

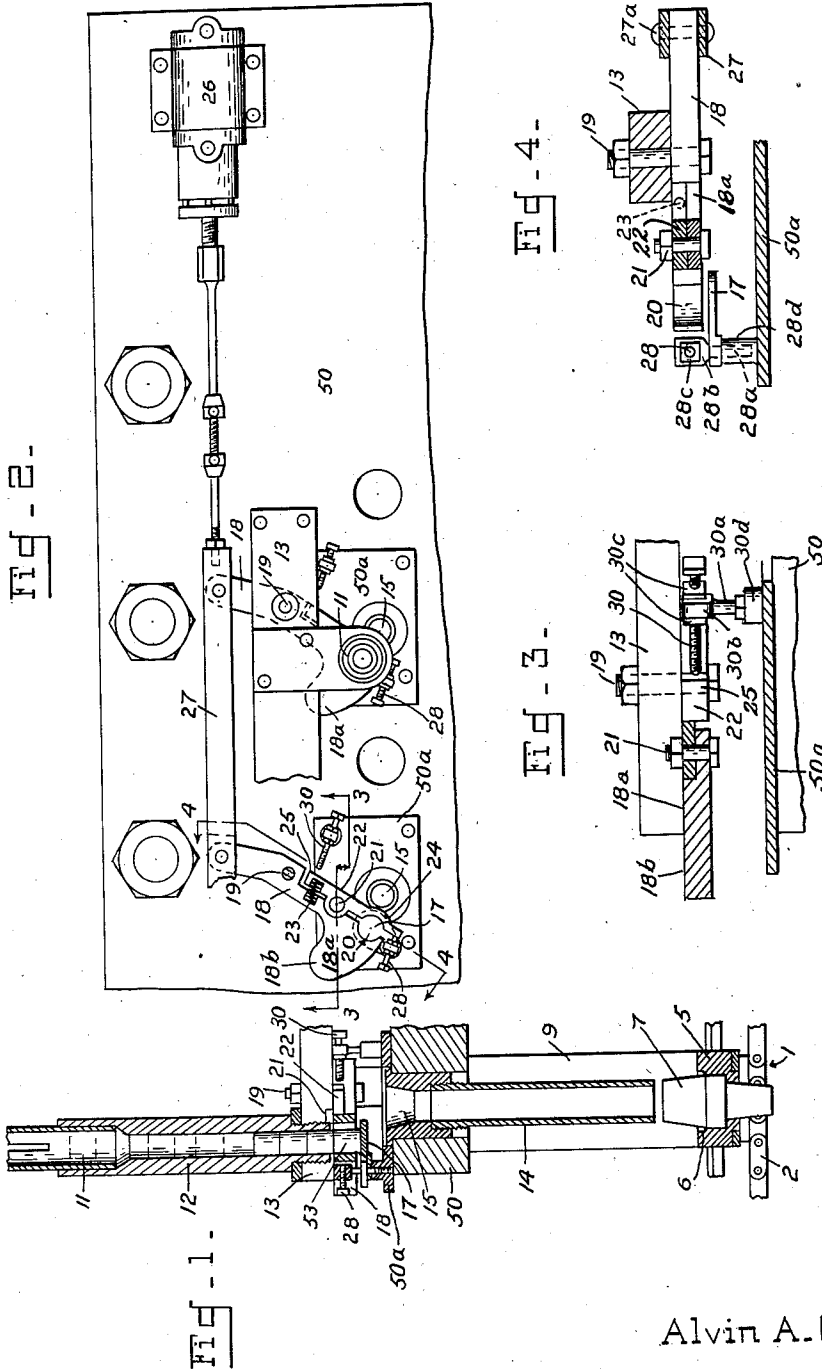
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TRANSFER MECHANISM

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TRANSFER MECHANISM

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4 Claims. (Cl. 214—1)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to a transfer or feeding mechanism for automatic loading machines and this application constitutes a division of my co-pending application filed July 7, 1941, bearing Serial Number 401,335 and entitled Automatic loading machine.

