

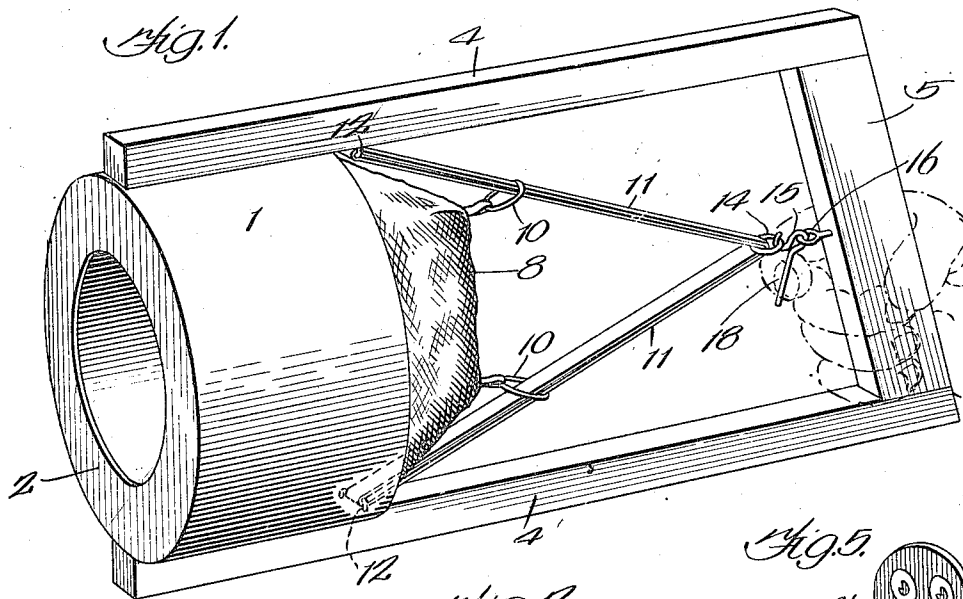
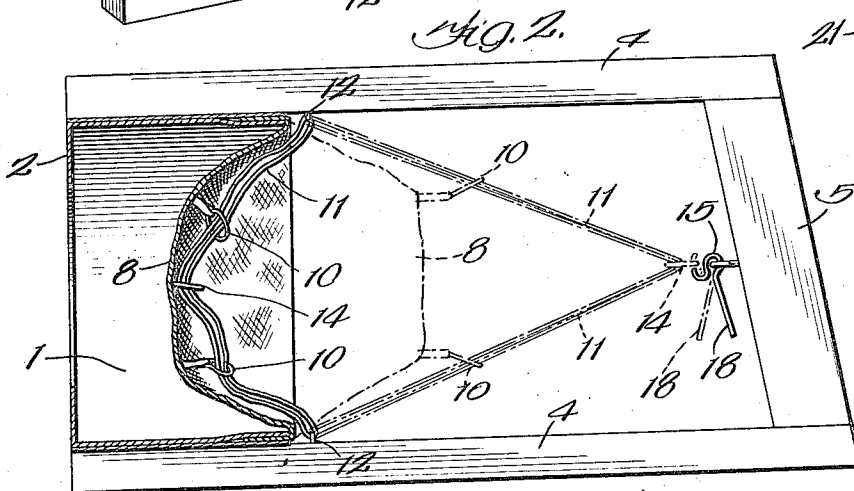
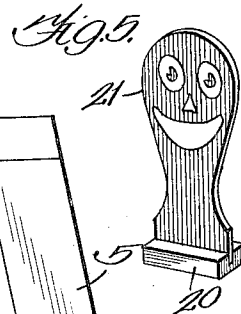
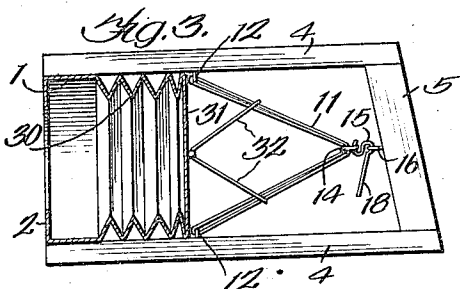
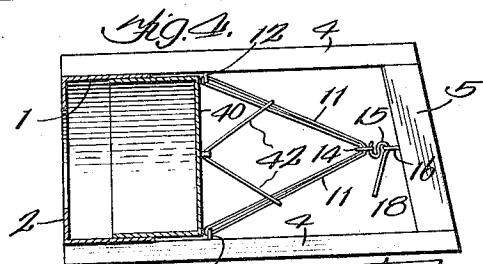
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W. R. DRAY

PNEUMATIC TOY

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Inventor:
Walter R. Dray
By Cheever & Cox Attys

UNITED STATES PATENT OFFICE.

