July 10, 1945. H. T. HALLOWELL, JR 2,380,306

TRANSFER MECHANISM

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FIG. 1.

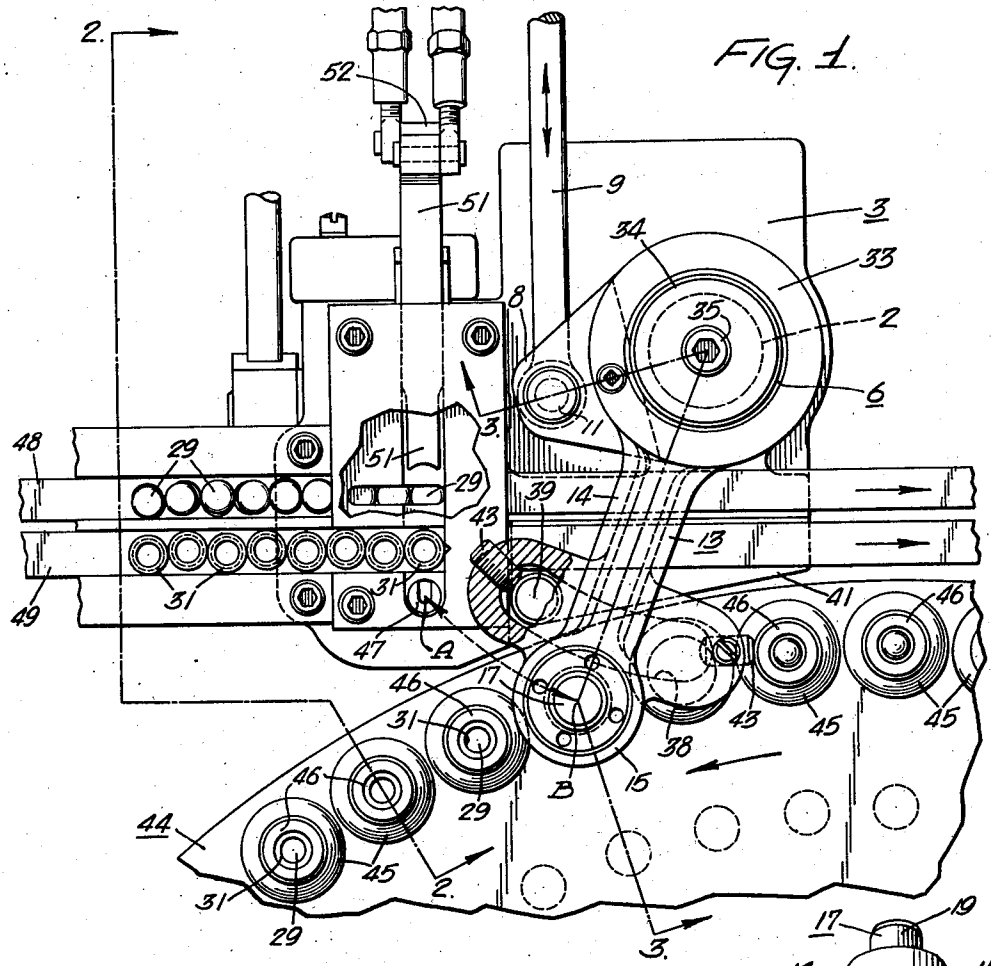


FIG. 5.

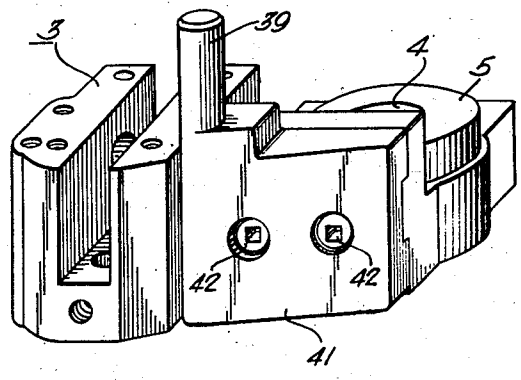
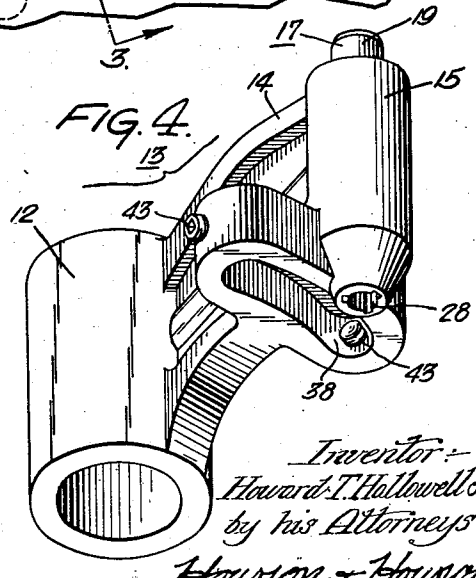


FIG. 4.