It is a particular object of this invention to provide a novel construction of transfer or feed mechanism for use in conjunction with and as a part of the automatic loading machine, above referred to, for feeding pellets of explosives to shells being loaded by the machine.

More particularly, it is an object of the invention to provide an automatic transfer mechanism which will operate efficiently to feed pellets, at predetermined intervals of time, to shells carried by a conveyor means, the latter being operated intermittently to move the shells into and out of positions to be loaded.

Other objects and advantages of the invention will hereafter become more fully apparent from the following description and the drawings, which illustrate a preferred embodiment therefore, and wherein:

Figure 1 is a vertical, substantially central sectional view, partly in elevation, of one unit of the transfer mechanism of the above mentioned machine;

Figure 2 is fragmentary top plan view, partly broken away;

Figure 3 is an enlarged longitudinal vertical sectional view taken substantially along the line 3—3 of Figure 2; and

Figure 4 is an enlarged transverse vertical section taken substantially along the line 4—4 of Figure 2.

Referring more particularly to the drawing, wherein like reference characters designate like or corresponding parts throughout the different views, for the purpose of illustrating the use of the transfer mechanism, constituting the present invention and which will hereafter be described, certain parts disclosed and fully covered in my co-pending application, heretofore referred to, and which form no part of this invention, have been illustrated and will be described briefly herein to more fully disclose a preferred use of this invention. These parts include among others, a portion of an endless conveyor designated generally 1 formed of parallel chains one of which is shown at 2 and to which are connected shell

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holders 5 having openings extending there-through forming seats 6 for containing shells 7 to be loaded.

The present invention includes a feed tube 11 the lower end of which telescopes into the upper end of a feed tube 12 which tube, in turn, extends through and is detachably connected to a support 13. Support 13 is disposed above and supported by a table 50 to the upper surface of which is fastened a plurality of cover plates 50a. A feed tube 14 has an upper section which is connected to and supported by one of the plates 50a and it will be readily apparent that each of the plates 50a is similarly adapted to support a tube 15 or conduit 14. The upper section of the tube 14 is provided with a flared mouth fitting 15.

A plurality of horizontal lever arms 18 are fulcrumed on the support 13 as levers of the first order by the bolts 19, and are pivotally connected at corresponding arms thereof to an operating shifter bar 27, as seen in Figures 2 and 4, which is reciprocated by a fluid motor 26 for oscillating the levers 18.

It will be understood that a conduit 11, 12 and 14 is associated with each lever and that a battery of any number of levers 18 can be connected to and oscillated by connecting rod 27.

The arm 18a of each lever 18 opposite the bar 27 is disposed above the table 50 and beneath the discharge end of one of the tubes 12. A pedestal 28a (Fig. 4) projects upwardly from each plate 50a to detachably support a platform 17 beneath each arm 18a and beneath the outlet end of each conduit 12.

A finger or detachable arm section 22 extending generally longitudinally beside the lever 18 at its right hand side in Figure 2 is pivotally connected intermediate of its ends to each arm 18a, between its free end and the pivot 19, by means of a pivot pin 21. The outer clamp end 24 of each finger 22 extends slightly beyond the extremity of the respective arm 18a and is provided with a substantially semi-circular inwardly opening recess and the adjacent portion of the arm 18a is provided with a complementary recess, which recesses combine to form a substantially circular opening 20, adjacent the free end of arm 18a. The opposite end 25 of the finger 22 and the complementary portion of lever 18 are provided with opposed socket portions to receive an expansion spring 23 which bears against end 25 for urging said end away from the arm 18 to swing the opposite end 24 toward lever 18a. Arm 18a is provided with an enlargement at its free end 55 which extends in a clock-wise direction there-

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from, as seen in Figure 2, and which forms a shield 18b, for purpose which will hereinafter be described.

