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Laporte et al.

[11] **3,841,293**

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[54] **CLAY PIGEON DISPENSING APPARATUS**

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[52] **U.S. Cl.** **124/8,** 124/50, 221/251, 221/297, 221/289

[51] **Int. Cl.** **F41b 3/04**

[58] **Field of Search** 221/224, 225, 236, 238, 221/251, 290, 297, 298, 299, 289; 124/8, 9, 36, 43, 50

[56] **References Cited**

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Primary Examiner—Robert B. Reeves
Assistant Examiner—Joseph J. Rolla

[57] **ABSTRACT**

Apparatus for serially dispensing, from a vertical stack, plate-like objects which may be fragile in nature. The invention is shown in the environment of a device for distributing target plates to the catapult arm of a throwing device used in trap shooting. The apparatus of the invention includes means for laterally supporting a vertical stack of objects, retractable latch means for supporting the stack from the bottom and retention means for preventing vertical movement of all but the lowermost object in the stack when the latch means are retracted.

7 Claims, 5 Drawing Figures

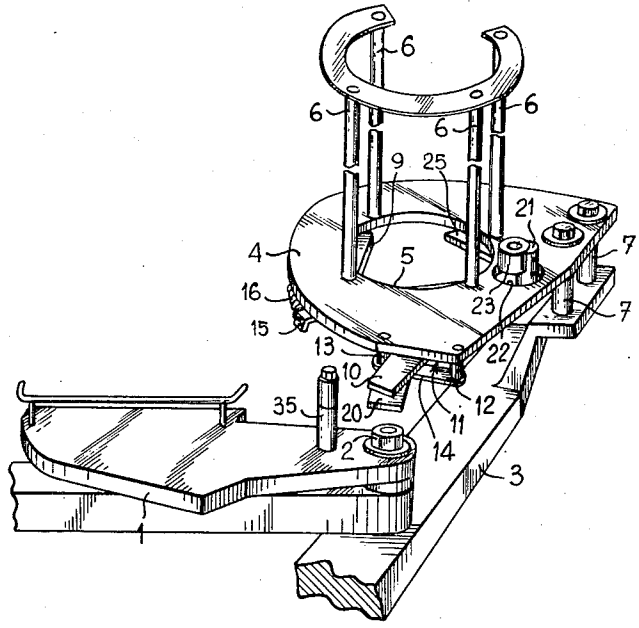

FIG. 1

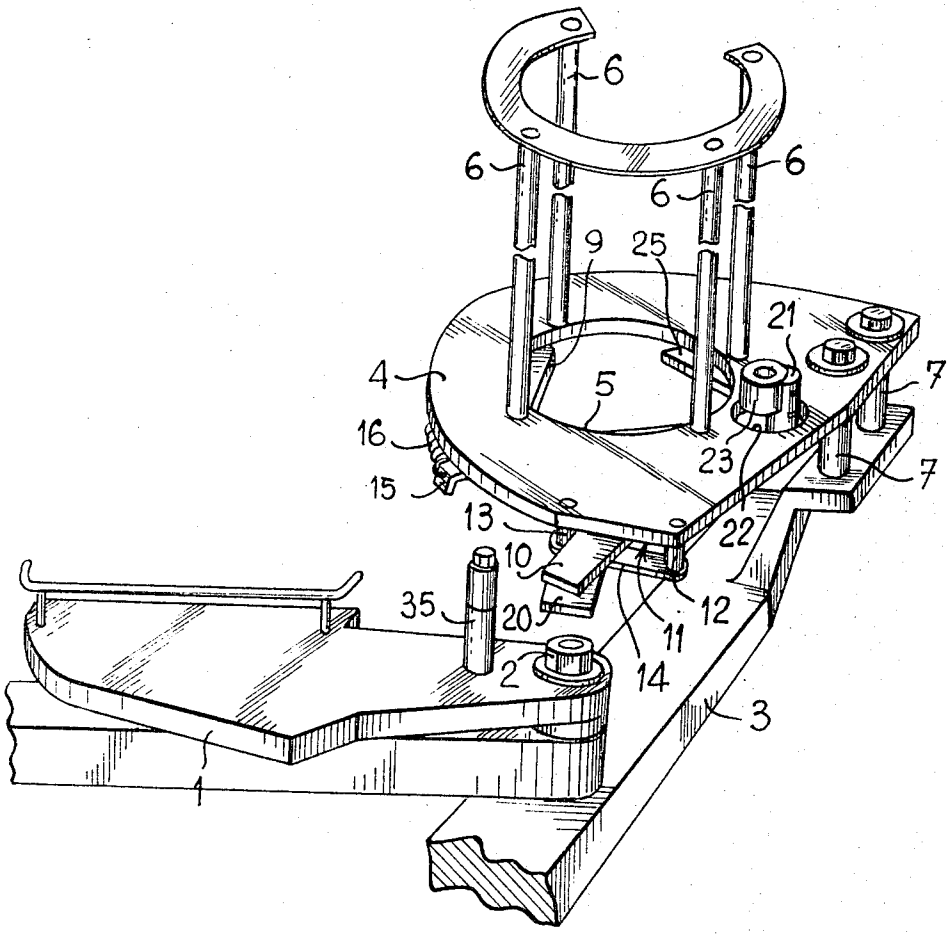

FIG.2

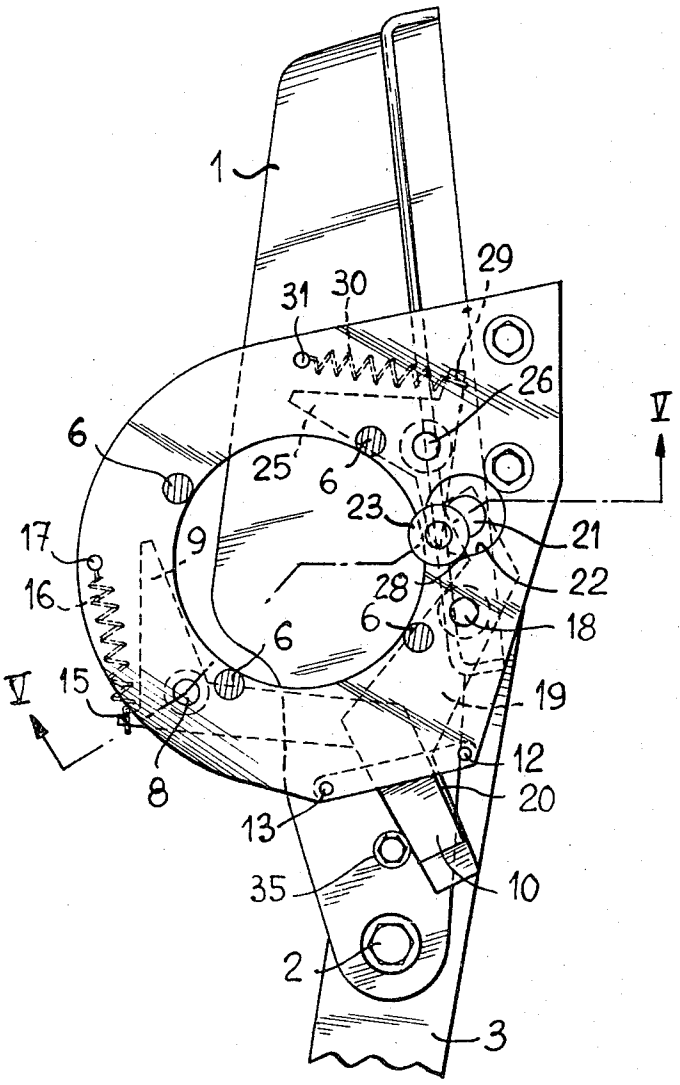

FIG. 3

