H. W. DAY.

MECHANISM FOR APPLYING COATING TO SHRAPNEL SHELLS AND OTHER ARTICLES.

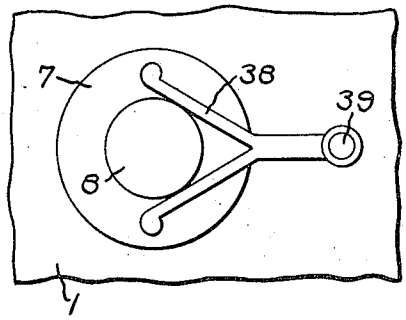
APPLICATION FILED OCT. 25, 1915.

1,201,219.

Patented Oct. 10, 1916.

3 SHEETS—SHEET 1.

*Fig. 2.*



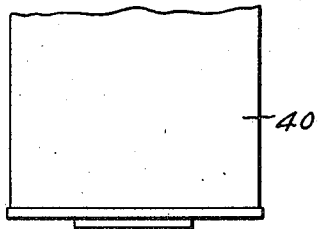
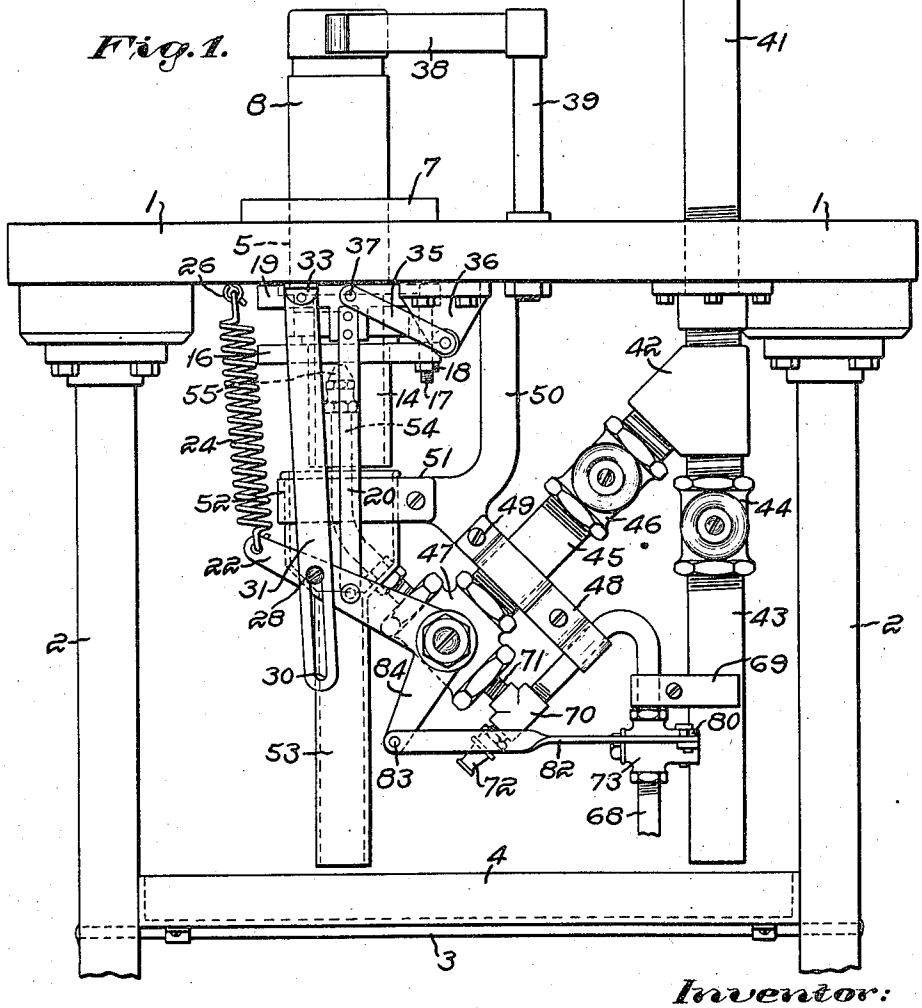




*Fig. 1.*




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3 SHEETS—SHEET 2.

Fig. 3.

