July 22, 1930. W. A. SHIELDS 1,771,358

SMOKE RING EMITTING DEVICE

Filed Aug. 22, 1928

Fig. 1.

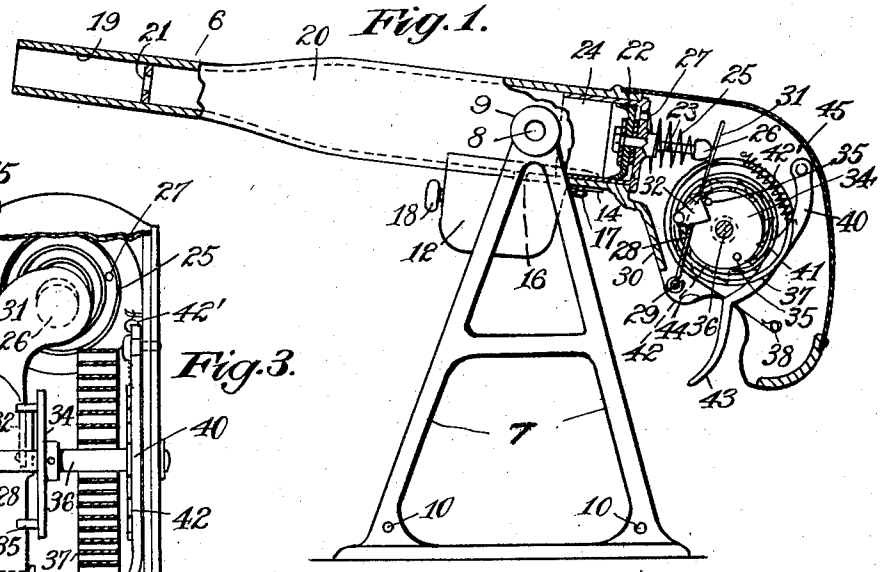


Fig. 3.

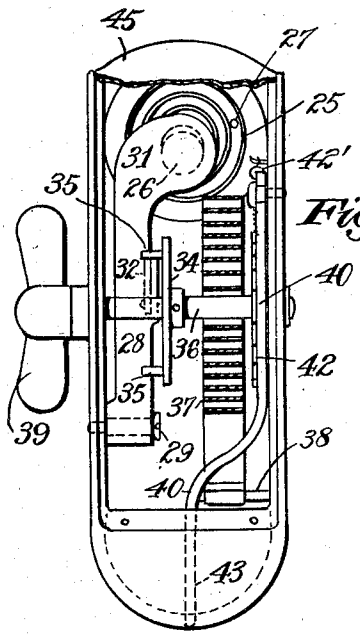
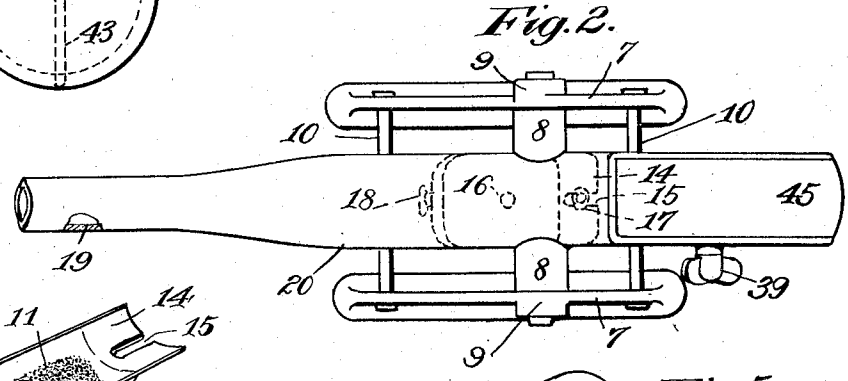


Fig. 2.



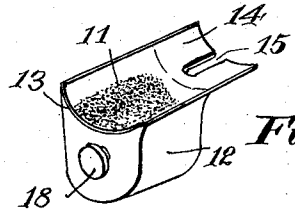


Fig. 4.