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FIG. 2.

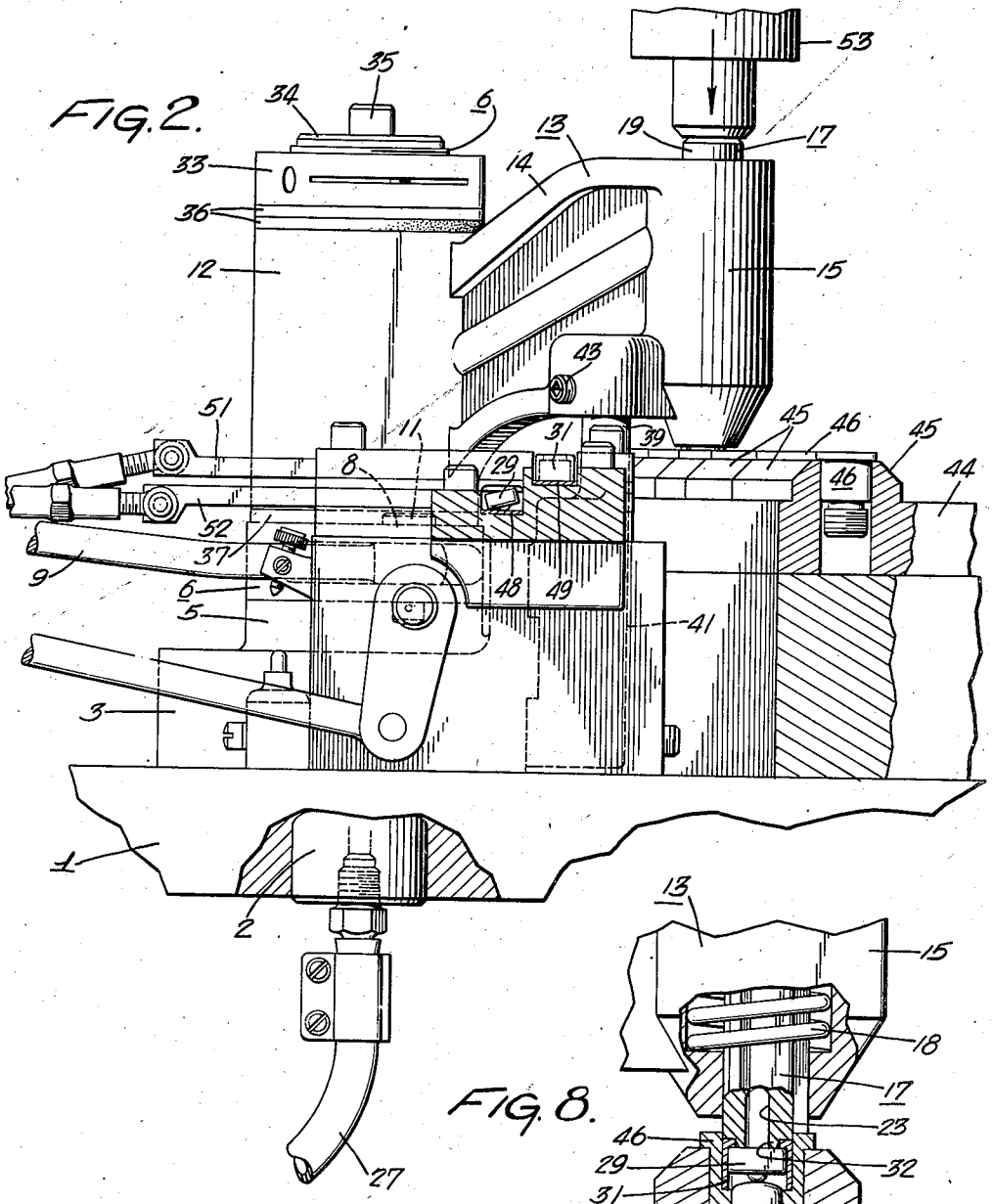


FIG. 8.

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FIG. 3.