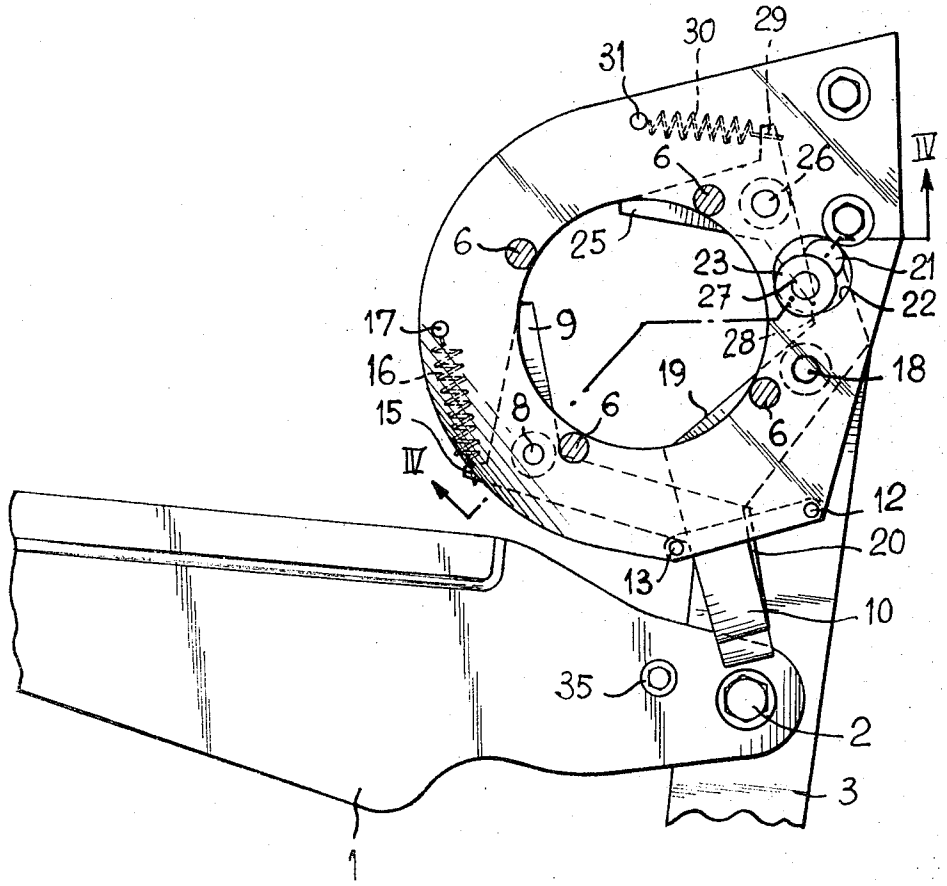
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FIG. 4

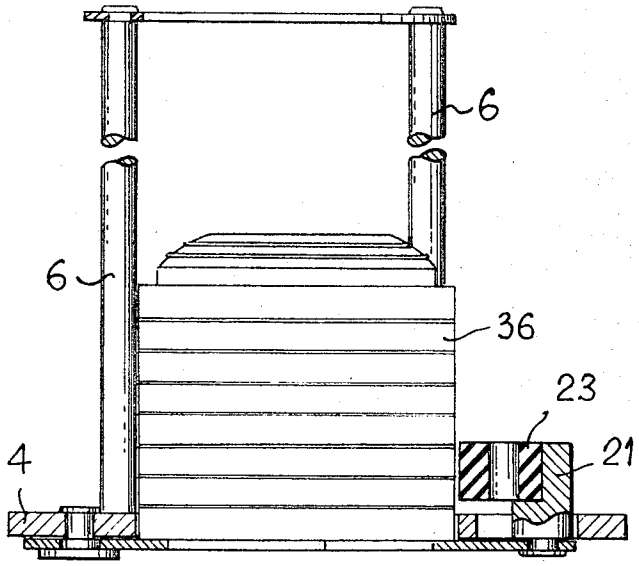
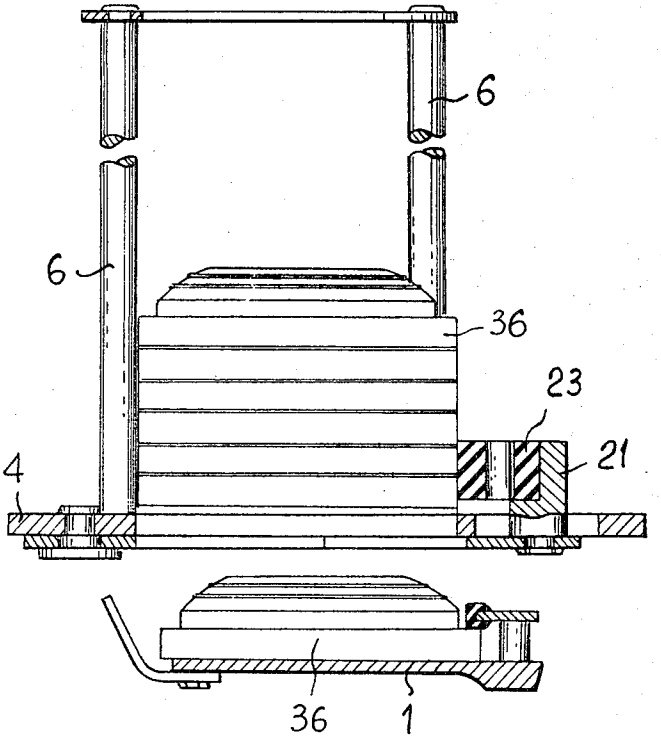


FIG. 5



CLAY PIGEON DISPENSING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to dispensing, serially and from the bottom of a stack, individual objects and particularly objects of a fragile nature. More specifically, this invention is directed to apparatus for feeding plates to a throwing mechanism of the type employed in trap shooting. Accordingly, the general objects of the present invention are to provide novel and improved methods and apparatus of such character.

