May 12, 1953 H. L. LANGOS 2,637,941

PAPER BURSTER GUN

Filed Dec. 12, 1949 2 Sheets-Sheet 1

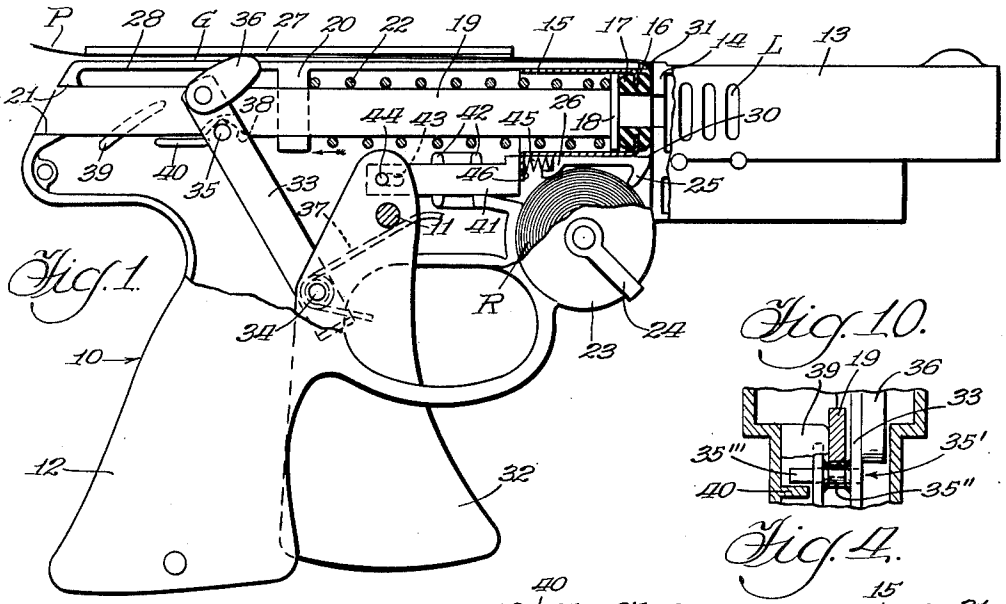
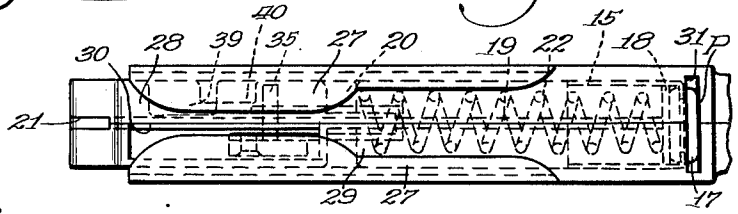


Fig. 1.

Fig. 10.

Fig. 4.



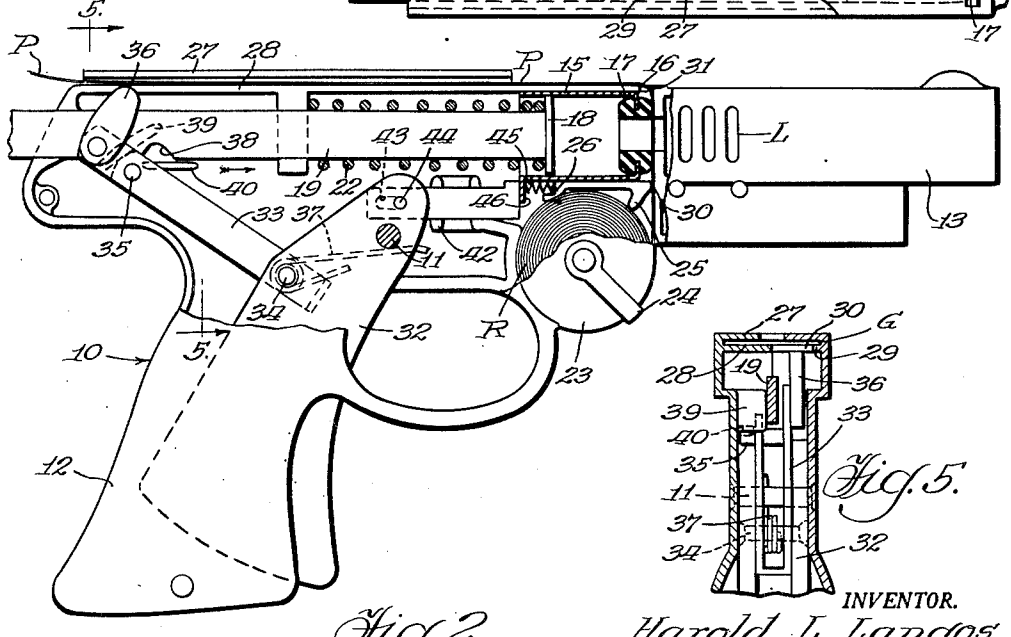


Fig. 2.