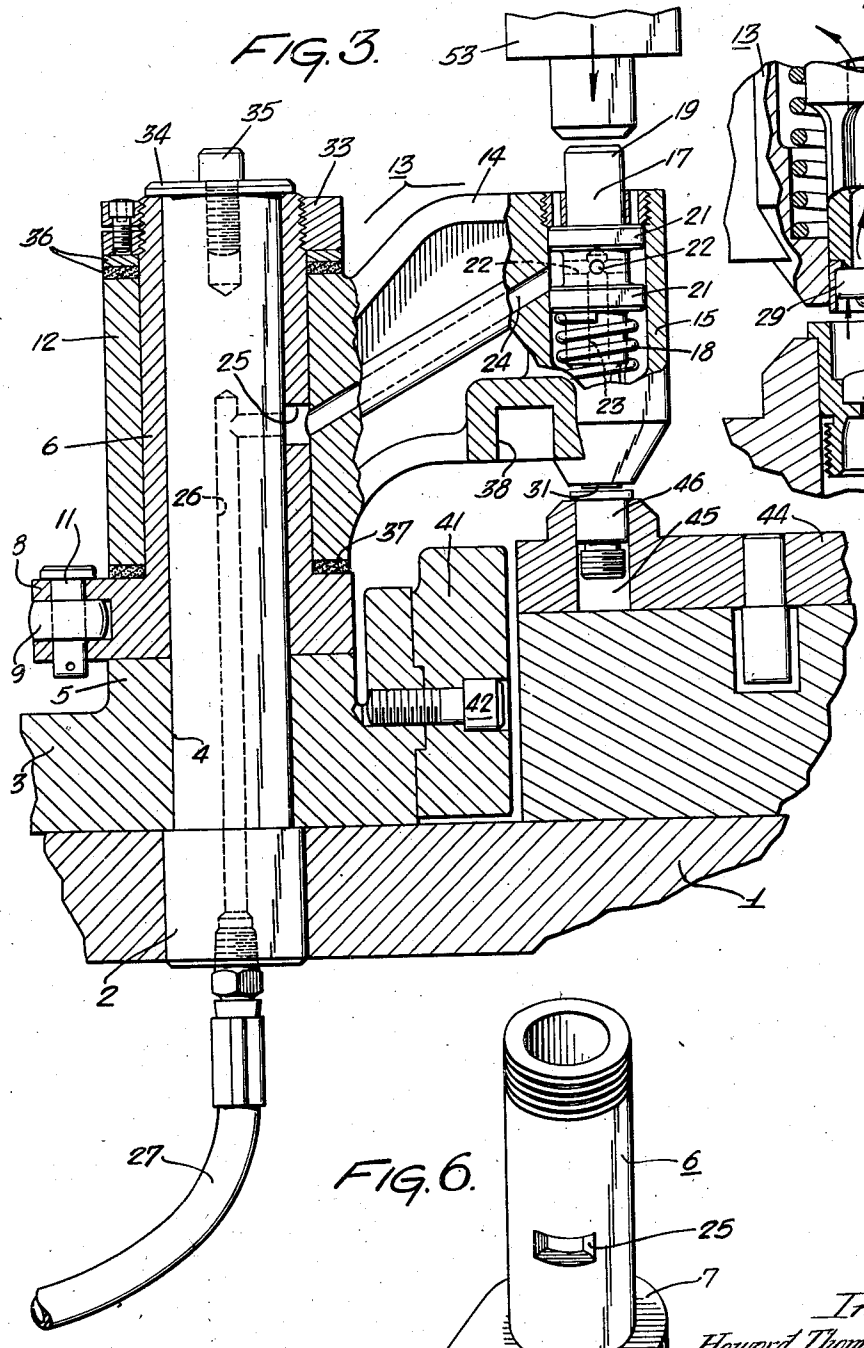


FIG. 7.

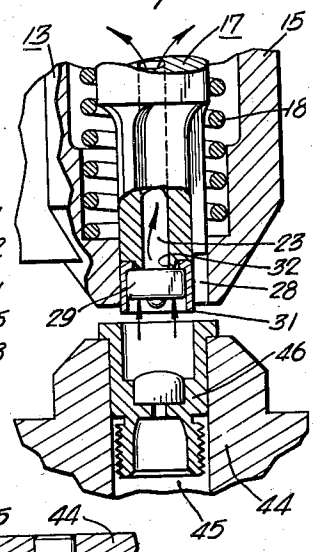


FIG. 6.

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UNITED STATES PATENT OFFICE

2,380,306

TRANSFER MECHANISM

Howard Thomas Hallowell, Jr., Jenkintown, Pa., assignor to Pennsylvania Manufacturing Company, Jenkintown, Pa., a corporation of Delaware

Application January 23, 1943, Serial No. 473,383

2 Claims. (Cl. 214—1)

This invention relates to improvements in transfer devices of the general character disclosed in my copending application Serial Number 424,052.