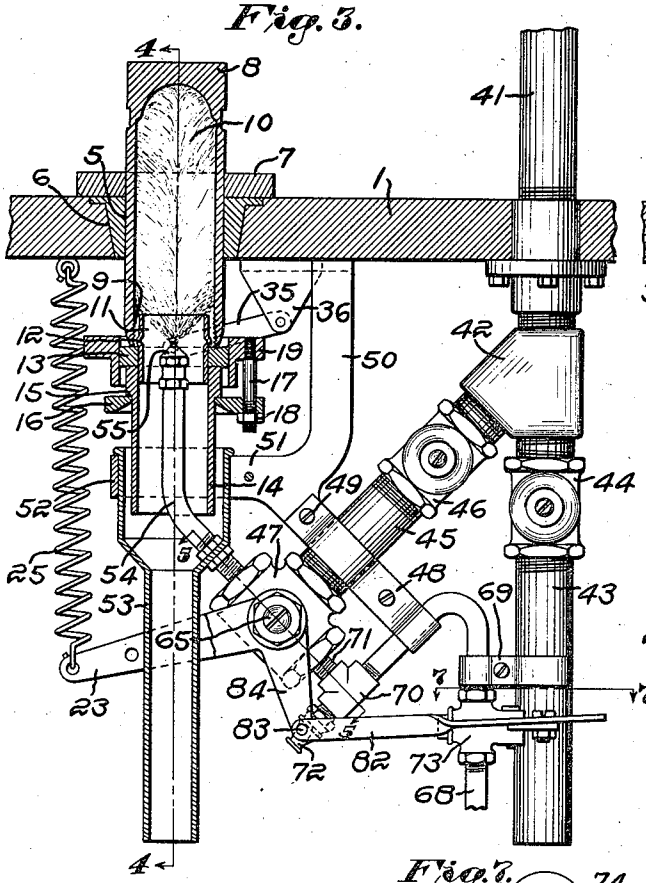



Fig. 4.

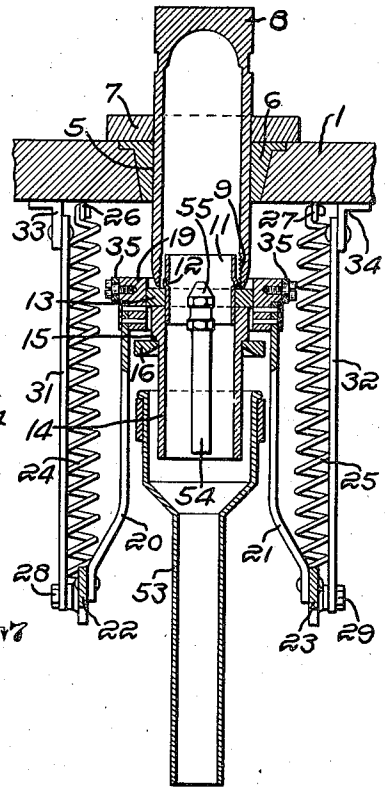



Fig. 7.

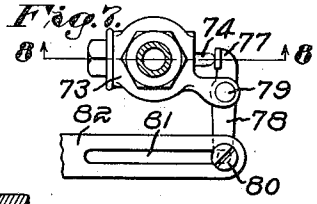



Fig. 5.

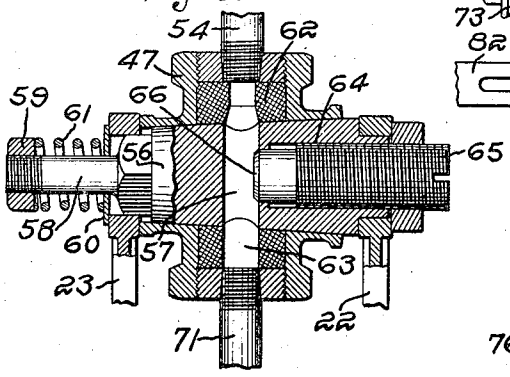



Fig. 6.

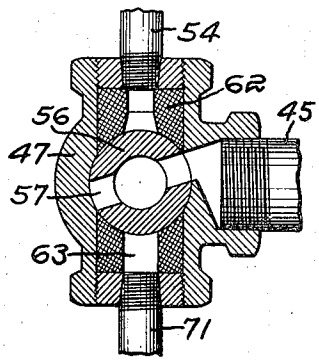
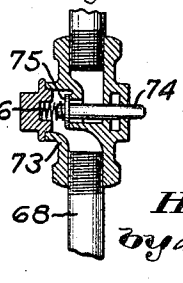



Fig. 8.




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3 SHEETS—SHEET 3.

Fig. 9.