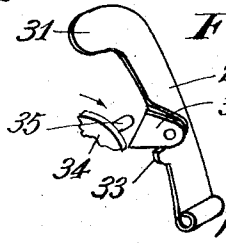


Fig. 5.

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UNITED STATES PATENT OFFICE

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SMOKE-RING-EMITTING DEVICE

Application filed August 22, 1928. Serial No. 301,403.

This invention relates to a smoke ring emitting or discharging device particularly adapted to be used in toy guns which is novel and inexpensive to make and it is an object of the invention to provide such a device adapted to emit or discharge perfect rings of smoke at any desired interval of time.

Further objects of the invention will hereinafter appear.

The invention embodies a tubular member in simulation of a gun barrel, closed at one end and arranged with a bore having different diameters, with the portion of smaller diameter at the outlet or discharge end thereof; or it may have a bore of uniform diameter and arranged at the outlet end thereof with a restricted portion adapted to form smoke emitted therefrom into smoke rings. The smoke is generated in a carrier releasably mounted on and in communication with the tubular member, enters into said member and is emitted through the outlet by impulses of air created at and within the closed end of the tubular member by means actuated exteriorly of the tubular member by an intermittent moving member which may be controlled by a trigger or the like.

In the drawing accompanying and forming a part of this application, Figure 1 is an elevational view of the device partly in section to show the manner of restricting the bore of the tubular member and the air impulse creating means and actuating means therefor.

Figure 2 is a plan view looking at the top of Figure 1.

Figure 3 is an enlarged view looking at the rear of Figure 1, partly broken away to show the air impulse creating means.

Figure 4 is a perspective view of the carrier for the smoke generating means; and

Figure 5 is a perspective view in detail of a hammer constituting a part of the air impulse creating means.

Like characters designate like parts throughout the drawing.

In carrying out the invention there is provided a tubular member 6 preferably formed of a casting having a bore of uniform diameter or of irregular diameter with the portion of smaller diameter adjacent the outlet end, as illustrated in the drawing, adapted to be pivotally supported upon standards 7 in the form of a figure A, by trunnions 8 fixed to and extending laterally from the tubular member and pivotally engaging bearings 9 in the standards to adjust the tubular member to different positions relative to the standards, and the standards are held in spaced relation by tie rods 10 adjacent to the base thereof.

The tubular member is supplied with smoke by the combustion of a fumid material, such as incense, as indicated at 11 in Figure 4, carried in a rectangular receptacle 12 having an open top 13 curved to conform to the periphery of the tubular member for the mounting of the receptacle on the underside of the tubular member adjacent the closed end thereof in communication with a perforation 16 therein to permit the smoke from the incense to enter the tubular member and to prevent the escape of any smoke from the receptacle. The receptacle is secured to the tubular member by an extended portion or flange 14 integral with the receptacle extending in a plane with the top of the receptacle and also curved to conform to the periphery of the barrel and arranged with a slot 15 extended in from the end thereof to slidably engage a button or headed pin 17 fixed to and extending laterally of the tubular member. The receptacle is arranged with a hand grip 18 at the end opposite the end with the flange 14 to manipulate the receptacle on the tubular member to change or renew the fumid material.

To expel the smoke accumulated in the tubular member from the carrier 12 and cause the emitted smoke to form rings, the bore of the tubular member may be arranged with two different diameters forming two different sized chambers, the smaller chamber 19 being arranged at the discharge or outlet end and the larger chamber 20 at the closed end and arranged with the perforation 16 for the admission thereto of the smoke generated in the carrier 12; or the tubular member may be arranged with an uniform

bore and arranged with means to restrict the core adjacent the outlet, as by an annular abutment 21 in the form of a ring inserted in or integrally with the tubular member, both of said arrangements being shown in Figures 1 and 2. The rings or smoke are formed by the forcing of the smoke from the larger chamber 20, or the portion of the tubular member in the rear of the annular abutment, through the smaller chamber 19 or annular abutment 21 by creating air impulses at the closed end of the tubular member by exerting air compressing force on the rear of the smoke in the tubular member and the sudden relief of the compressing force in the discharge of the smoke from the outlet end of the tubular member.