WALTER R. DRAY, OF CHICAGO, ILLINOIS.

PNEUMATIC TOY.

Application filed December 16, 1921. Serial No. 522,872.

To all whom it may concern:

Be it known that I, WALTER R. DRAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Pneumatic Toys, of which the following is a specification.

My invention relates to pneumatic toys, and the object of the invention is to provide novel and attractive means for "shooting" a charge of air at any suitable object, such for example as a target adapted to fall over or otherwise register a hit. It has been demonstrated, for example, by discharging smoke from a locomotive stack, or smoker's mouth, that smoke or air may be made to travel forward in the form of a circular vortex or vortex ring by discharging it impulsively from a chamber having a restricted opening. I have constructed a toy capable of operating upon this principle and able to form such rings and project them at comparatively high velocity, the rings being capable of maintaining their shape and identity for a surprisingly long distance in proportion to the dimensions of the toy. One of the objects of the invention, therefore, is to produce a toy capable of forming such a ring and projecting it forcibly for a long distance and enabling it to maintain its shape for such a comparatively long time that it may assume the character of a projectile and be used for shooting at a target adapted to fall over or otherwise indicate whether it has been hit or not. Another object is to provide a construction such that the toy may be operated somewhat after the manner of a pistol and released through the operation of a trigger. Contributory objects are to provide a convenient mounting, also to provide convenient means for setting the device preparatory to discharging it. Other contributory objects will become apparent as the description proceeds. I accomplish my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a perspective view of the complete toy set, ready for discharge.

Figure 2 is a side view of the toy showing the chamber and ejector in section, the latter element being in the position it will assume after the toy has been discharged.

Figures 3 and 4 show modified forms of the invention.

Figure 5 illustrates one type of target that may be employed.

Like numerals denote like parts throughout the several views.

Referring first to the form shown in Figures 1 and 2, the chamber 1 is cylindrical and has an inturned annular flange 2 at its forward end. The chamber is mounted at the forward end of a frame consisting, according to the present design, of two longitudinal members 4, 4 connected at the rear end by an upright cross bar 5. The center bar constitutes the handle and carries a trigger mechanism hereinafter described.

The rear end of the chamber is closed by an ejector or diaphragm 8 consisting in this case of rubberized fabric having sufficient fullness to enable it to be distended for a considerable distance into the body of the chamber and for a considerable distance back of it. Mounted on the outside of the ejector are rings 10 thru which passes a resilient member 11 usually consisting of rubber. This member is fastened to the beams 4 by staples 12 or other devices located preferably adjacent to the rear end of the chamber. Between its ends the resilient member passes through a ring 14 adapted to be engaged by a trigger 15 carried by a screw-eye 16 secured to the middle of the cross bar 5. The trigger is so formed that it will retain ring 14 and hold the device set, but when the depending portion or tail 18 is pulled backward, it will release ring 14. The rings or loops 10 are preferably of rubber so as to enable them to grip the resilient member and cause the ejector 8 to be retracted when the device is being set.

