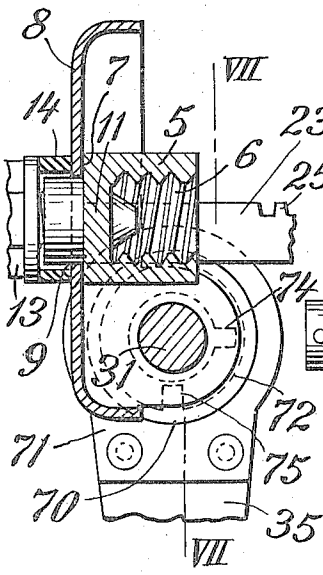


FIG. 7.

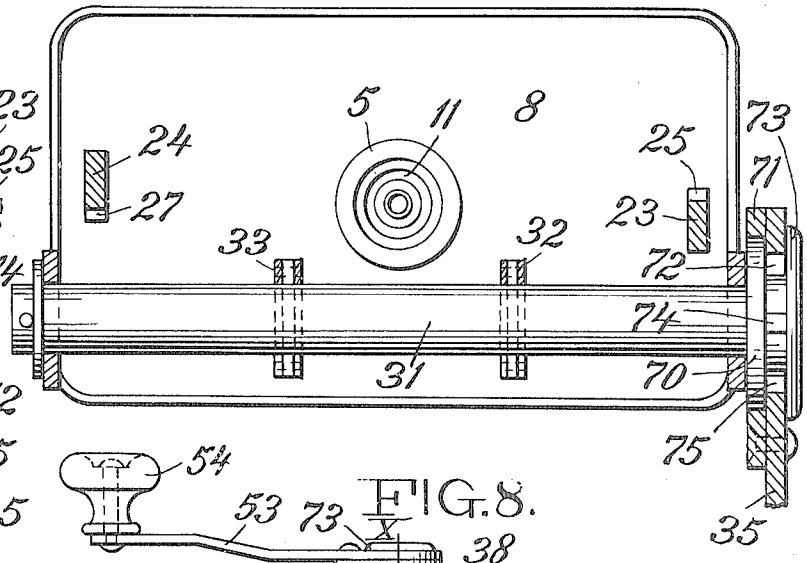


FIG. 8.

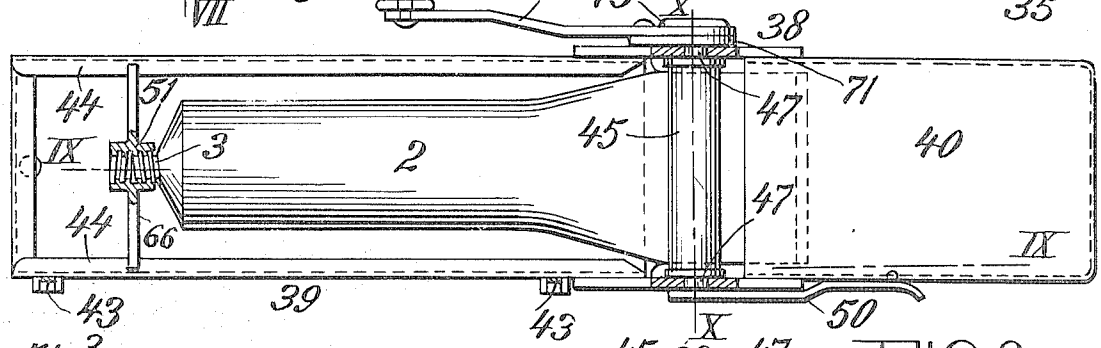


FIG. 9.