Fig. 5.

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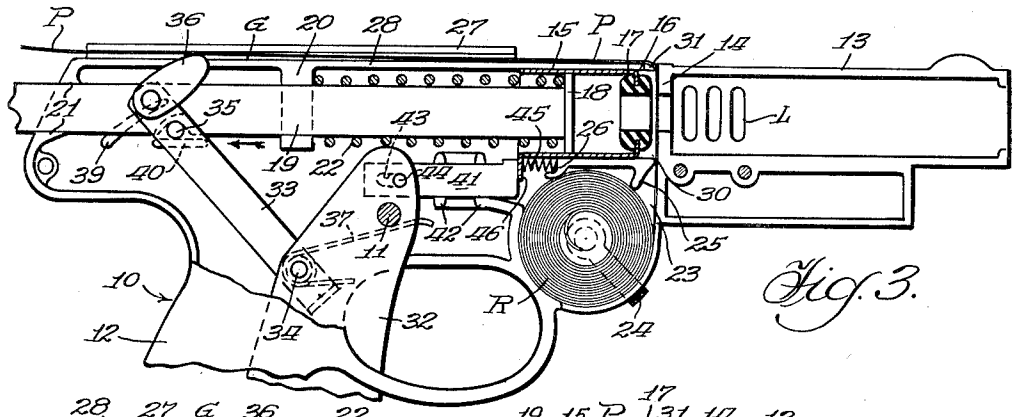


Fig. 3.

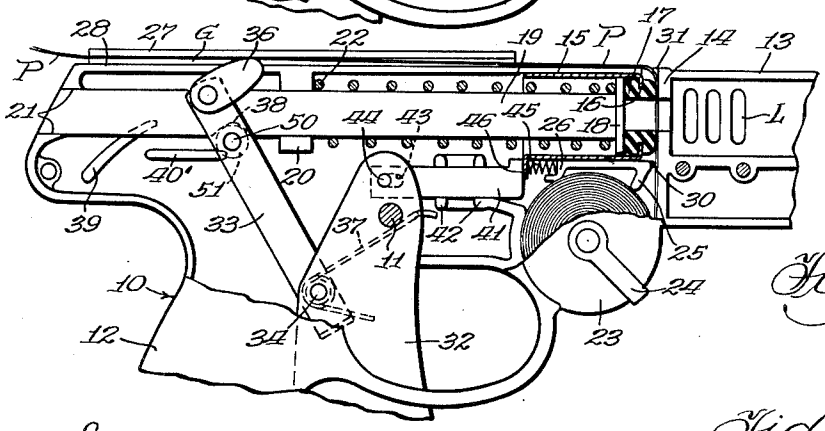


Fig. 6.

Fig. 7.

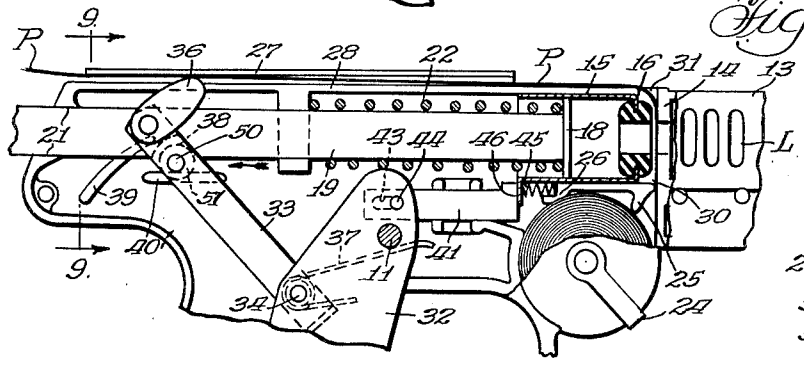
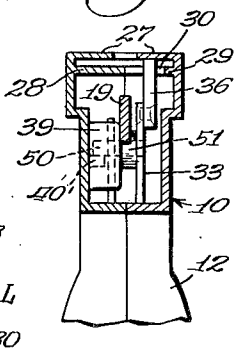


Fig. 9.