Referring particularly to Figure 4, a standard 28a extends into and detachably engages each pedestal 28d and functions to detachably mount the platform 17 which is supported by said pedestal 28d. Each standard 28a is provided with a head 28b having a threaded opening extending horizontally therethrough for adjustably receiving a bolt 28 which is retained in its adjusted position therein by means of a pair of locked nuts 28c. Each of the bolts 28 forms a stop and is disposed to engage the extremity of one finger portion 24 when the lever 18 is at initial or receiving position, for a purpose which will hereinafter be explained. A bolt 30 is similarly associated with each arm 18 and is supported by a standard 30a, having a head 30b, and a pedestal 30d and is adjustably fixed by locked nuts 30c. Each bolt 30 also forms a stop and is disposed to engage one of the finger ends 25.

As seen in Figure 1, the tubes 12 and 14 are axially offset relatively to one another and the platform 17 is disposed beneath the tube 12 and to one side of the tube 14. Tubes 11 and 12 are adapted to convey pellets 53 of explosives by gravity toward the platform 17 and said pellets may be supplied or fed to tube 11 in any suitable manner, not shown. With motor 26 in operation, levers 18 will each be oscillated on their pivot 19, and said levers, in Figure 2, are shown in their normal initial or receiving positions at one extremity of their travel and from which position they are swung in a counter-clock-wise direction. Each arm 18a, as thus disposed, has its opening 20 positioned directly beneath the discharge end of the tube 12, which it is associated with, and directly above the platform 17, with which it functions. With the arm 18a thus positioned, the stop 28 engages the terminal of the clamping finger portion 24 of said arm and swings it away from the arm 18a to enlarge the opening 20, and permit one of the pellets 53 to drop therethrough and come to rest on the platform 17. The pellet 53, when thus disposed, will extend upwardly through the opening 20 so that its upper surface is flush with or slightly above the upper surface of the arm 18a. As the arm 18a commences its movement counter-clock-wise, the tip of the finger portion 24 will move out of engagement with stop 28 permitting the spring 23 to expand and move the finger 22 in a clockwise direction relatively to the arm 18, thus moving outer clamp end 24 toward arm 18 to restrict the opening 20 and thereby cause the finger portion 24 and the adjacent portion of the arm 18a to move into gripping engagement with the pellet 53 for supporting the pellet when said pellet is slid off of the platform 17 by the oscillation of arm 18a. As said arm approaches the other limit of its movement, finger portion 25 will move into engagement with stop 30 and be moved thereby against the action of spring 23 toward arm 18, rocking finger 22 in a counter-clock-wise direction, relative to arm 18a, and moving finger portion 24 away from arm 18a to thereby enlarge opening 20 so as to release the pellet 53. At this point the opening 20 is disposed above the flared mouth 15 of the tube 14, which is associated with feed lever 18, to allow the pellet 53 to fall by gravity through tube 14 and into the shell 7 which is disposed therebeneath. As the opening 20 moves out of registry with tube 12 the shield 18b will move into position

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beneath the discharge end of tube 12 and is of sufficient length and proper shape to close said discharge end and prevent another pellet 53 from dropping out of the tube 12 until the opening 20 is again in registry therewith. Thus, it will be seen, that shield 18b functions as a valve for closing the lower end of tube 12 during most of the movement of arm 18a. As the arm 18a approaches the limit of its movement in a clockwise direction the tip of portion 24 will again engage the stop 28 to enlarge the opening 20 for receiving another pellet 53, preparatory to repeating the operation previously described.

It will thus be seen that the present invention provides an automatic transfer or feed mechanism for delivering a predetermined quantity of a material to a container into which the material is to be loaded and that the feeding operation is performed intermittently by the mechanism.

Various modifications and changes are contemplated and may obviously be resorted to, providing they fall within the spirit and scope of the invention as hereinafter defined by the appended claims, as only a preferred embodiment of the invention has been illustrated and described.