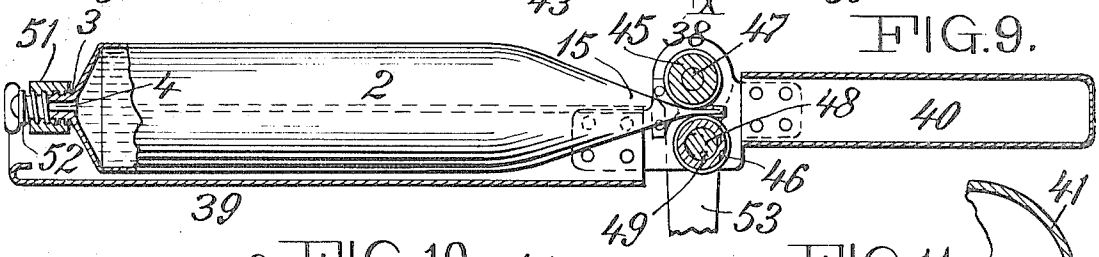


FIG. 10.

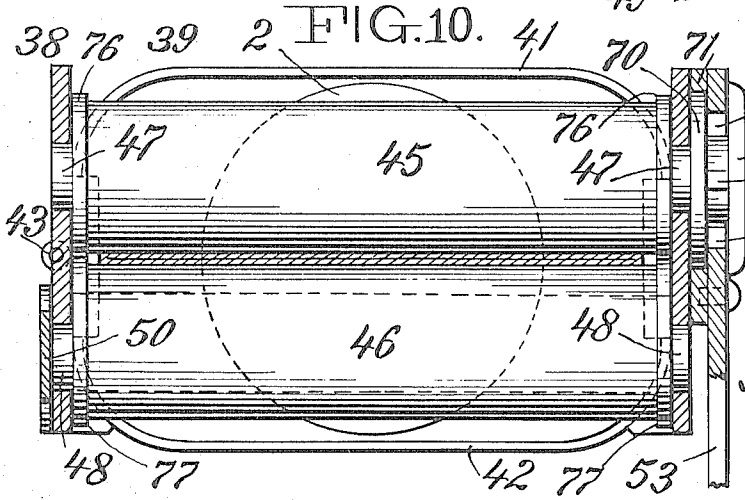
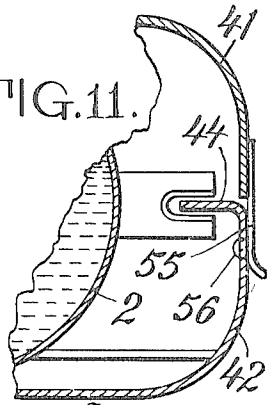


FIG. 11.



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3 SHEETS—SHEET 3.

FIG.12.

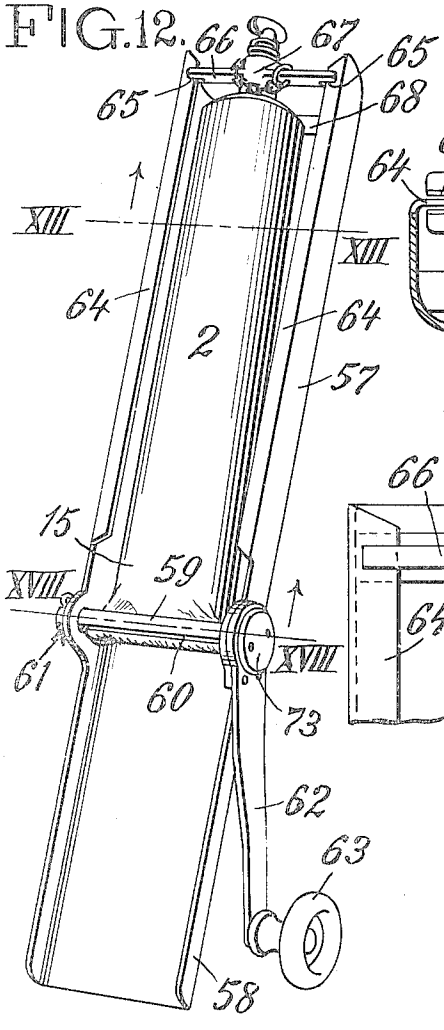


FIG.13.