2. Description of the Prior Art

While not limited thereto in its utility, the present invention is particularly useful for distributing plates or clay targets to a releasing or throwing mechanism of the type used in clay pigeon shooting. There are, in the prior art, several devices for successively distributing plates to apparatus which projects the plates into the air. The projecting or throwing apparatus conventionally comprises an arm connected to a strong draw spring. This arm, known as the catapult arm, is capable of occupying a loaded or cocked position in which the draw spring is under tension or compression. The target or plate is typically delivered to the catapult arm when the arm is in the cocked position and the arm is thereupon released to throw the plate. The prior art devices, and particularly those which are entirely mechanical in nature, have been quite complicated and thus expensive and susceptible to mechanical failure. The complexity of the prior art plate feed mechanisms has been dictated by the fact that the plates to be thrown are comparatively fragile and thus a great deal of care must be taken to minimize the risk of the plates being broken during the sometimes rather rapid distribution to the throwing device.

Target distribution devices which are fluid operated have also been known in the prior art. These fluid operated devices are exemplified by the apparatus of French Pat. No. 69/09552 of Apr. 9, 1969. While devices such as that of the referenced French patent were reliable, the necessity of providing a source of pressurized fluid for operating the apparatus has proven to be unduly burdensome.

SUMMARY OF THE INVENTION

The present invention overcomes the above briefly discussed and numerous other deficiencies and disadvantages of the prior art by providing a novel and improved distribution device for fragile articles such as targets employed in trap shooting. In the environment of a plate releasing apparatus for a shooting trap used in clay pigeon shooting, apparatus in accordance with the present invention includes vertical plate support means which is located above the catapult arm of the releasing apparatus when the arm is in the loaded position. This vertical support means receives a stack of plates or targets and is provided, in its base, with an aperture through which the plates pass. A first plurality of movable catches are located immediately beneath the support means, and above the catapult arm, for supporting the stack of plates when the catapult arm is not loaded or in position to be loaded. The catches are operated to release the lowermost plate in the stack in order that such lowermost plate may drop onto the catapult arm when the arm is brought into the cocked position.

Apparatus in accordance with the invention also includes movable retention means positioned above the base of the vertical support means and cooperating with at least the second plate from the bottom of the stack to prevent vertical movement of all but the lowermost plate when said lowermost plate is being delivered to the catapult arm. The first plurality of lower catches and the retention means are operated in synchronism, for example by the catapult arm itself, whereby the catches will be retracted and the retention means moved into operative engagement with the stack when the unloaded catapult arm moves into the cocked position.

In accordance with a preferred embodiment of the invention, the catches positioned below the vertical support means include tongues pivotally mounted on vertical axles. These tongues are spring loaded into the plate stack supporting position where they project into a vertical extension of the aperture in the support means through which the plates serially pass. The retraction of these tongues is achieved mechanically by means of contact between a projection on the catapult arm with control bar extensions of the catches.

Also in accordance with a preferred embodiment of the invention, the retention means which supports all but the lowermost plate when the lower catches are retracted will comprise a flexible member operated by one of the catches. In one embodiment the flexible member comprises a rubber block supported on a transverse projection of one of the catches; the projection extending through the base of the support means and being movable generally radially with respect to the aperture through which the plates are fed.

BRIEF DESCRIPTION OF THE DRAWING

The present invention may be better understood and its numerous objects and advantages will become apparent to those skilled in the art by reference to the accompanying drawings wherein like reference numerals refer to like elements in the several figures and in which:

FIG. 1 is a perspective view of a first embodiment of a plate distribution device in accordance with the present invention, the device being shown in the environment of a target throwing mechanism;

FIG. 2 is a top plan view, partly in section, depicting the apparatus of FIG. 1 with the associated throwing arm in the loaded or cocked position;

FIG. 3 is a view similar to FIG. 2 but with the throwing arm in the unloaded position;

FIG. 4 is a cross-sectional, side elevational view taken along line IV—IV of FIG. 3 and showing the disclosed embodiment of the invention in the position assumed with the throwing arm in the unloaded state; and