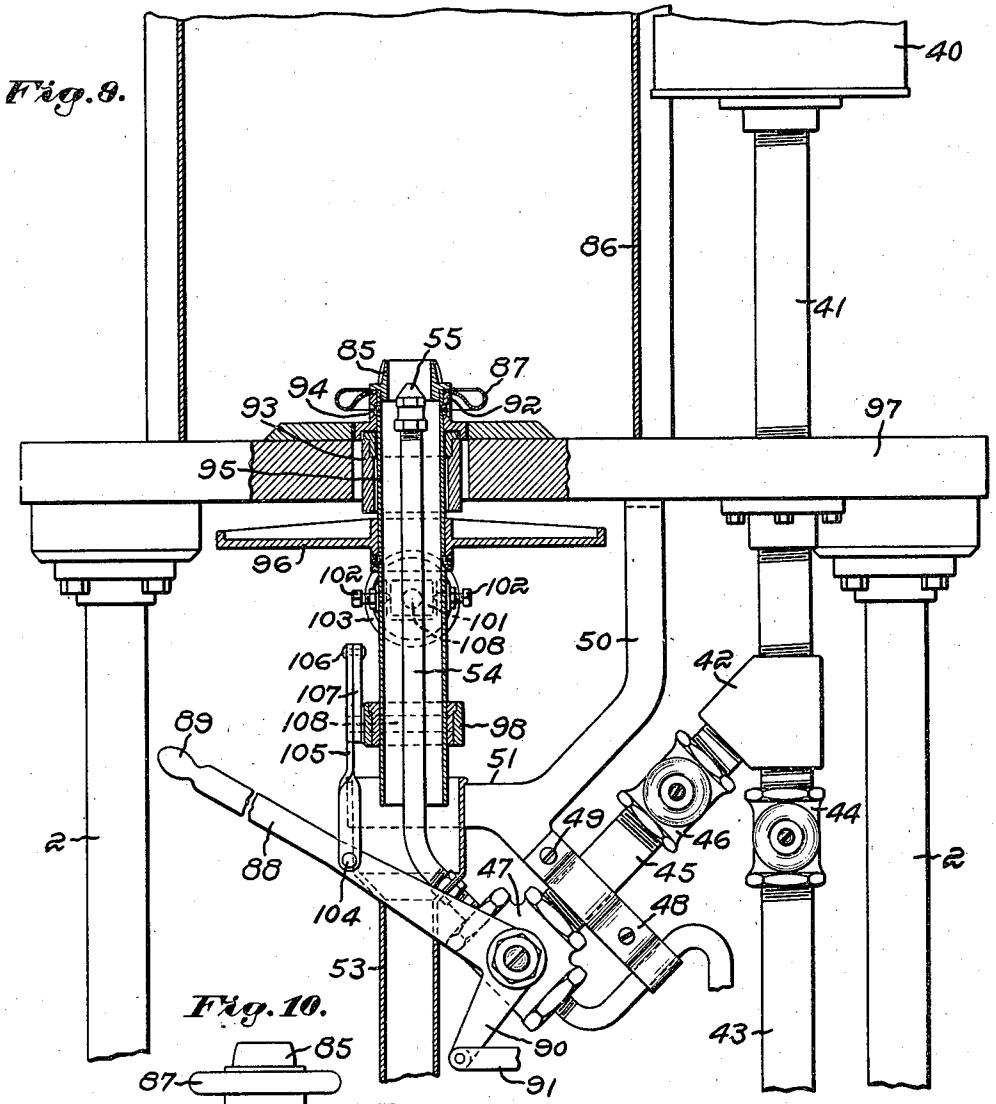
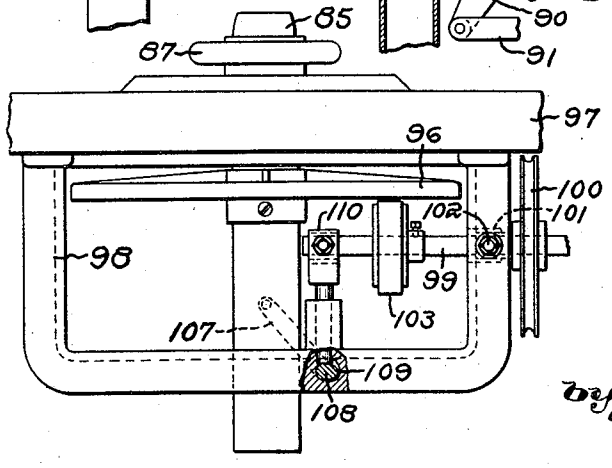



Fig. 10.