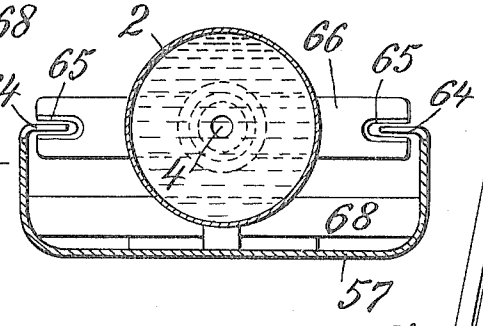


FIG.14.

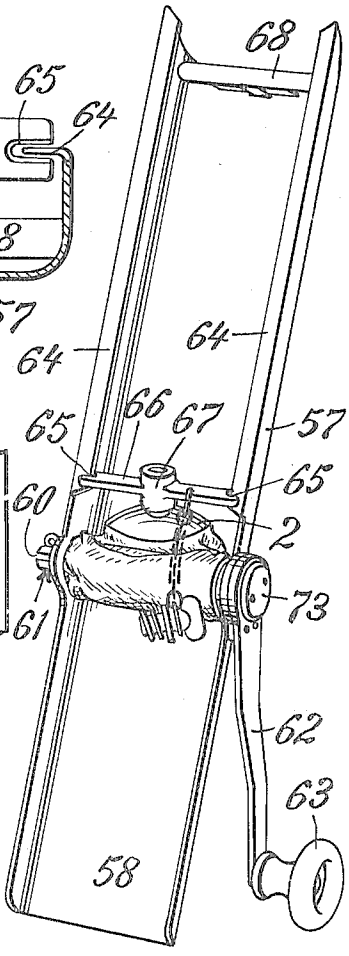


FIG.15.

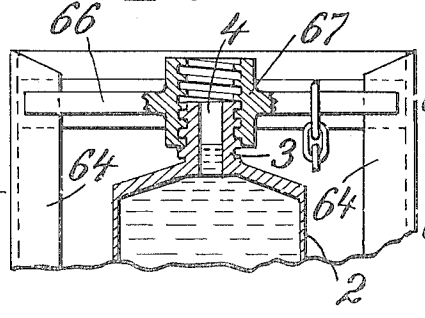


FIG.16.

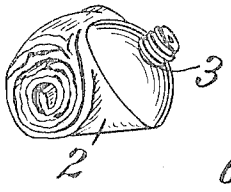


FIG.17.

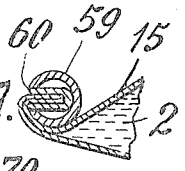


FIG.18.

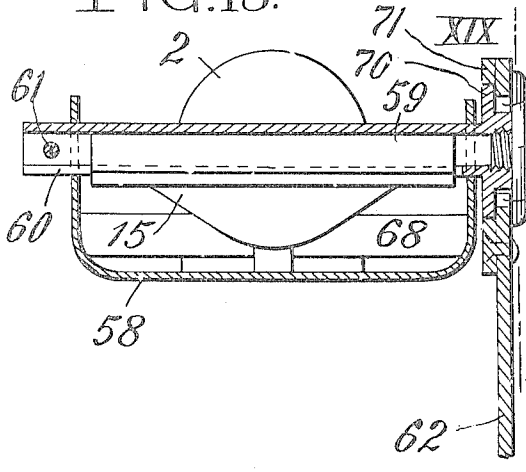
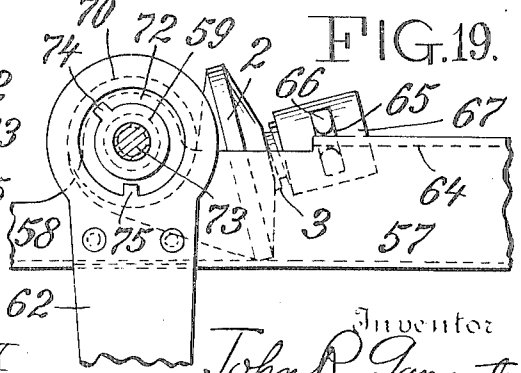


FIG.19.