FIG. 5 is a view similar to that of FIG. 4 depicting the present invention in the state assumed with the associated throwing arm in the loaded position, FIG. 5 being a view taken along line V—V of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in the drawing, the present invention is associated with apparatus for throwing targets or plates of the type used in trap or clay pigeon shooting. Ac-

cordingly, the present invention is shown in the environment of a target throwing device which includes a catapult arm 1 rotatably mounted by means of an axle 2 from a support 3. The catapult arm may occupy a loading position, in which it extends below the base member 4 of the disclosed embodiment of the present invention as shown in FIG. 2, or an unloaded position. As is well known, the catapult arm 1 is connected to a strong draw spring which tends to bring the arm into the cocked position shown in FIG. 1. The spring, the means for locking the arm in the firing position and the means for controlling the retraction of the arm have not been shown in the drawing.

The base member 4 of the loading or plate delivery apparatus of the present invention is comprised of a flat section which is provided with a central aperture 5. The central aperture 5 has the same dimensions as the plates or other objects which are to be serially and singly dispensed. In the disclosed embodiment, four parallel vertical shafts 6 are mounted on the upper side of base member 4 and are evenly positioned about the periphery of the central aperture 5 therein.

The base member 4 is secured to the throwing device by means of a pair of supporting columns 7—7. A plurality of catch mechanisms are mounted on the underside of base member 4. Thus, a first catch member 9 is mounted for pivoting with an axle 8. As may best be seen from FIGS. 2 and 3, the catch member 9 includes at the first end thereof an integral control bar 10 which projects outwardly from base member 4. The free end of the control bar 10 extension of catch 9 extends through a slot or passage 11 (FIG. 1) defined by pins 12 and 13 and a connecting plate 14; movements of bar 10 and thus of catch 9 being guided by the walls of the passage 11 and limited by pins 12 and 13. The catch 9 is also provided with an extension which defines a hook 15. A draw spring 16 extends between the hook 15 and a stud 17 on the underside of base member 4. Spring 16 tends to hold the catch 9 in the position shown in FIGS. 1, 3 and 4.

A second catch member 19 is also mounted, on an axle 18, from the underside of base member 4. As may best be seen from a joint consideration of FIGS. 1 and 3, catch member 19 has at the first end thereof an integral extension 20 which functions as a second control bar; control bar 20 also projecting through the passage 11. The second or free end of catch member 19 supports a finger or pawl 21 which projects upwardly through a second small aperture 22 in base member 4. The pawl 21 has, mounted thereon or formed integrally therewith, a resilient member 23. In a first position of the control bar 20 the member 23 will project inwardly beyond the periphery of an extension of central aperture 5 in base member 4. The resilient member 23 is shown in cross-section in its two operative positions in FIGS. 4 and 5 and may be a rubber block.

A third catch member 25 is pivotally mounted from the underside of base member 4 on an axle 26. The catch member 25 has, at a first end thereof, an extension 27 which cooperates, in the manner which may best be seen from FIG. 3, with a ramp 28 on the free end of catch 19. As with catch 9, the catch 25 is spring loaded into the position shown in FIGS. 1 and 3 by means of a spring 30 extending between a hook extension 29 of catch 25 and a stud 31 affixed to the underside of base member 4.

Referring jointly to FIGS. 1 and 3, with the catapult arm 1 in the unloaded position, the control bars 10 and 20 will be spring loaded against pin 13 which functions as a stop therefore. With the control bars loaded against pin 13 portions of all three catch members 9, 19 and 25 will define tongues which extend inwardly beyond the perimeter of a vertical extension of aperture 5 in base member 4 and the rubber block 23 will be withdrawn from the cylindrical space defined by the four vertical shafts 6.

Referring again to FIG. 1, the catapult arm 1 is, adjacent to the axle 2, provided with an upwardly extending stop screw 35. As may be seen from FIG. 2, stop screw 35 cooperates with the control bars 10 and 20 during loading of a plate onto the catapult arm 1.