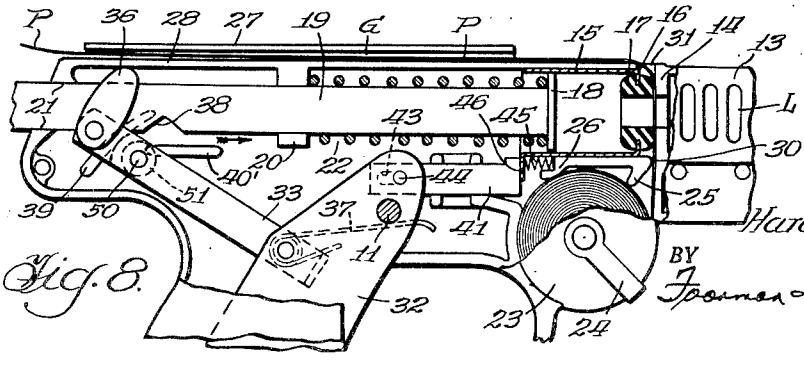


Fig. 8.

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UNITED STATES PATENT OFFICE

2,637,941

PAPER BURSTER GUN

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Application December 12, 1949, Serial No. 132,458

4 Claims. (Cl. 46—195)

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The present invention relates to toy guns of the paper-bursting type, and more particularly to improved paper feeding means therefor.

In such guns, means are provided to feed the paper through the gun so as to present an unbroken area of the paper at the muzzle after a preceding portion of the paper has been burst, the feeding being accomplished by engagement of the feeding means with the paper during one stroke of the mechanism. Difficulty has been experienced in the proper feeding of the paper, in that the paper feeding means in some cases remains engaged with the paper during a return stroke, with the result that on the next feeding stroke the paper is not properly advanced.

In such guns, also, linkage mechanism is provided including the paper feeding means, this mechanism cocking a piston element during a working stroke and releasing the piston element to permit bursting of the paper at the end of the working stroke, thus requiring a releasable or disengageable connection between the mechanism and the piston element. Such a releasable connection presents the difficulty that disengagement may possibly occurred prematurely, resulting in improper operation of the gun, the only remedy heretofore being such care in manufacture as to produce parts of relatively precise proportions, with consequent increased manufacturing costs.

The present invention obviates these difficulties by novel and effective yet simple and inexpensive means. The invention is disclosed as embodied in two forms, in each of which a guide element is provided for preventing engagement of the paper feeding means with the paper during a return stroke. In the first form of the invention, means are provided for positively disengaging the linkage mechanism and piston element, which are releasably connected to move the piston element upon a working stroke. The paper feeding means are so related to the engaging portion of the linkage mechanism that disengagement from the paper occurs as the linkage mechanism and piston element are engaged. The disengaging means comprises a cam surface so fixed in the path of the linkage portion as to be operative at the end of the working stroke, and the guiding element affords a surface or side on which the engaging portion bears after its disengagement from the piston element and during its return stroke, so as to hold the paper feeding means disengaged from the paper during such return stroke. In the application of Otto A. Langos, Serial No. 853, filed January 7, 1948, entitled "Self Feeding Paper Bursting Toy Gun," now matured

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into Patent No. 2,490,991, which was reissued as Re. 23,386, there are disclosed improved operating and paper feeding means which include releasably connected portions which all together overcome the difficulties mentioned. The present invention provides other improved means for curing such defects.

In the other form of the invention disclosed, the engaging portion of the mechanism and the piston element are so formed that disengagement occurs at the end of the working stroke without requiring the employment of other parts to accomplish disengagement, and is likely to occur during the working stroke unless positive means are provided to prevent the same, The guiding element in this form has one side adapted to be engaged by the engaging portion of the mechanism so as to hold the mechanism and piston element in positive connection during the working stroke, and another side on which the engaging portion bears during the return stroke, as in the first form. The disengaging means in this form serves only as a guide to bring the engaging portion of the mechanism into position for engagement with the other side of the guide element.

It is an object of the invention to provide a paper-bursting gun or similar toy having an improved paper-feeding arrangement whereby the disadvantages mentioned above are obviated.

Another object is the provision of a guiding element in a gun of the type described which serves to positively maintain the paper-feeding means out of contact with the paper during a return stroke of the operating mechanism.

A further object of the invention is to provide a guiding element which serves to positively maintain releasably connected parts of the gun mechanism against disconnection during a working stroke thereof.

It is a still further object of the invention to provide a guiding element in a paper bursting gun, or the like, which maintains releasably connected parts of the gun mechanism against disconnection during a working stroke thereof, and maintains paper-feed means which comprise a portion of said mechanism out of contact with the paper during a return stroke thereof upon disengagement of said parts.

It is also an object to provide a positively operating paper-feeding arrangement by means which are novel, effective, simple and economical.