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FIRE-EXTINGUISHER.

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Application filed June 15, 1915. Serial No. 34,134.

To all whom it may concern:

Be it known that I, JOHN R. GAMMETER, a citizen of the United States, residing at Akron, county of Summit, and State of Ohio, have invented certain new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

This invention relates to portable or hand fire extinguishers and more specifically to an extinguisher of this type comprising a replaceable container for fire extinguishing material.

The objects of my invention are first, to provide a device of the portable and refillable type in which the fire extinguishing contents may be forcefully and completely ejected under a controllable pressure that may be maintained substantially uniform during the entire operation; second, to provide such a device which shall be so simple and certain in its operation that no mistake can be made in its use; third, to provide such a device which, while always ready for use, shall require no inspection or maintenance to keep it in operable condition; fourth, to provide such a device at a cost that will admit its general adoption by the public; and fifth, to provide for the convenient recharging of such a device by the user, by the insertion of the new charge of fire extinguishing material in packaged form, that may be easily and safely handled, shipped and inserted without detriment to the efficiency of the material.

With these general objects in view, and other incidental features of utility and advantage that will be plain from the following description, my invention consists of a removable collapsible container adapted to contain a fire extinguishing substance, a frame therefor of substantially rigid material, and hand-operated compression means for collapsing the container and expelling the fire extinguishing material therefrom.

In the accompanying drawings, in which similar reference numerals designate similar parts, are represented several embodiments of my invention.

Figure 1 is a plan view of the device partly in section showing the collapsible container inserted in the casing ready for use; Fig. 2 is a longitudinal sectional elevation on the line II—II of Fig. 1; Fig. 3 is a detail view of the container with a closure cap showing the form in which the container is furnished to the user; Fig. 4 is a substantially central longitudinal sectional elevation showing the cage and compression members moving toward the nozzle of the container to expel the fire extinguishing substance; Fig. 5 is a cross-sectional elevation on the line V—V of Fig. 4; Fig. 6 is a fragmentary detail view of the head end of the machine; Fig. 7 is a transverse sectional elevation on the line VII—VII of Fig. 6; Fig. 8 is a plan view partly in section and with a portion of the casing removed showing a modification wherein the compression members are fixed; Fig. 9 is a longitudinal section on the line IX—IX of Fig. 8, showing the end of the container in position between the compression rollers; Fig. 10 is a transverse sectional elevation on the line X—X of Fig. 8; Fig. 11 is a fragmentary detail view showing the container and casing and means for guiding the container; Fig. 12 is a perspective view showing another modification including a single roller to which the end of the container may be attached and upon which, on rotation, the container is wound up and its contents expelled by compression; Fig. 13 is a transverse sectional elevation on the line XIII—XIII of Fig. 12; Fig. 14 is a view similar to Fig. 12 showing the container compressed and wound up after the expulsion of its contents; Fig. 15 is a longitudinal sectional detail view showing the nozzle end of the container and the movable carriage for supporting it; Fig. 16 is a perspective view of the compressed container after removal from the carriage; Fig. 17 is a fragmentary view showing the manner of fastening the container to the roller prior to winding the container on the roller; Fig. 18 is a transverse sectional elevation on the line XVIII—XVIII of Fig. 12; and Fig. 19 is a vertical sectional elevation on the line XIX—XIX of Fig. 18.