To briefly describe the operation of the disclosed embodiment of the invention, when the catapult arm 1 is in the unloaded position of FIGS. 1, 3 and 4, a stack of plates 36 to be thrown are placed between the shafts 6. The plate 36 situated at the lower end of the stack will rest on the tongue portions of catch members 9, 19 and 25 which extend inwardly beyond the perimeter of aperture 5 in base member 4. When the catapult arm 1 is moved to the loading position shown in FIG. 2, the stop member 35 will contact the control bars 10 and 20 thereby causing the control bars to pivot about their respective axles 8 and 18. The pivoting of control bar 10 causes the catch 9 to be retracted in opposition to the force of spring 16. Similarly, the catch 19 will also be retracted and its ramp portion 28 will cause pivoting of catch 25 in opposition to the force exerted by spring 30. With the catches retracted the plate 36 which is located at the lower end of the stack, and thus is accommodated in aperture 5 in base member 4, will drop onto arm 1 as shown in FIG. 5. During the pivoting of catch 19 to the retracted position, its free end will move toward the perimeter of the cylinder defined by vertical shafts 6. This inward movement will bring the resilient member 23 into contact with the stack of plates 36 as is also shown in FIG. 5. The resilient member 23 is staggered in height with respect to the catches 9, 19 and 25 so that, with arm 1 in the loading position, the member 23 will bear against the second and third plates at the lower end of the stack to thereby hold, by means of wedging the stack against the oppositely disposed vertical shafts 6, the entire stack of plates with the exception of the lowermost plate.

When the arm 1 is released, by means not shown, it pivots to catapult the plate which it has received and the stop screw 30 will be moved away from the ends of the control bars 10 and 20. The bars 10 and 20 will thus return to their original positions as shown in FIGS. 1 and 3 respectively under the influence of springs 16 and 30. This spring associated return action of the control bars will result in the reinsertion of catches 9, 19 and 25 to the position shown in FIGS. 1, 3 and 4 and will simultaneously cause the resilient member 23 to move outwardly with respect to the axis of aperture 5 in base member 4. When member 23 moves outwardly it will release the stack of plates 36 and the stack will move downwardly with the lowermost plate remaining coming to rest on the tongue portions of catches 9, 19 and 25.

While a preferred embodiment has been shown and described, various modifications and substitutions may be made thereto without departing from the spirit and scope of the invention. Accordingly, it is to be under-

stood that the present invention has been described by way of illustration and not limitation.

What is claimed is:

1. In an apparatus for throwing frangible targets, the apparatus including a catapult arm having loading and unloaded positions, the improvement comprising:

means for supporting a stack of targets, said supporting means being provided with a central aperture through which the targets pass, the catapult arm being in vertical registration with said central aperture when in the loading position;

pivotal latch means mounted for movement in a direction generally transverse to the direction of movement of the targets during delivery of the catapult arm, said latch means being disposed below said supporting means between said supporting means and the catapult arm, said latch means including at least a first latch having a first end which defines a retractable stack supporting tongue member, said tongue member normally extending into partial vertical alignment with said supporting means central aperture whereby a stack of objects will normally be supported on said latch means;

means biasing said latch means into said normally extended position;

a control arm extension on said first latch;

a projection on the catapult arm, said projection engaging and operating said control arm extension to cause pivoting of said control arm and its associated latch when said catapult arm is moved into registration with said supporting means central aperture whereby the lowermost target in the stack will be released for delivery to the catapult arm;

retention means vertically displaced from said latch means, said retention means being movable between a first position wherein said retention means engages at least the second target from the bottom of the stack to thereby support the stack and a second position wherein said retention means is withdrawn from contact with the stack of targets; and

means operating said retention means in synchronism with and in opposition to said latch means whereby said retention means will occupy said first position when said latch means is retracted and will occupy said second position when said latch means is in its normally extended position.

2. The apparatus of claim **1** wherein said latch means comprises:

a plurality of pivotal latches affixed to vertical axles located below said supporting means, said latches each having first ends which define retractable stack supporting tongue members.

3. The apparatus of claim **2** further comprising:

stop means for limiting the motion of said control arm extension.

4. The apparatus of claim **3** wherein each of said pivotal latches has a control arm extension, at least one of said extensions being operated by an adjacent latch and at least two other extensions being directly operated by said catapult arm projection.

5. The apparatus of claim **1** wherein said retention means is a resilient member and wherein said operating means comprises:

a vertical pawl on one of said latches, said pawl being located on the opposite side of the axle from the tongue member.

6. The apparatus of claim **4** wherein said retention means is a resilient member and wherein said operating means comprises:

a vertical pawl on one of said latches, said pawl being located on the opposite side of the axle from the tongue member, said pawl being affixed to one of said directly operated latches.

7. The apparatus of claim **6** wherein said pivotal latches comprise:

a tongue having two sides forming an intermediate elbow, the first side being intended for projecting into registration with said central aperture under the force of said biasing means, the other side being extended by a control arm.

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