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# UNITED STATES PATENT OFFICE.

HERBERT W. DAY, OF WOLLASTON, MASSACHUSETTS, ASSIGNOR TO SPRAY ENGINEERING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## MECHANISM FOR APPLYING COATING TO SHRAPNEL-SHELLS AND OTHER ARTICLES.

1,201,219. Specification of Letters Patent. Patented Oct. 10, 1916.

Application filed October 25, 1915. Serial No. 57,679.

*To all whom it may concern:*

Be it known that I, HERBERT W. DAY, a citizen of the United States, and a resident of Wollaston, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Mechanism for Applying Coating to Shrapnel-Shells and other Articles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to mechanism for applying paint or other coating material to shrapnel shells and other articles.

In order that the principle of my invention may be readily understood, I have disclosed certain embodiments of my invention wherein the same is represented as applied to the coating of shrapnel shells in the accompanying drawings, wherein—

Figure 1 is a front elevation of one form of mechanism embodying my invention; Fig. 2 is a plan view of a portion of the mechanism shown in Fig. 1; Fig. 3 is a vertical central section of the main portion of the mechanism shown in Fig. 1; Fig. 4 is a vertical section upon the line 4—4 of Fig. 3; Fig. 5 is a transverse section on the line 5—5 of Fig. 3 taken through the charge or measuring valve; Fig. 6 is a sectional view taken through said valve at right angles to Fig. 5; Fig. 7 is a view partially in transverse section and partially in plan, as upon the line 7—7 of Fig. 3, showing the air valve operating means; Fig. 8 is a vertical section taken through the air valve; Fig. 9 is a view partially in front elevation and partially in vertical section of a second embodiment of my invention; and Fig. 10 is a view mainly in front elevation of certain of the operating means for the shell carrier or support.

While I have herein represented my invention as applied to the coating of shrapnel shells with paint, it is evident that my invention may be employed in other relations and in the application of a coating to other articles.

Referring to that specific application or embodiment of my invention herein shown, an important object thereof is to provide means whereby a hollow article, such, for example, as a shrapnel shell may be very readily coated interiorly and if desired exteriorly, so that a large number of such articles may be treated in a minimum length of time.

Referring more particularly to the drawings, I have therein represented a table or support at 1, it being provided with supporting uprights 2 of any suitable character connected if desired by a cross piece or cross pieces 3 herein shown as having a tray or receptacle 4 supported thereon. The said table or support 1 is provided with a suitable opening 5 extending vertically therethrough and within which if desired, may be positioned a bushing or wearing member 6 herein shown as having supported thereon a guide or wearing block 7 of annular form and of any suitable material, such for example as hard fiber. Within said opening is adapted to be positioned the shrapnel shell or other object 8 to be coated interiorly and if desired also exteriorly. The said shell at its lower end is provided with threads 9 of usual construction and adapted for the reception of the cap of the shell. It is desirable and important that the paint or other coating 10 be applied to the entire inner surface of the shell with the exception of the said threads 9 which are therefore herein represented as protected by a suitable shield 11 herein shown as cylindrical in form and having a bead 12 adapted to be received upon a ring-like support 13 upon which the lower end of the shell is positioned prior to commencing the coating operation.

The ring-like support 13 is positioned at the upper end of a tubular member 14 having an annular flange 15 received upon and supported by a ring 16 itself supported by one or more bolts 17 tapped therethrough and adjustably connected therewith by means of a suitable nut or nuts 18. The said bolt or bolts 17 are tapped into and depend from a ring 19, the construction being such that the primary ring or support 13 may be vertically adjusted with respect to the supporting ring 19. The latter ring has pinned thereto and depending therefrom links 20, 21, which at their lower ends are pivotally connected to operating levers 22, 23 suitably spaced apart and respectively connected by coil springs 24, 25 with the under side of the table or support 1 at 26, 27. Preferably said levers 22, 23 are provided with stop screws 28, 29 which are positioned in longitudinal slots 30 in

brackets 31, 32 attached at 33, 34 to the under side of the table or support 1, as shown most clearly in Figs. 1 and 3.

The construction and arrangement of parts as described are such that upon the insertion of the shell or other hollow article 8 in the opening 5 the weight thereof or the weight and such pressure as may be imparted thereto by the operative depress the ring 13 and the supporting parts and also rock the levers 22, 23 upon their support. Preferably a guiding link 35 is provided, as shown most clearly in Figs. 1 and 3, to insure a right line movement of the supporting ring 13 and associated movable parts. I have herein represented the link 35 as pivotally connected to the bracket 36 bolted to the under side of the table or support 1 and also pivotally connected at 37 to the said ring like member 11. If desired and preferably two such guiding links 35 may be employed.