For a better understanding of the invention, together with other objects and features thereof, reference is had to the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view, with a part of the housing broken away, of one form of a gun embodying the present invention;

Fig. 2 is a view similar to Fig. 1, but showing the parts of the gun mechanism in a different position;

Fig. 3 is a view similar to Figs. 1 and 2, but showing the parts of the mechanism in still another position;

Fig. 4 is a fragmentary plan view of the gun as shown in Fig. 1;

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary view similar to Fig. 1, but showing a different form of the invention;

Fig. 7 is a view similar to Fig. 6, but showing the parts of the gun mechanism in another position;

Fig. 8 is a view similar to Figs. 6 and 7, but showing the parts of the mechanism in a third position;

Fig. 9 is a sectional view taken substantially along the line 9—9 of Fig. 7; and

Fig. 10 is an enlarged fragmentary sectional view of a modification of the mechanism connecting structure of Fig. 1, but actually the preferred means for use in both the Fig. 1 and Fig. 6 embodiments of the invention.

Referring to the drawings, the gun comprises a housing 10, preferably of two longitudinally divided sections in die-cast metal which may be secured together by any suitable means, as the rivet 11, and include a handle or grip 12 and a forward muzzle portion 13. The muzzle portion 13 with three slots L therein amplifies the report of bursting paper in the gun, and enhances the similarity to a regular gun in the appearance of this gun. The three slots are provided in each of the cast halves of the housing, and are positioned consecutively in the muzzle or barrel portion from a point immediately adjacent the paper explosion orifice. In a commercial embodiment three slots have been found to provide the maximum noise effect with a lesser number of the size illustrated insufficient and a greater number unnecessary and simply adding to the die complexity and disfiguring the gun. At the rear end of the muzzle portion 13 is an apertured breech 14. Disposed rearwardly of the breech 14 in the housing and substantially aligned with the muzzle portion 13 is a movable cylinder 15 open at both ends, an inturned flange 16 being formed on its forward end which engages in a peripheral groove of a grommet 17 of spongy rubber or similar material to hold the grommet assembled with the cylinder. A piston 18 fits snugly in the cylinder 15, and has a piston rod 19, which may be a flat strip, extending therefrom out of the rear end of the cylinder and guided for sliding movement in substantially a straight line by a housing lug 20 and an aperture 21 at the butt end of the housing through which it may project. A relatively strong spring 22 is disposed about the piston rod 19 between the piston and the housing lug 20, which normally urges the piston 18 and the cylinder 13 forwardly against the breech 14. The spring 22 is designed so that it is at least equal in ultimate compression strength to the break test factor of the paper used in the gun. It is particularly desirable to maintain as close tolerance as practical on this, for if the spring is too strong it requires an unnecessarily large pressure on the trigger.

A paper magazine 23 integral with the gun housing 10 is provided below the cylinder 15, for holding a roll R of paper P, which may be inserted therein through an opening in the forward and lower portion thereof, and prevented from falling therefrom by a generally U-shaped strap 24 pivoted on the magazine. Suitable projections 25 and 26 may be formed on a partition in the housing below the cylinder 15, and extend into the magazine 23 to assist in maintaining the roll in proper position. The magazine is in communication with the interior of the housing. The paper P is led upwardly from the magazine between the breech 14 and grommet 17 when they are separated as in Fig. 3, and rearwardly therefrom through a paper guideway G, from which it projects at the butt end of the housing 10, so that it may be torn off from time to time.

The guideway G is formed integrally with the housing 10 by flanges 27 spaced above and extending over the top wall 28 of the housing. An aperture 29 is formed in the wall 28 below one of the flanges 27. The paper P passes over the top wall 28 and aperture 29 and beneath the flanges 27, which preferably have their adjacent edges spaced apart to facilitate threading of the paper through the guideway and to permit viewing of the paper therein. A transverse slot 30 is provided in the partition between the cylinder 15 and magazine 23 adjacent the breech 14, and a similar slot 31 is provided in the top wall 28, to permit passage of the paper P from the magazine between the cylinder and breech and rearwardly through the guideway. The forward projection 25 of the partition guides the paper through the slot 30 to facilitate initial threading thereof.

Linkage mechanism for operating the piston 18 is provided, and as shown includes a trigger 32 which is pivoted at its upper portion on the rivet 11. A link 33 is pivoted to the trigger by a suitable pin 34 or the like, at a point spaced below the pivot 11. At its other end, the link 33 carries a stud 35, and also carries paper feeding means which include the pawl 36, which in the commercial embodiment is made of rubber and this is preferred. However the complete paper feeding structure including the housing portion is all such that satisfactory feeding is obtained with the pawl made from any material. The paper feeding means extend beyond the stud 35, so that the pawl 36 may extend through the aperture 29 in the wall 28, and engage against the paper P in the guideway, pressing it against the inner surface of the flange 27 disposed thereabove. The paper-feeding means are formed to move with the link 33 as a unit. For this purpose, the link 33 may as shown be conveniently formed of elongated U-shape with the longer arm carrying the pawl 36. The stud 35 may extend through both arms, projecting outwardly of the shorter arm adjacent its end.