It should be noted that the platform 17 is elevated above the table cover plate 50 a distance which is about equal to the vertical dimension or length of the cylindrical pellets 53 shown, and that the flared part of the mouth opening in the fitting 15 is conical and equal to the length of the pellet, with its sides at a small angle to the axis of the tube therebelow. The manner in which the gripping finger, the height of the platform 17 and the slight inclination of the sides of the mouth opening are coordinated contributes to prevention of pellets from becoming lodged across the opening of the tube 14. Thus, the pellet is gripped while at a high level above the tube, and released so as to become free in the air above the fitting 15. It tends to fall while maintained on a vertical axis, and if it strikes the side of the opening, it will have its center of gravity well within a vertical projection of the opening at customary speeds of operation of such apparatus, and its downward momentum will set up correcting resultants of force and motion by which the pellet becomes aligned with the tube 14.

I claim:

1. In a machine for loading pellets of explosive material into shells at a loading station, a pellet feeding mechanism comprising a lower feed tube for delivering pellets to the shells, an upper pellet feeding tube offset from and spaced above the lower tube, a platform below and axially aligned with the upper tube for temporarily supporting the pellets as they come from the upper tube, and stopping short of a vertical projection of the lower tube, an arm oscillatable horizontally close below the upper feed tube and over said platform from an initial position in alignment with the upper tube to a delivery position in alignment with the lower tube, a portion of said arm provided with an arcuate recess concentric with the upper tube at said position for engagement with the pellet while on said platform, a gripping finger pivoted intermediately of its length on that side of said arm which is in the direction of the movement of the arm from initial position towards said delivery position and having a recess therein adjacent its outer end opposite and complementary to the recess in said arm, said outer end exposed beyond the path of said movement

of the arm, the space between said recesses being such as to allow a pellet to pass from said upper tube through said recesses to reach said platform at open position of the finger when the arm is in initial position, spring means urging the recessed end of the gripping finger toward said arm, a member fixed adjacent the upper tube in the path of said exposed end of said finger arranged to engage the gripping finger when the arm is in initial position to stop the gripping portion of the finger on approach of the arm to said initial position and hold the gripping portion away from the arm to permit the passage of pellets through said recesses and to grip a received pellet on departure from initial position, and a member fixed adjacent the lower tube in the path of said arm and the inner end of said finger to engage the latter on approach of the arm to said delivery position to release the pellet over the lower tube under oscillation of said arm.

2. A feeding mechanism as in claim 1, said means being adjustable for varying the positions where the pellet will be gripped and released.

3. A feeding mechanism comprising an oscillating arm, a finger pivotally connected thereto, spring means urging a portion of the finger into gripping engagement with a portion of the arm, means for moving said finger out of gripping engagement with the arm when the arm is at the limits only of its movement, so that the arm and finger will grip an element to be conveyed on departure from one position during the travel of the arm and release the element at a delivery point in the travel of the arm, and a fixed platform disposed beneath said arm, aligned with the initial position of the arm and stopping short of the opposite limit of its movement, for supporting the element to be conveyed until it is engaged by the arm and finger adjacent said initial position, and to clear said element when released at the opposite limit of movement of the arm, a feed tube over said initial position, a lower receiving tube having a flared mouth part at said delivery point, said platform being elevated above the lower tube a distance which is not less than half the vertical dimension of the said element to be conveyed.

4. In an article feeding device, a platform, an

article receiver below and offset from the platform, feed means to position articles successively on said platform in an initial position, a horizontally oscillatable lever pivoted adjacent the platform having an arm movable across the platform from an initial limit beside said initial position of articles opposite the receiver, article gripping members on the arm movable toward and from each other, one of said article gripping members comprising a portion of said arm arranged to extend radially beyond said initial position of articles, the other of said gripping members being a finger pivoted intermediately of its length on the arm, its outer end movable to lie at the far side of said initial position of articles when the arm is at said initial limit, the outer end of said finger exposed beyond the path of the arm, spring means urging the finger toward the arm, a stationary member fixed in the path of said exposed end of the finger adjacent said initial position to engage and stop the finger spaced from the arm to receive an article between the gripping members from said feed means, whereby to grip such pellet on departure of the arm from said initial unit, and a stationary member fixed in the path of the inner end of the finger to engage and stop the latter on approach to said delivery position so as to release an engaged article over the said article receiver.

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