If desired and as here represented I may provide a forked guide 38 for the upper end of the shell, the same being herein represented as supported upon a pillar 39.

The paint or other liquid that is to be applied to the shell or other article is contained within a suitable tank 40, preferably having a loose fitting cover and supported by the discharge pipe 41 above the level of the said shell 8. The said discharge pipe 41 is tapped in or otherwise secured to the table or support 1 and passes therethrough as represented most clearly in Figs. 1 and 3. Below the said table 1 the discharge pipe 45 has threaded thereto a fitting 42 into which may be tapped a pipe 43 through which the contents of the tank may, if desired, be drawn off. The said pipe 43 is herein represented as provided with a suitable valve 44. The said fitting 42 has also tapped therein a discharge pipe 45 having a valve 46 and having threaded onto its lower end a valve casing 47.

Suitably mounted or supported upon the discharge pipe 45 or on any other desired part of the mechanism is a bracket 48 having connected thereto by a screw 49 a second bracket 50 which, if desired, may have its upper portion connected to or bearing against the under side of the table 1. The said bracket 50 has an arm 51 having an annular portion 52 supporting a waste or discharge pipe 53, the upper end of which surrounds the lower end of the tube 14, being preferably spaced therefrom so as to permit the entrance of air at the upper end of said discharge pipe 53.

Tapped into the valve casing 47 is a paint discharge pipe 54, which passes through the upper portion of the discharge pipe 53 and the tube 14, it being provided at its upper end with a suitable spraying nozzle 55 of any suitable construction not herein necessary more fully to describe. The construction is, however, such as to permit the discharge of the paint in fine particles or globules over the entire inner surface of the shell 8 or other hollow article.

Within the valve casing 47 is positioned a suitable charge or measuring valve 56 shown most clearly in Fig. 5. It is provided with a transverse passage 57 therethrough and is here shown as having a threaded extension or spindle 58 receiving thereon a nut 59 between which and a washer 60 is positioned a coil spring 61 acting to hold the valve in position and co-acting also to afford a tight joint. In conjunction with said valve I provide a surrounding packing 62 herein shown as having a passage 63 therethrough which may coincide with the passage 57 through the valve. In order accurately to measure the charge contained within the valve and also to vary the amount of said charge, I have herein represented the valve as recessed at 64 and having tapped therein a threaded bolt 65, the inner end 66 of which may be positioned at such point as is necessary to permit the introduction of exactly the proper charge into the passage 57 of the valve.

I have herein provided means for forcibly discharging the charge or measured amount of the paint or other liquid from the passage 57 of the valve, though within the broad scope and purpose of my invention, the charge might be permitted to flow by gravity with the parts suitably arranged to such end. Preferably, however, I employ compressed air or other fluid under pressure.

For the purpose, I have herein represented an air supply pipe 68 leading from any suitable source and supported upon the discharge pipe 47 by means of a suitable bracket 69. The said pipe 68 is herein represented as bent and supported by the bracket 48 upon the pipe 45. At a suitable point said pipe 68 is provided with a suitable fitting 70 tapped thereonto and having a threaded connection 71 with the lower end of the valve casing 47 as indicated in Figs. 3 and 6, whereby when the valve 56 is turned into the position shown in Fig. 5 and the valve governing the air supply is open, the charge of paint or other coating material is ejected through the nozzle 55 and sprayed against the entire inner surface of the shell or other article 8.

The fitting 70 is provided with a pet cock 72 and at a suitable point the air supply pipe 68 is provided with a valve casing 73 shown in section in Fig. 8, and having therein an axially movable valve 74 provided with a valve disk 75 and normally held in closed position by a coil spring 76 which is assisted by the pressure of the air. The stem of the valve 74 extends through the casing 73 and is adapted to be engaged and in-

wardly pressed by the end 77 of a lever 78 pivoted at 79 upon a suitable bracket or extension of the valve casing and having at its opposite end a pin or screw 80 positioned within a longitudinal slot 81 in a link 82, the opposite end whereof is pivotally connected at 83 to the arm 84 of one of the levers 22, 23. The said levers 22, 23 are fixedly connected as shown in Fig. 5 to the valve 56 and the construction and arrangement of parts are such that upon depression of said levers 22, 23, the valve 56 is rotated into the position shown in Fig. 5, and the link 82 is moved to the right viewing Fig. 7, so that the left hand end of the slot 81 viewing said figure, engages the screw 80 upon the lever 78 and thus opens the air valve 74. Thereupon the charge or measured quantity of paint is discharged from the valve 56 and sprayed into the interior of the shell 8.