Means are provided to urge the linkage mechanism toward the normal or idle position, shown in Fig. 1, the means in this instance being shown as a suitable spring 37 coiled about the pivot 34, with one end bearing against a portion of the link 33 below the pivot 34 and the other end against the rivet 11. The lower edge of the piston rod 19 is provided with a suitable recess 38 to provide a shoulder against which the stud 35 may bear to move the piston rod rearwardly in the housing upon a working stroke of the mechanism, and preferably the construction is

such that the center of the stud 35 is well within the confines of the recess 38, so that the parts will not disengage as the link 33 moves toward parallelism with the piston rod 19 when it is actuated as a toggle by the trigger 32.

A projection 39 is provided in the housing extending across the path followed by the upper end of the shorter arm of the link 33 in its rearward movement as described, this projection 39 providing on its lower side a downwardly and rearwardly extending camming surface which is engaged by the end of the shorter arm as the piston rod 19 and the end of the link 33 move rearwardly in the working stroke. The projection 39 is so positioned that it is engaged by said end of the link 33 as the working stroke reaches completion. As the end of the link 33 engages the cam projection 39 in its rearward movement, it is swung downwardly thereby and carries the stud 35 out of engagement with the recess 38, thus releasing a piston rod 19 for forward movement under the impetus of the spring 22, compressed during the rearward movement. At the same time, the pawl 36 is moved downwardly with the link 33 and becomes disengaged from the paper P.

A guide element 40 is provided in the form of a projection interiorly of the housing 10 which extends from adjacent the cam projection 39 to a point adjacent the normal or idle position of the stud 35. As will be evident from Fig. 1, this point is also adjacent the idle position of the recess 38, the stud 35 and recess 38 engaging in the normal or idle positions of the rod 19 and link 33. The guide element 40 extends inwardly a sufficient distance to be engaged by the stud 35, but not so far as to engage the link 33, as will be evident from Figs. 4 and 5. The guide element 40 is preferably substantially parallel to the flange 27 overlying the aperture 29, and is spaced therefrom a sufficient distance to cause the pawl 36 to be spaced from the paper in the guideway and from the flange 27 when the stud 35 is at a level corresponding to the bottom surface of the element 40. The lower end of the projection 39 extends somewhat below the guide element. The arrangement is preferably such that the stud does not contact the upper side of the guide element 40, so that friction and wear are reduced.

In the preferred embodiment of the invention the cam projection 39, and the guide projection 40 are both integral with the die cast housing member from which they project. Not only does this insure accurate placement of the projections, for this is determined in the making of the die, but die cast metal is smooth and hence friction is minimized.

It will be seen that by this arrangement the pawl 36 is cammed out of engagement with the paper P simultaneously with the disengagement of the link 33 and piston rod 19, as the mechanism reaches the end of its working stroke. Upon such disengagement, the spring 37 causes the trigger 32 and link 33 to move toward the normal or idle position, urging the link 33 upwardly and forwardly toward the piston rod 19. The stud 35, however, due to the camming operation of the link 33 is moved downwardly, and in returning to normal position, engages against the lower surface of the guide element 40. The pawl 36 is thus maintained out of contact with the paper P during the return stroke of the mechanism. Thus there is no possibility of the pawl causing any reverse movement of the paper which might produce slack to prevent proper advance of the paper at the next working stroke, nor is there any possibility of injuring the paper.

A modified, but actually the preferred, structure for the stud 35 of Fig. 1 is shown in Fig. 10. This structure is likewise preferred to the pin and roller construction in the modification of Figs. 6 to 9, inclusive to be hereinafter described. The modification of Fig. 10 comprises a stud 35' having a spool-like roller portion 35'' with flanged edges providing a circular track to take the lower edge of the piston rod 19 at the recess 38 and center such piston rod therein. An extension 35''' acts in engagement with the lower surface of the guide projection 40 to maintain the link 33 and feed pawl 36 in depressed positions during the return movement of the mechanism to an idle position. This construction of the stud 35' prevents any relative lateral movement between such stud and the piston rod 19 and acts to immediately center such rod on the stud when they engage in the idle position prior to the beginning of the working or cocking stroke of the mechanism.