Referring now more particularly to the drawings, the embodiment included in Figs. 1 to 8 comprise a substantially rectangular casing 1 preferably consisting of rigid material, such as brass, copper, etc. Within the casing the removable container 2, for a fire extinguishing substance such as carbon tetrachlorid, is placed. This container, as shown, is of substantially cylindrical form and is made of hard material, for example, copper, brass, German silver, etc., of sufficient thinness to be collapsible, or is composed preferably of a soft metal, for ex-

ample, lead. The container is provided with a screw-threaded boss 3, which, as shown more clearly in Fig. 4, is provided with an interior passage 4 for the ejection of liquid therethrough. This boss is adapted to be engaged by means of a nipple member 5 which is interiorly screw-threaded at 6 to engage the screw threads of the boss 3. This nipple is provided with shoulders 7 which engage the removable front wall 8 of the casing adjacent the orifice 9 therein, through which a portion of the nipple projects. The projecting portion of the nipple is likewise provided with screw threads 10 and is separated from the portion of the nipple provided with the screw threads 6 by an orificed diaphragm 11 having an inwardly projecting conical portion to provide a tight engagement with the similarly inclined mouth of the orifice 4. Engaging the screw threads 10 of the projecting portion of the nipple are the screw threads 12 on a boss projecting from a conventional type of spray nozzle 13. Between the spray nozzle and surrounding the boss thereof is a washer ring 14 abutting the outer face of the wall 8 opposite the shoulders 7. This manner of fitting the nozzle to the container insures a tight engagement between the parts and insures against leakage. The end of the container opposite the spray nozzle is preferably flattened, as shown more clearly in Fig. 2, providing a tail member 15, which, when the extinguisher is filled, is in a position adjacent the fixed rear end 16 of the casing. Situated adjacent this tail member and adapted to engage therewith is a compression means comprising an upper roller 17 whose surface is adapted to contact with the upper surface of the container 2, and a lower roller 18 whose surface is adapted to contact with the lower surface of the container 2. The rollers 17 and 18 are spaced such distance apart that they tightly squeeze the walls of the container 2 to thereby urge the fire extinguishing substance toward the discharge end of the container. The rollers 17 and 18 are mounted respectively on substantially parallel shafts 19 and 20 which extend transversely of the casing 1. These shafts are mounted in a cage having side walls 21 and 22 corresponding in general outline to the side walls of the casing. This cage is supported in turn by rack members 23 and 24 which, as shown more clearly in Fig. 7, are attached to the front wall 8 of the casing. These rack members 23 and 24 extend longitudinally throughout the entire length of the casing, their ends being fastened to the front and rear walls, respectively. The rack member 23 with its upwardly extending teeth 25 passes under the roller 17 and thereby supports one side of the roller and cage construction mentioned, as shown more clearly in Fig. 5. The teeth 25 engage corresponding depressed teeth 26 at the edge of roller 16 for a purpose hereinafter set forth. The other rack member, with its downwardly extending teeth 27, supports the other side of the roller and cage construction set forth through its upper edge, which contacts with the shaft 19. The end of the roller 18 adjacent the rack member 24 is provided with depressed teeth 28 for engagement with the teeth of the rack member for a purpose hereinafter stated.

As shown in Fig. 4, the roller 17 is mounted eccentrically with respect to the shaft 19 by means of an eccentric collar 29 interposed between the shaft 19 and the roller 17. The roller is adapted to revolve freely on this collar. The collar extends to a point just beyond the end of the roller opposite the teeth 26 and is provided at its extremity with a handle 30. By rotation of this handle the upper roller 17 may be raised a sufficient distance to permit the insertion of the extremity of the tail 15 of the container. When this has been accomplished the compression means is then in position to be operated. The compression means are given both a translatory and rotary motion with relation to the container and casing. The device for providing relative motion of the cage and roller construction is a tractor mechanism which comprises a shaft 31 having bearings in projections on the front wall 8 of the casing adjacent the bottom thereof. Attached to this shaft, on either side of the center thereof and just beneath the boss 3 of the container are the tractor chains 32 and 33 which extend in divergent directions to two plates 34 attached, respectively, to the walls 21 and 22 of the cage. The chains 32 and 33 are attached to these plates. The shaft 31 is rotated by means of a lever 35 provided with a handle 36. As shown in Figs. 6 and 7, the shaft 31 is provided with an enlarged head 70 upon which is mounted a ring 71 to which is attached the lever 35, which is provided with an aperture 72. A head 73 screw-threaded into the end of the shaft 31 holds the shaft and lever together. The head 70 is provided with a lug 74 coacting with a lug 75 on the inner surface of the aperture 72. The handle is thus free to move through a limited arc without operating the device, but when the lugs 74 and 75 contact the shaft will be turned and the compression rolls advanced. Accidental operation of the device is thus minimized. Upon rotating the shaft 31 through the lever 35 the chains 32 and 33 will be wound about the shaft and will provide a motion of translation to the rollers and cage. When this movement of translation begins, the teeth 26 and 28 of the rollers 17 and 18 will contact, respectively, with the teeth 25 and 27 of the rack members 23 and 24 and will