In using the toy the operator first grips the cross bar 5 in his hand in the manner indicated in dotted lines, Figure 1. He then with the other hand draws back the resilient member 11 and passes the ring 14 over the hooked forward extremity of the trigger 15. The drawing back of the resilient member will automatically draw back the ejector 8 to the position shown in Figure 1 and in dotted lines in Figure 2, for the rings 10 will frictionally engage the resilient member and be drawn back with it as far as the fullness of the ejector will permit. A suitable form or target is shown in Figure 5, the same having a base 20 consisting of a small block of wood or other material surmounted by an upstanding plate 21 of stiff paper or

other suitable substance, which for the amusement of children may be marked so as to portray a fanciful head or a bird or animal. When the device has been set in the manner described, the user stands at a distance from the target, aims the device, and pulls the trigger. This releases the resilient member 11, which not only strikes the back of the ejector 8, but carries it forward into the chamber to some such position as is indicated in full lines in Figure 2. It will be evident that this movement of the ejector suddenly and forcibly ejects a comparatively large volume of air out through the opening in the front of the chamber and it has been found that the air thus ejected travels in a straight line and maintains a constant diameter (or an approximately constant diameter) for a remarkably long distance in proportion to the diameter and length of the vortex chamber. For example, I have found that a chamber having a diameter of four, or five inches and a length of three or four inches may be made to project a quantity of air to a distance of ten feet or more, the vortex ring in that distance not increasing its diameter to any great extent. The light paper target may be knocked over at a distance of many feet if the device is properly aimed, but if the aim is inaccurate to only a few degrees, the target will remain upstanding. The device is, of course, intended for young children, and one of the characteristics which adds to its interest from a child's standpoint is the fact that the percussion of the resilient member against the back of the ejector 8 produces quite a loud report. The device, therefore, simulates a pistol or other fire arm in several different ways. If smoke is introduced into the chamber when the ejector is set, it will, upon release of the resilient member, be ejected in the form of a vortex ring which will be visible and will, as in the previous case, travel rapidly and maintain its diameter to a surprising extent.

The ejector is not necessarily limited to the form hereinabove described and shown in Figures 1 and 2. In Figure 3 I have shown an ejector of the bellows type, this form having a collapsible bellows 30 the back of which is closed by a diaphragm 31 connected to the resilient member 11 by cords 32.

Still another form is shown in Figure 4 in which the ejector is in the form of a hollow plunger 40 slidingly mounted in the chamber 1 and connected to the resilient member by cords 42. I have found, however, that the rubberized cloth type shown in Figures 1 and 2 possesses the advantage of being simple to make, sure to operate, and capable of displacing a comparatively large volume of air.

Having thus described my invention what

I claim as new and desire to secure by Letters Patent is:—

1. A pneumatic toy having a chamber with a restricted opening at the front, a flexible diaphragm at the rear of said chamber, a resilient member behind said diaphragm, the ends of said resilient member being connected to said chamber for causing the intermediate portion of said resilient member, when released, to strike the rear surface of the diaphragm, and a manually controlled trigger for releasably holding the intermediate portion of the resilient member drawn backward from said diaphragm.

2. A pneumatic toy having a chamber with a restricted opening at its forward end, an ejector composed of a piece of fabric closing the rear end of the chamber, said fabric having a moderate degree of fullness, a resilient member connected at one end to the chamber and also connected to the ejector for distending it rearward when the rear end of the resilient member is drawn backward, and means whereby the rear end of the resilient member may be drawn backward, the last mentioned means being adapted to suddenly release said resilient member.

3. A toy having a frame having a handle at the rear end for supporting it, a vortex chamber mounted at the forward end of the frame, a piece of fabric closing the rear end of the chamber, the area of the fabric being greater than the area of the rear end of the chamber, a rubber strip the forward ends whereof are secured near the rear end of the chamber at diametrically opposite sides thereof, a trigger mounted on the handle at a distance behind the chamber for releasably stretching said strip in a rearward direction, the trigger being adapted to suddenly release the rubber strip for thereby impacting the piece of fabric.

4. A toy having a frame having a handle at the rear end for supporting it, a vortex chamber mounted at the forward end of the frame, a piece of fabric closing the rear end of the chamber, the area of the fabric being greater than the area of the rear end of the chamber, a rubber strip the forward ends whereof are secured near the rear end of the chamber at diametrically opposite sides thereof, a trigger mounted on the handle at a distance behind the chamber for releasably stretching said strip in a rearward direction, the trigger being adapted to suddenly release the rubber strip for thereby impacting the piece of fabric, the fabric being adapted to engage the rubber strip whereby it may be drawn backward with it and distended when the strip is stretched to engage the trigger.

In witness whereof I have hereunto subscribed my name.

WALTER R. DRAY.