The paper P is burst at the aperture of the breech 14 by compression of the air in the cylinder 15 as the piston 18 is moved rapidly forward therein by the spring 22 after the release of the piston rod 19 from the link 33 in the manner previously described. To assure that the paper will be burst by the compressed air, and to provide a satisfactorily loud report, it is necessary that the cylinder 15 seal closely against the paper P and clamp it tightly against the breech 14. It is also necessary that space be provided to permit the paper P to be threaded between the grommet 17 and breech 14 and to free the paper for feeding a fresh portion thereof to the breech after a preceding portion has been burst. This is effected by providing means for moving the cylinder away from the breech during the working stroke of the mechanism, during which the piston rod 19 is cocked and the paper advanced by means of the feed pawl 36, and to position the cylinder with the grommet 17 firmly clamping the paper P at the breech, at the completion of the working stroke and before the piston 18 has more than begun its compression stroke. The means provided in the present case comprise a link 41 fixed to the cylinder 15 and extending rearwardly therefrom and below the piston rod 19 and supported for slidable movement forwardly and rearwardly of the gun housing 10 by suitable lugs 42 projecting from the housing. At its rear end portion, the link 41 is provided with a slot 43 through which extends a pin 44 secured in the trigger 32 above the rivet 11. A relatively light spring 45 is disposed between the rear projection 26 in the paper magazine 23 and the forward end of the link 41, a suitable bearing surface being provided in any suitable manner, as by a lip 46 extending from the rear edge of the cylinder 15 to which the link 41 may be secured. The spring 45 urges the cylinder 15 and link 41 away from the breech 14, but normally its biasing effect is overcome by the considerably stronger spring 22. The pin and slot connection of the link 41 and trigger 32 provides lost motion which permits the cylinder 15 with its grommet 17 to be moved away from the breech 14 by the spring 45 during the working stroke of the trigger 32 and link 33, which obviously releases the pressure of the spring 22 on the grommet 17 of the cylinder. This releases the strip of paper P from its clamped relation be-

tween the grommet and the breech 14, and at the same time the pawl 36 is in engagement with the paper in the guideway and drawing it rearwardly so as to unroll a fresh section from the roll R in the magazine 23 and draw it upwardly into position at the breech.

The pin 44 is in engagement with the forward part of the slot 43, as will readily be understood, during the cocking movement while an opening corresponding in size to the distance of travel of the pin 44 in the slot 43 provides free movement of the paper between the grommet and breech. During the first portion of the working stroke of the trigger 32, the pin 44, while engaging the forward end of the slot 43, as shown in Fig. 3, is farther to the rear than during the latter portion of the stroke, as shown in Fig. 2, where the trigger is just about to begin its return movement to normal position. Between these two positions of the pin 44, which in the present instance may be described for convenience as rearwardly or forwardly relative to the rivet 11, the pin moves sufficiently forward to move the cylinder 15 back to its forward position clamping the paper P against the breech 14, overcoming the resistance of the spring 45. It will be seen that the linkage mechanism provides a toggle action, with the link 33 thrusting rearwardly and the link 41 acting forwardly. The arrangement and proportion of the various parts is such that the grommet 17 clamps the paper against the breech and seals against the paper just as the link 33 and piston rod 19 are disengaged as already described. In other words, the lost motion in the pin and slot connection between the trigger and link 41 is taken up during the working stroke of the trigger 32 and the cylinder moved into its sealing and clamping position before the piston 18 completes its compressive stroke. Upon the disengagement of the piston rod and link 33, as already explained, the pawl 36 is maintained out of contact with the paper P in the guideway during the return stroke and until the parts have returned to the normal or idle position.

The second form of the invention disclosed, illustrated in Figs. 6 to 9, is in the main substantially similar to the form illustrated in Figs. 1 to 5, and the same reference numerals are employed to designate the various parts of the gun except for such parts as differ substantially from the disclosure of the first form.

Referring to Figs. 6 to 9, inclusive, it will be seen that all of the parts are substantially the same as in the first form of the invention just described, except that instead of the stud 35, the link 33 is provided with a pin 50 secured in the two arms of the link and projecting through the shorter arm, in substantially the same manner as the stud 35 of the first form. Journalled on the pin 50 between the two arms of the link 33 is a roller 51 of any suitable material. The diameter of the roller 51 is considerably greater than that of the stud 35, and is sufficiently great so that the roller when engaged in the recess 38 of the piston rod 19 has its center disposed outside of the recess. It will be apparent that on the working stroke of the mechanism, therefore, the roller will tend to move out of the recess 38, particularly toward the end of the working stroke, as the link 33 comes closer to parallelism with the piston rod 19 and the longitudinal component of the force it exerts on the piston rod increases. Thus at the end of the working stroke, the roller 51 will disengage from the piston rod without requiring the use of cam means or the like to force it out of the recess.