The air impulses for forcing the smoke into the smaller chamber 19 or through the abutment 21, and emit the same from the outlet are created by a plunger comprising a disk 22 of flexible material carried by a rod 23 slidably mounted in the head of a cylinder 24 inserted in the open end of the chamber 20 and which serves to close said end and secured therein by a flange extending radially of the head and abutting the edge of the tubular member. The disk is maintained in abutting relation to said head by a coiled spring 25 of conical form confined between the exterior of the head of the cylinder and a knob 26 on the rod 23. The head of the cylinder is arranged with a perforation 27 to permit of the escape of the air between the disk and head, and the disk to assume the abutting relation thereof with the cylinder head.

The plunger is moved into the cylinder against the action of the spring to create impulses of air in the tubular member by a reciprocating member in the form of a bar 28 pivotally supported at one end on a pin 29 fixed to a side wall of a casing 30 mounted on and extending backward from the chamber 20 of the tubular member, with the opposite end of the bar arranged with a lateral extending finger or hammer 31 for contact with the knob 26 of the plunger, and intermediate the ends of the bar pivotally carried by the bar there is provided a pawl 32 adapted to be limited in one direction of movement thereof by a detent 33 extending from an edge of the bar adjacent the mounting of the pawl and to be engaged by a rotatable cam member to reciprocate the bar 28 in one direction of rotation thereof.

The cam member comprises a disk 34 carrying pins 35, two in number in the present instance for the engagement with the pawl 32 and fixed on a shaft 36 extending transversely of the casing and rotatably mounted in the side walls thereof adapted to be rotated by the unwinding of a coiled clock spring 37 fixed at one end to the shaft and the opposite end fixed to a pin 38 projecting from a wall of the casing opposite the wall carrying the pin 29. The spring is tightened or wound up by the rotation of the shaft by a key 39 fixed to a portion of the shaft extending exteriorly of the casing. Upon the rotation of the shaft to wind up the spring the disk 34 is rotated positioning the pins 35 into engagement with the pawl 32 rotating the same and permitting the pins 35 to pass and the rotation of the disk without imparting movement to the bar, and during the unwinding of the spring the disk is rotated in the opposite direction when the pins engage the pawl 32 moving the same against the detent 33 imparting forward movement to the bar forcing the hammer against the knob 26 and moving the plunger into the cylinder and creating air impulses in the tubular member.

To control the reciprocation of the bar 28 and the plunger, a trigger 40 is pivotally mounted at one end on the casing wall carrying the pin 38 and arranged with a detent 41 to engage a ratchet wheel 42 fixed to the shaft 36 to stop the rotation of the shaft in the spring unwinding direction of rotation, the trigger being influenced to engage the detent with the ratchet wheel by a spring 42′, one end thereof fixed to the proximate casing wall and other end fixed to the trigger to permit the rotation of the ratchet wheel during the winding of the spring 37. The trigger is arranged with a finger engaging portion 43 extending beyond the casing adjacent a recess 44 formed in the casing. The upper edge of the casing is open to facilitate the inspection and replacement of the actuating mechanism housed therein and it is provided with a cover 45 of flexible material engaging grooves in the edges of the casing opening and secured thereto and also forming the butt of the gun.

It will be obvious that various modifications may be made in construction and arrangement of parts, and that various means other than that illustrated and described may be utilized to create the smoke emitting air impulses, without departing from the scope of the invention.

Having thus described my invention I claim:

1. In an intermittent smoke ring emitting device, a tubular member, the bore of which is arranged with two different diameters, and the portion of smaller diameter arranged with an outlet and the end of larger diameter closed, smoke generating means in communication with the portion of larger diameter, a spring influenced plunger slidably mounted in the portion of larger diameter and having a stem extended through the end of the tubular member, and means to co-operate with the plunger stem exterior of the tubular member to intermittently move the plunger in said portion of larger diameter to create smoke emitting air impulses after each actuation of the plunger.