thereby provide a rotary motion for the rollers. The compression rollers will thus advance while rotating and will contact with successive portions of the surface of the container 2. As the compression members advance and traverse the container of course the collapsing of the walls of the container will urge the carbon tetrachlorid or other fire extinguishing material through the orifices of the boss, nipple, and spray nozzle. It will be noted, according to this mode of operation, and as shown more clearly in Fig. 4, that the container simply flattens out like a ribbon, so that when the compression has been extended over the entire surface of the container from the extremity of the tail 15 practically up to the boss 3, the container may be unscrewed from the nipple, the roller 17 may be raised from the roller 18, and the container may be easily removed in this flattened form from the apparatus. In order to remove the container the spray nozzle 13 is unscrewed and the front of the casing with the rack members 23 and 24 and rear end wall 16 are removed. The nipple 5 is then unscrewed from the boss 3 of the container and the lever 30 is rotated to raise the roller 17 to thereby release the container, which may then be withdrawn. A new container, which will ordinarily be supplied in the form as shown in Fig. 3, may then be inserted. These stock containers, however, will be provided with an auxiliary closure cap 37, which upon insertion of the container in the casing will be removed. The operation then of screwing the boss 3 into the nipple 5 and securing the spray nozzle, etc., is carried on in the reverse manner to that already indicated for the removal of the discharged container.

The construction as outlined provides an efficient means for discharging a container at constant, regulable and uniform pressure until emptied. There are few parts to get out of order, the compressing mechanism may be operated to provide a rapid discharge of the fire extinguishing substance, and a filled container may be quickly and easily inserted after discharge of an empty container.

Referring now more particularly to the showing in Figs. 8 to 11, the modification there shown includes a casing 38, which, as shown more clearly in Figs. 8 and 10, is provided with a substantially oval-shaped sectional portion 39 for holding the charged container and a flattened substantially rectangular rear portion 40 for receiving the discharged container 2. The container portion 39 of the casing is divided into an upper section 41 and a lower section 42 which are hinged at 43. The lower section 42 is provided with inwardly projecting flanges 44 on either side thereof, which serve as guide members for the guide bar 66 projecting laterally from and formed integral with the nipple 51. Intermediate the portions 39 and 40 of the casing is fixed a pair of compression rollers, the upper one indicated by 45 and the lower by 46. These rollers rotate but are mounted in fixed position with respect to the container. The upper roller 45 is mounted on the shaft 47 and the lower roller 46 is mounted on the shaft 48, which is fixed to an eccentric 49 upon which the roller 46 rotates. A lever 50 on the outside of the casing is connected to the shaft 48 and eccentric 49 in order to lower the roller 46 to permit the insertion of the tail 15 of the container 2 in a manner similar to that already indicated in connection with the description of Figs. 1 to 7. It will of course be understood that the container here shown is similar to that already described above. The boss 3, as more clearly shown in Fig. 9, is attached to a nipple 51 surrounding the boss into which screws the stopper 52. The roller 45 is provided with a lever 53 having a handle 54. Upon rotation of the upper roller a sufficient compression is provided to urge the container to slide between the rollers and to emerge into the section 40 of the casing as a flattened ribbon. Rollers 45 and 46 have flanges 76 and 77 at each end which, by bearing against each other, serve to limit the space between the rollers for passage of the compressed container. The lever 53 is connected to the shaft 47 as heretofore described in connection with Figs. 6 and 7. The fire extinguishing substance is of course expelled at the spray nozzle as heretofore. In the replacement of the container, the roller 46 may be lowered by rotating the lever 50, the discharged container may be removed and a new one inserted in its place. The rollers may then be brought to engaging position and the hinged upper section 41 which has been thrown back to permit the replacement may then be swung back and secured by means of the spring catch 55 which is attached to the side wall of the upper portion 41, and engages by means of a button 56 a socket in the lower section 42.