To prevent the premature disengagement of the roller 51 from the recess 38 of the piston rod, the guide element 40' is employed as a retaining means. This corresponds generally to the guide element 40 of the Fig. 1 embodiment except that it is positioned further from the lower edge of the piston rod 19. The pin 50 engages upon the upper surface of the guide element 40 during the working stroke, as best shown in Fig. 7, and thus prevents the roller from moving downwardly out of the recess 38. During this working stroke, the pawl 36 advances the paper feed in the same manner as described in connection with the first form, the action of the cylinder 15 under the influence of the spring 45 and the engagement between the pin 44 of the trigger 32 in the slot 43 of the link 41 also being the same. When the end of the working stroke is reached, the roller 51 disengages from the recess 38 under the influence of the thrust of the link 33, simultaneously disengaging the pawl 36 from the paper, and the end of the short arm of the link 33 engages against the cam projection 39 to limit the rearward movement of the roller 51 and pin 50 and guide the same beneath the guide element 40 inasmuch as normally there is still some gripping pressure on the trigger 32 urging the link 33 slightly rearwardly. The cam projection 39 in this form of the invention is contemplated as primarily a guide means, but the releasing action is so sudden that should manufacturing tolerances make possible a rearward movement of the piston rod 19 and link 33 such that they are not completely disengaged when the pin or stud 50 goes off the top surface of the guide member 40; then the projection 39 might have a slight camming and releasing function supplementing the releasing action due to the roller and recess construction and the angular position thereof. At any rate, after the link 33 and piston rod 19 are disengaged at the end of the working stroke, the return stroke is made under the influence of the spring 37, with the pin 50 engaging on the lower surface of the guide element 40' to hold the pawl 36 out of contact with the paper feed during the return stroke, in the same manner as described in connection with the first form of the invention. After the end of the return stroke, as the parts come to the normal or idle position, the roller 51 is again engaged in the recess 38 as the pin 50 passes off the forward end of the guide element 40'.

In Fig. 6, the parts are shown in the normal or idle position, while in Fig. 7, the position of the parts is illustrated at one point during the working stroke. Fig. 8 shows the parts just after disengagement of the link 33 and piston rod 19 at the end of the working stroke, and just as the return stroke is beginning. From this position, the parts return to the position shown in Fig. 6.

It will be seen that in the form of Figs. 1 to 5, inclusive, the guide element 40 serves primarily to maintain the paper feed means out of contact with the paper during the return stroke, and the cam projection 39 is provided in order to effect disengagement between the linkage mechanism and piston rod. In the form illustrated in Figs. 6 to 9, inclusive, the element 40' is provided both to maintain the link 33 and piston rod 19 in engagement throughout the working stroke, as well as maintaining the pawl 36 in contact with the paper P to feed the same, and also to maintain the parts disengaged, particularly the feed pawl 36 disengaged from the paper, during the re-

turn stroke. The cam projection 39, instead of serving as a means for causing disengagement of the parts, at least as its primary function, serves as a means for guiding and limiting the movement of the link 33 so as to insure engagement of the pin 59 on the underside of the guide element 40' so as to prevent contact of the pawl against the paper P.

The structure of Fig. 10 can be substituted for the pins, studs, and rollers of both forms just described.

It will be apparent from the foregoing description that I have provided a toy paper-bursting gun which incorporates the advantages and features, and accomplishes the objects, hereinabove referred to.

It may also be pointed out that the specific parts disclosed may be considerably altered without departing from the principles of the invention. Thus, the recess 38 in the bottom edge of the piston rod might be replaced by a pair of pins or studs on one or both faces of the piston rod against which the stud 35 might bear, the spacing of the pins serving as a recess and their positions assuring retention of the pin during the working stroke. Again, the pins might be so arranged for engagement by the roller 50 as to assure its disengagement therefrom in the same manner as in the case of the recess 38. Actually, in any such structure there is engagement between a shoulder means on the piston rod and an engaging portion at the top or top portion of the link as 33. Other releasable connections may similarly be employed.

It is not necessary that the paper feed means be integral, or even move as a unitary structure with the link 33, so long as the feeding means are so related to the linkage mechanism that the pawl is engaged with the paper during the working stroke and disengaged therefrom at the end of the stroke and maintained out of engagement therewith during the return stroke. The linkage mechanism may also be considerably varied in other respects yet operate in the desired manner. Further, the guide element 40 need not be integral with the housing half, but may consist of a part secured to the inside of the housing.

It will therefore appear that the embodiments of the invention disclosed may be varied in many respects without departing from the inventive concept. Some of the possible modifications and changes have been pointed out or suggested, hereinabove, and others will readily suggest themselves to those skilled in the art. It is therefore intended to include such modifications within the scope of the appended claims.