2. In a smoke emitting device, a tubular member arranged with an outlet having an annular abutment adjacent thereto and the end opposite to the outlet closed, a carrier for smoke generating means releasably mounted on the tubular member and in communication therewith, a spring influenced plunger slidably mounted in the closed end of the tubular member to have reciprocating movement, and means to intermittently reciprocate the plunger in the tubular member comprising a pivotally mounted hammer to engage the plunger, a spring actuated cam mechanism to reciprocate the hammer, and means to control the actuation of the cam mechanism.

3. In a smoke emitting device, a tubular member arranged with an outlet having an annular abutment adjacent thereto and the opposite end closed, a carrier for smoke generating means releasably mounted on the bottom of the tubular member and in communication therewith, a spring influenced plunger slidably mounted in the closed end of the tubular member, a casing extending from the closed end of the tubular member, and means to effect reciprocation of the plunger comprising a hammer pivotally mounted in the casing, a spring actuated disk rotatably mounted in the casing and arranged with means to trip the hammer to impart reciprocatory movement to the hammer, and a trigger pivotally mounted in and extending from the casing to control the actuation of the disk.

4. In a smoke emitting device, a tubular member arranged with an outlet having an annular abutment adjacent thereto and the end opposite the outlet closed, a carrier for smoke generating means releasably mounted on the tubular member and in communication therewith, a spring influenced plunger slidably mounted in the closed end of the tubular member to have reciprocating movement, and means to intermittently reciprocate the plunger in the tubular member comprising a pivotally mounted hammer carrying a pawl, a rotatably mounted disk arranged with a series of laterally extending pins to reciprocate the hammer by the pins engaging the pawl in one direction of rotation thereof, a coiled spring connected to the disk to rotate the same, a ratchet wheel rotatable by the spring, and a trigger pivotally mounted and having a detent to normally engage the ratchet wheel to control the pawl engaging direction of rotation of the disk.

5. In a smoke emitting device, a tubular member arranged with an outlet having an annular abutment adjacent thereto and the opposite end closed, a carrier for smoke generating means releasably mounted on the bottom of the tubular member and in communication therewith, a spring influenced plunger arranged with a stem slidably mounted in the closed end of the tubular member, a casing extending from the closed end of the tubular member, and means to effect reciprocation of the plunger comprising a hammer pivotally mounted in the casing arranged with a pawl yieldingly urged into contact with the plunger stem, a shaft rotatably mounted in and extending transversely of the casing and carrying a disk arranged with laterally extending pins to trip the hammer by the pins engaging the pawl in one direction of rotation of the shaft, a coiled spring fixed at one end to the shaft and the other end fixed to the casing to rotate the shaft, a ratchet wheel rotatable with the shaft, means fixed to the shaft exteriorly of the casing to wind the spring, and a trigger pivotally mounted in the casing having a finger engaging portion extended to the exterior of the casing and arranged with a detent to engage the ratchet wheel to control the rotation thereof and of the shaft in a predetermined direction of rotation.

6. In a smoke emitting device, a tubular member arranged with an outlet having an annular abutment adjacent thereto and the opposite end closed, a carrier for smoke generating means releasably mounted on the bottom of the tubular member and in communication therewith, a spring influenced plunger slidably mounted in the closed end of the tubular member, a casing extended from the closed end of the tubular member, and means to effect reciprocation of the plunger comprising a hammer pivotally mounted in the casing, a rotatably mounted spring actuated disk having pins extending laterally therefrom to intermittently trip the hammer in one direction of rotation of the disk, and a trigger pivotally mounted in the casing having connection with the disk and a finger engaging portion extended to the exterior of the casing to control the hammer tripping movement of the disk.

Signed at the city of New York, in the county of New York, and State of New York, this 11th day of August, 1928.

WALTER A. SHIELDS.