The valve 56 is returned to its closed position by the coil spring 24, 25, and the air valve 74 is closed by the spring 76 and the air pressure. The surplus paint, if any there be, and the air used in discharging the paint from the valve, is discharged through the depending pipe 53, and in such discharge of air or air and paint, air may be entrained between the upper end of the pipe 53 and the tube 14.

In that form of my invention shown in Figs. 1 to 8 inclusive, the charge or measuring valve is opened or actuated by the positioning of the shell or other article 8. While I prefer so to operate the valve, this is not essential to the broad scope and purpose of my invention, and in Figs. 9 and 10, I have represented another form of my invention wherein the said valve may be operated manually or by treadle means. Referring to said Figs. 9 and 10, the parts therein shown excepting as hereinafter described, are similar in construction and mode of operation to those shown in Figs. 1 to 8 inclusive. In said Figs. 9 and 10, I have provided an annular support 85 to receive the threaded end of the shrapnel shell, the threads thereof being protected by the outer surface of said support 85. If desired, the outer surface of the shell may be coated and to this end I support at any suitable point a stationary nozzle not herein shown and which may have discharged therethrough in any suitable and preferably automatic manner similar to that by which the valve 56 is operated, a proper quantity of paint or other coating material. To this end, I have represented a cylindrical sheathing 86 surrounding and suitably spaced from the support 85, and I have represented a trough 87 to catch any excess material.

The shell is preferably rotated not only for the more effective application of the coating to the outer surface thereof, but to the inner surface through the agency of the nozzle 55 preferably of similar construction to that shown in Figs. 3 and 4.

The construction shown in Figs. 9 and 10 differs from that shown in Figs. 1 to 8 partially in that the valve 56 is operated manually or by treadle, and to that end I have substituted for the levers 22, 23, a lever 88 having a handle 89 by which it may be rotated upon its pivotal support. If desired, the said lever 88 may be connected to a treadle, not shown, thereby to operate said lever by the application of foot pressure. The said lever 88 is preferably of bell crank form, and the arm 90 thereof is connected by link 91 to an air valve of construction similar to that shown in Figs. 7 and 8 and which need not be further described.

The support 85 for the threaded end of the shell is carried by a ring 92 itself mounted for rotation upon a suitable bearing 93, and also having attached thereto by screws 94 and depending therefrom a suitable tube 95 surrounding the paint discharge pipe 54 and having fast thereon a driving disk 96.

Attached to the under side of the table 97 is a yoke-like bracket 98 having mounted therein for rotation a shaft 99 which has fast thereon a pulley 100 preferably driven continuously from a small motor of any suitable type. As indicated in Figs. 9 and 10, the bearing 101 for said shaft 99 is supported by pivotal bolts 102, 102, whereby said shaft 99 may be slightly rocked in a vertical plane. Adjustably mounted upon said shaft 99 is a non-toothed driving pinion 103 which may be adjusted to any position along said shaft 99, thereby to engage with the disk 96 at any desired point from the center thereof. In this manner, I permit the rotation of the disk 96 and hence of the shell at any desired speed, so that the paint or other liquid may be applied to the inner and if desired to the outer surface thereof in a satisfactory manner.

Preferably the disk 96 and hence the shell are rotated only when the lever 88 is depressed and the valve 56 is open. While this result may be accomplished in any suitable manner, I have herein pivotally connected at 104 to the lever 88 a link 105, the upper end of which is pivotally connected at 106 to a second link 107. The lower end of this link is fixedly secured to a short shaft 108 having an eccentric portion 109. The said shaft 108 is preferably mounted in the lower portion of the bracket 98 as shown most clearly in Fig. 10. The shaft 99 has an inner bearing 110 which is supported by a pin or spindle 111 resting loosely upon the cam shaft 108. When said latter shaft is turned into the position shown in Fig. 10, the bearing 110 of the shaft 99 is permitted to drop slightly, thus withdrawing the driving pinion 103 from driving engagement with the disk 96.