I claim:

1. In a paper-burster gun having paper feedable therethrough and including a gun housing, paper bursting means including a member movably mounted in said housing and an element movable to sealingly clamp said paper for bursting thereof and to release said paper for feeding thereof and normally held in clamping position by said movable member and released thereby upon movement thereof to cocked position, and also including means biasing said element to releasing position, the combination including linkage mechanism movably mounted in said housing and including a trigger pivoted in said housing, a link having one end pivoted to said trigger at a point spaced in one direction from said trigger pivot and having its other end releasably engaged with said movable member to move the same in a working stroke, and means providing a lost motion connection between said movable element and said trigger spaced from said trigger pivot in a direction substantially opposite said one direction permitting releasing movement of said movable element during the initial part of the working stroke, said mechanism affording a toggle action during said working stroke to move said movable member to cocked position by engagement of said link and movable member and to move said movable element to clamping position by said trigger during the latter part of said working stroke after movement of said element to releasing position by said biasing means, paper feed means connected for synchronized movement with said link and engageable with said paper during said working stroke to feed said paper while said movable element is in a releasing position, means for disengaging said link and movable member and said feed means and paper at the end of said working stroke, and a guide surface within the housing for maintaining said feed means disengaged from said paper during a return stroke of the mechanism.

2. In a paper-burster gun having a housing and having feedable and burstable paper therein as well as means including movable piston means for developing air pressure to burst the paper, the combination including mechanism for interconnection and disconnection with the piston means to cock the piston means and to feed the paper comprising linkage having paper feed means and projecting engaging means thereon, with the latter adapted to mechanically connect with the piston means to move the same and with said paper feed means at the same time adapted to engage and move the paper, a fixed cam within the housing engageable by said engaging means contemporaneously with the disconnection of the latter from the piston means and with said paper feed means on said linkage moving in accordance with said engaging means, said fixed cam displacing said engaging means downwardly and said paper feed means moving therewith away from connection with the paper, and a fixed projection within the housing spaced from said fixed cam adapted to be engaged by said engaging means substantially at the end of the downward movement, said fixed projection being of a length less than the total distance of the return movement of the paper feed means and engaging means on said linkage, and by the engagement of the engaging means therewith said fixed projection is adapted to guide the paper feed means and maintain the same out of engagement with the paper on such return movement.

3. In a paper-burster gun having a housing and having feedable and burstable paper therein as well as means including movable piston means for developing air pressure to burst the paper, having therewith a piston rod with a depression on the underside thereof, the combination including mechanism for interconnection and disconnection with the piston rod to cock the piston means and to feed the paper comprising linkage having thereon paper feed means and a laterally projecting engaging portion, with the latter adapted to mechanically connect with the depression in the piston rod to move the same, and with said paper feed means adapted to engage and move the paper, a fixed cam within the housing engageable by said engaging portion contemporaneously with the disconnection of the

same from the piston rod and with said paper feed means on said linkage moving in accordance with said engaging portion, with said fixed cam displacing said engaging portion downwardly and said paper feed means moving therewith away from connection with the paper, and a fixed longitudinal projection within the housing spaced from said fixed cam adapted to be engaged on one side thereof by said engaging portion to maintain said engaging portion in said piston rod depression during a cocking movement of the piston rod and adapted to be engaged by said engaging portion on the opposite side thereof substantially at the end of the downward movement, said fixed projection being shorter than the distance of the return movement of the engaging portion and the paper feed means to accomplish the guiding of the paper feed means to maintain the same out of engagement with the paper on such return movement.

4. In a paper-burster gun having a housing and having therein feedable and burstable paper of a somewhat fragile character as well as means including movable piston means for developing air pressure to burst such paper, having therewith a piston rod with a depression on the underside thereof, the combination including mechanism for interconnection and disconnection with the piston rod to cock the piston means and to feed the paper comprising linkage having thereon paper feed means with a friction portion to contact the paper and a laterally projecting engaging portion, with the latter adapted to mechanically connect with the depression in the piston rod to move the same, and with said paper

feed means adapted to engage the paper at the friction portion and move the paper, a fixed cam within the housing engageable by said engaging portion contemporaneously with the disconnection of the same from the piston rod and acting to accomplish the disconnection and to move the engaging portion downwardly, with said paper feed means on said linkage moving in accordance with said engaging portion and away from connection with the paper, and a fixed longitudinal projection within the housing spaced from said fixed cam and in a position relative to the movement of the engaging portion to receive the same substantially at the end of its said downward movement, said fixed projection being shorter than the distance of the return movement of the engaging portion and the paper feed means to accomplish the guiding of the paper feed means to maintain the friction portion of the same out of engagement with the paper on such return movement.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,240,990	Lefever	Sept. 25, 1917
1,304,975	Helsel	May 27, 1919
1,511,718	Burger	Oct. 14, 1924
2,083,535	Langos	June 8, 1937
2,302,963	Lefever	Nov. 24, 1942
2,364,051	Berridge	Dec. 5, 1944
2,490,991	Langos	Dec. 13, 1949
2,553,388	Steiner et al.	May 15, 1951