Referring now more specifically to the embodiment shown in Figs. 12 to 19, the container 2 is there shown mounted in a casing of substantially U-shaped cross-section. The casing comprises a forward portion 57 adapted to receive the container and a rear portion 58 which is an elongation of the portion 57 and which aids in holding the extinguisher in position when it is operated. Intermediate the portions 57 and 58 of the casing is placed a roller 59 adapted to compress the container 2 to thereby expel the fire extinguishing substance. This roller is provided with a slit 60 into which the extremity of the tail 15 of the container may be inserted. In order that this extremity may be slid under the roller 59 and brought

up on its rear face, the roller is positioned a short distance above the base of the casing and is held in that position by the side walls of the casing. As shown more clearly in Fig. 18, the roller 59 is mounted so that it may be removed from the casing, being held in place at one end by a cotter-pin 61. It is provided at the opposite extremity with a lever 62 provided with a handle 63. The lever is connected to the shaft 59 as heretofore described in connection with Figs. 6 and 7. The forward portion 57 of the casing is provided with inwardly extending flanges 64 which serve as guide members. Coacting with these guide members, as shown more clearly in Fig. 13 are notches 65 formed in opposite extremities of the guide bar 66 which is attached to the spray nozzle 67 at the exit end of the container. In order to strengthen the casing a cross bar 68 is provided adjacent its front end. Assuming that a container is to be inserted for the operation of the device, the container 2 is slid into the casing until the extremity of its rear portion 15 is beneath the roller 59. The extremity, as shown more clearly in Fig. 17, is then bent around into position to be inserted in the slot 60 of the roller. Having been so secured, the notches 65 in the guide bar are arranged to coact with the flanges 64 of the casing. The spray nozzle 67 is opened and the lever 62 is rotated. This rotation will cause the winding up of the container upon the roller, the collapsing of the walls, and the ejection of the fire extinguishing substance through the spray nozzle. When the container has been discharged it will occupy the position shown in Fig. 14. In order to make the apparatus ready for the reception of a new container, the cotter-pin 61 is removed and roller 59 may be withdrawn transversely of the casing, its slit 60, which extends through to the extremity opposite the lever 62 permitting the end of the container to slide therethrough. The container upon removal will appear approximately as shown in Fig. 16.

It will thus be seen that the objects heretofore enumerated are accomplished by the embodiments of the invention described in an efficient and simple manner.

While I have shown in the drawings and described in detail certain preferred embodiments of my invention, I do not desire to be limited to the specific forms thereof except as indicated in the appended claims.

Having thus described my invention, I claim:

1. In a fire extinguisher, in combination, a collapsible container for a fire extinguishing substance, a pair of compression rollers, said container resting between said rollers, and mechanism, independent of said container for rotating said rollers, adapted to be manually operated from the discharge end of said container.

2. In a fire extinguisher, in combination, a collapsible container for a fire extinguishing substance, a pair of compression rollers adapted to squeeze material from said container, one end of said container resting between said rollers, and mechanism independent of said container for rotating said rollers comprising a rotatable shaft and gears positioned on said rollers, adapted to be actuated manually by means located at the other end of said container.