When the lever 88 is depressed manually or by treadle, the shaft 108 is turned ninety degrees, thereby lifting the driving pinion 103 into driving relation with the disk 96, thereby rotating the shell. At the same time, the charge or measuring valve 56 and the air valve 74 are opened and the inner surface of the shell is coated, as hereinbefore set forth. At the same time and if desired by similar connections the outer surface of the shell is sprayed or coated.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims.

1. Mechanism for applying coating comprising an article support, means for containing a predetermined quantity of coating material, said means being movable from filling to discharging position, and means forcibly to discharge said material upon said article.

2. Mechanism for applying liquid coating comprising a support for the article to be coated, a container for a measured quantity of coating material, and movable from a filling position to a discharging position, and means for forcibly discharging material from said containing means onto said article.

3. Mechanism for applying liquid coating comprising an article support, a container for a predetermined quantity of liquid coating and movable from a filling position to a discharging position, and fluid pressure means for ejecting the coating material from said container onto said article.

4. Mechanism for applying liquid coating comprising an article support, means for containing a measured quantity of liquid coating, and movable from a filling position to a discharging position, fluid pressure means for ejecting the coating from the container onto said article, and means for admitting fluid pressure to said container.

5. Mechanism for applying liquid coating comprising an article support, a container for coating, said container being constructed and arranged to receive a predetermined amount of coating and movable from a filling to a discharging position, and means operating by the article for effecting the discharge of the coating onto said article.

6. Means for applying liquid coating comprising an article support, a container for a measured quantity of liquid coating, movable from a filling position to a discharging position, and operative connections between the article support and said valve.

7. Means for applying coating comprising an article support, a reservoir for a supply of liquid coating, a chambered valve in communication with said reservoir and constructed and arranged to receive a predetermined, measured charge of coating to be discharged therefrom, and means for forcibly ejecting the coating through said valve on said article.

8. Mechanism for applying liquid coating comprising an article support, a reservoir for a supply of liquid coating a chambered valve in communication therewith and constructed and arranged to receive a predetermined, measured charge of coating to be discharged therefrom, means for forcibly ejecting coating through said chambered valve, and means controlled by the article support for moving said valve.

9. Means for applying liquid coating comprising a support for a hollow article in upright position, means for ejecting coating to the interior surface thereof, and means controlled by weight or pressure of the article in upright position for forcibly projecting measured quantities of coating to said directing means.

10. Means for applying coating to hollow articles comprising a support for a hollow article, a nozzle in proximity to the entrance to the interior of said article, a reservoir, a measuring device in communication with said reservoir, and movable from filling to discharging position, and means for forcing the coating material through said measuring device to said nozzle.

11. Means for applying coating to hollow articles comprising a support for a hollow article, a nozzle in proximity to the entrance to the interior of said article, a reservoir, a measuring device in communication with said reservoir, and means for forcing the coating material through said measuring device to said nozzle, said means being controlled by the article to be coated.

12. Means for applying liquid coating to hollow articles comprising a support for a hollow article, a nozzle adjacent to the opening thereof, a valve in communication with said nozzle, constructed and arranged to receive a predetermined charge of coating, and fluid pressure means in communication with said valve.

13. Means for applying liquid coating to hollow articles comprising a support for a hollow article in upright position, a nozzle adjacent to the opening thereof, a valve in communication with said nozzle, fluid pressure means in communication with said valve, and means controlled by weight or pressure of the article to be coated when in upright position to open said valve.

14. Means for applying liquid coating comprising a support for the article to be coated, a nozzle adjacent thereto, a measuring valve in communication with the nozzle, a fluid pressure controlling valve in communication with the measuring valve, and

means controlled by the article to be coated for moving said valves, thereby to eject the coating material.

15. Means for applying liquid coating comprising a support for the article to be coated, a nozzle adjacent thereto, a measuring valve in communication with the nozzle, a fluid pressure controlling valve in communication with the measuring valve, and means controlled by the article to be coated for moving said valves, thereby to eject the coating material.

16. Means for applying liquid coating comprising an article support, means to adjust the position of said support, a container for a measured quantity of coating, and means dependent upon the position of said support to open said container.

17. Means for applying liquid coating to shells comprising a support for the shell, a nozzle positioned adjacent the mouth of the shell, a chambered valve in communication with said nozzle and constructed and arranged to receive a predetermined charge of liquid coating, and lever means controlled by the shell for operating said valve.

18. Means for applying liquid coating to shells comprising a support for the shell, a nozzle positioned adjacent the mouth of the shell, a chambered valve in communication with said nozzle, lever means controlled by the shell for operating said valve, and fluid pressure means also controlled by the shell for forcibly ejecting the coating through said chambered valve and said nozzle.