3. In a fire extinguisher, in combination, a container for a fire extinguishing substance, a casing therefor, a pair of compression rollers, said container resting between said rollers, mechanism independent of said container manually operable from a point remote from said roller for rotating said rollers in opposite directions comprising teeth formed on said rollers and rack members mounted in said casing to coact therewith, said rack members being oppositely disposed.

4. In a fire extinguisher, in combination, a container for a fire extinguishing substance, a pair of rollers, one end of said container being adapted to seat between said rollers, said rollers being provided with teeth, racks adapted to coact with said teeth to rotate said rollers, and means to move said rollers along the surface of said container to thereby cause simultaneously the rotation thereof, said means being manually operable by means located at the other end of said container.

5. In a fire extinguisher, in combination, a container for a fire extinguishing substance, compression rollers in contact with the upper and lower surfaces of said container, means to permit the insertion of the end of said container between said rollers, comprising an eccentrically mounted rotatable support, said support upon rotation being adapted to raise one of said rollers from the other, and manually operable means located near the opposite end of said container for rotating said support.

6. In a fire extinguisher, in combination, a container for a fire extinguishing substance, a compression device contacting with said container comprising a pair of rollers, said rollers being mounted on substantially parallel shafts, and operable manually by a handle at the ejection end of said container, means to permit the insertion of the container between said rollers comprising an eccentric collar between one of said rollers and its supporting shaft, and a handle member connected to said collar and adapted upon rotation to raise its roller away from the other roller.

7. In a fire extinguisher, in combination, a

container for a fire extinguishing substance, a casing therefor, a rack member having upwardly projecting teeth and a second rack member having downwardly projecting teeth, said rack members being mounted in the end walls of said casing, a pair of compression rollers, one of said rollers contacting with the upper surface of said container, the other of said rollers contacting with the lower surface of said container, each of said rollers having a single set of teeth for contacting with the teeth on its corresponding rack member, said rack member with the upwardly projecting teeth being adapted to coact with the upper roller, and said rack member with the downwardly projecting teeth being adapted to coact with the lower roller, a cage for said rollers, shafts mounted in the walls of said cage for supporting said rollers, a shaft rotatably mounted transversely of said casing adjacent the ejection end thereof, and chains connected to said shaft and said cage, said shaft upon rotation being adapted to move said cage along the surface of said container, and said rollers upon such movement being adapted to rotate by engagement of the teeth thereon with the teeth of said racks.

8. In a fire extinguisher, in combination, a container for a fire extinguishing substance, a compression means for said container comprising a pair of rollers, shafts for said rollers, means located at the venting end for rotating said rollers, and means to permit one of said rollers to be moved away from the other comprising an eccentric collar mounted on the shaft of one of said rollers forming a bearing surface for its roller, and a handle member connected to said eccentric collar adapted upon rotation to move the rollers apart.

9. In a hand-operated fire extinguisher of the portable type, a casing, a collapsible container mounted therein, a pair of compression rolls adapted to pinch said container and cause the ejection of its contents, and means operable from the ejection end for imparting to said rolls both a translatory and rotary motion with relation to the container and casing.

10. In a hand-operated fire extinguisher of the portable type, a casing, a collapsible container mounted therein, a pair of compression rolls adapted to pinch said container and cause the ejection of its contents, and means operable from the ejection end for imparting to said rolls both a translatory and rotary motion with relation to the container and casing, said means comprising a handled shaft, a chain adapted to be wound thereon and connected to a cage in which said rolls are mounted.

11. In a hand-operated fire extinguisher of the portable type, a casing, a collapsible container mounted therein, a pair of compression rolls adapted to pinch said container and cause the ejection of its contents, and means operable from the ejection end for imparting to said rolls both a translatory and rotary motion with relation to the container and casing, said means comprising a handled shaft, a chain adapted to be wound thereon and connected to a cage in which said rolls are mounted, and a pair of racks mounted in said casing and meshing with gears upon said rolls.

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