19. Means for applying coating to articles comprising an article support, a reservoir for a supply of coating material, a valve casing in communication with said reservoir, a turn valve in said casing constructed and arranged to receive a predetermined charge of coating material, a nozzle in communication with said valve casing, and lever means for turning said valve means.

20. Means for applying coating to shrapnel shells including a shell support, means associated with said support for protecting the threading of said shell, and means for applying coating material to the unthreaded, inner surface of the shell.

21. Means for applying liquid coating to shells comprising a shell support, means for vertically adjusting said support, means associated with the support for shielding the threaded, inner surface of the shell, a nozzle adjacent said shielding means, and means for forcibly ejecting spraying material through said nozzle.

22. Means for applying liquid coating to the interior of shells comprising an annular shell support, a nozzle symmetrically arranged with relation to the mouth of the shell, means surrounding said nozzle for discharging surplus coating material, means for receiving a measured quantity of coating material, a conduit between said receiving means and said nozzle, fluid pressure means in communication with said receiving means, means controlling said receiving means, and a valve controlling said fluid pressure means.

23. Means for applying liquid coating to the interior of shells comprising an annular shell support, a nozzle symmetrically arranged with relation to the mouth of the shell, means surrounding said nozzle for discharging a surplus coating material, means for receiving a measured quantity of coating material, a conduit between said receiving means and said nozzle, fluid pressure means in communication with said receiving means, means controlling said receiving means, a valve controlling said fluid pressure means, and means controlled by the shell for operating said controlling means and said valve.

24. Means for coating shells comprising an annular shell support, a nozzle within said support, a chambered turn valve in communication with said nozzle and in communication with the source of supply, said valve being constructed and arranged to receive and to discharge a predetermined charge of coating material, a lever for operating said valve, and means for moving said lever in opposite directions, thereby to open and close the valve.

25. Means for coating shells comprising an annular shell support, a nozzle within said support, a chambered turn valve in communication with said nozzle and in communication with the source of supply, a lever for operating said valve, means for moving said lever in opposite directions, thereby to open and close the valve, fluid pressure means in communication with said valve, and a valve operatively connected with said first mentioned valve for controlling the flow of fluid under pressure.

26. Means for applying coating to articles comprising an article support, a nozzle adjacent to said article, a chambered valve for receiving a measured supply of coating material, and in communication with said nozzle, and means for varying the capacity of said valve.

27. Means for applying coating to shells comprising a shell support, means to rotate said support, a nozzle in proximity to said support, a chambered valve in communication with said nozzle, means for moving said valve, and fluid pressure means for ejecting material through said valve and nozzle.

28. Means for applying coating to hollow articles comprising a support for a hollow article, a pipe having a discharge, a reservoir, a measuring device in communication with said reservoir and means for forcing the coating material through said measuring

means to said discharge, said means being controlled by the article to be coated.

29. Means for applying coating to shrapnel shells including a shell support, means associated with said support for protecting the threading of the shell, and means for applying coating material to an unthreaded surface of the shell.

30. Means for applying coating to hollow articles including an article support, means associated with said support for protecting a threaded portion of the article, and means for applying coating material to an unthreaded portion of the article.

31. Mechanism for applying coating material comprising an article support, means accessible during the operation of the mechanism, for containing a predetermined quantity of coating material, and means forcibly to discharge said material upon the article.

32. Mechanism for applying coating material comprising an article support, means mounted for turning movement from receiving to discharging position and constructed and arranged to contain a predetermined quantity of coating material, and means forcibly to discharge said material upon the article.

33. Mechanism for applying coating material comprising an article support, a valve for containing a predetermined quantity of coating material, and means forcibly to discharge said material from said valve upon said article.

34. Means for applying liquid coating comprising a support for the article to be coated, a nozzle for discharging coating onto said article, a measuring valve in communication with said nozzle and constructed and arranged to receive a predetermined charge of coating material, a fluid pressure controlling valve in communication with the measuring valve, and means for moving said valve, thereby to eject the coating material.

35. Means for applying coating to shells comprising a shell support, means to rotate said support, a pipe having a discharge, a chambered valve in communication with said discharge and constructed and arranged to receive a predetermined charge of material, means for moving said valve and fluid pressure means for ejecting material through said valve and discharge.

In testimony whereof, I have signed my name to this specification.

HERBERT W. DAY.