Therein, I disclosed a machine for assembling the elements of priming heads for explosive shells and the like by transferring the elements from suitable points of supply to the priming head casings carried by a rotary work-table successively into the transfer positions. Two of the elements, namely, the firing pin and the cap were transferred together as a sub-assembly by means of a transfer device employing suction as a means for holding the pin and cap together in their proper relative positions during the transfer operation. The machine further includes means for bringing the said pins and caps together in the form of the sub-assemblies and for introducing the sub-assemblies thus formed into the active transfer member.

A principal object of the present invention is to provide a simplified, more accurate and functionally improved transfer device of the aforesaid character, said device being designed so as to maintain its operating efficiency and accuracy over extended periods of use and irrespective of the wear that unavoidably occurs in the several relatively moving elements of the device.

The invention further resides in certain structural details hereinafter described and illustrated in the attached drawings, wherein:

Figure 1 is a fragmentary plan view of a transfer device made in accordance with my invention, together with the associated portions of the assembling machine of which the transfer device constitutes a part;

Fig. 2 is a section on the line 2—2, Fig. 1;

Fig. 3 is a section on the line 3—3, Fig. 1;

Figs. 4 and 5 are views in perspective respectively of the oscillatory transfer head and the supporting base for said head;

Fig. 6 is a view in perspective of the hollow pintle of the oscillatory head, and

Figs. 7 and 8 are fragmentary sectional views showing different steps in the transfer operation.

Referring to the drawings, the machine, which includes the transfer device as an element, comprises a base plate or member 1 within which is mounted a relatively fixed vertical pintle 2. Seated upon the plate 1 is a base member 3 shown detached in Fig. 5, said member being rigidly secured to the plate and having as a part thereof a cylindrical aperture 4 for passage of the pintle 2, as best shown in Fig. 3. The boss-like projection 5 of the member 3 forms a seat for a sleeve 6 which closely embraces the pintle 2, this sleeve having at its lower end a shoulder 7 and a projecting bifurcated arm 8, the latter being adapted for reception of an operating rod 9 which fits between the bifurcations of the arm 8 and is secured to the arm by means of a pin 11. By means of the rod the sleeve 6 is oscillated as and for a purpose hereinafter described.

Embracing the sleeve 6 is the hub portion 12 of a transfer head 13, this head being illustrated in Fig. 4. As herein shown, in addition to the hub portion 12, the head comprises a transversely extending arm 14 having at its outer end a hollow cylindrical portion 15. Slidably supported within the cylinder 15 is a plunger 17 which is adapted for vertical reciprocation within the cylinder and which is normally held in an elevated position, as shown in Fig. 3, by a spring 18. The upper end 19 of the plunger projects through and beyond the top of the cylinder 15, and by means of this projecting portion the plunger may be depressed in the cylinder against the pressure of the spring 18, as hereinafter set forth. Intermediate its ends the plunger comprises two longitudinally spaced collars 21, 21, and between these collars is a plurality of ports 22 which extend inwardly to a bore 23 in the interior of the plunger, said bore extending downwardly to the lower end of the plunger, as shown, for example, in Fig. 7. The space between the collars 21, 21 of the plunger is in communication with a port 24 which extends through the arm 14 to the inner surface of the hub 12; and the sleeve 6 is provided with a circumferentially elongated port 25 which communicates continuously with the port 24, and also with one end of a port 26 which extends downwardly in the pintle 2 and through the bottom of the latter where it is connected in the present instance with a tube 27 extending to a source of suction.

The lower end of the cylinder 15 has a restricted opening 28 within which is slidably fitted the lower end of the plunger 17, and this opening 28 is also of a size to receive the aforesaid sub-assembly of the priming head, which sub-assembly consists of a firing pin 29 and a cap 31. This is shown in Fig. 7. With the plunger in the normal elevated position and the sub-assembly 29—31 occupying the opening 28 at the bottom of the cylinder 15, as shown in Fig. 7, suction applied through the duct 27 and the associated ports 26, 24, 22 and 23 will act upon the sub-assembly to retain the latter in the opening 28 for the transfer operation which is hereinafter described. It will be noted that the lower end

of the plunger 17 is provided with an extension 32 which is adapted to fit through the open top of the cap 31 so as to contact the upper surface of the firing pin 29 whereby the suction applied directly to the upper face of the firing pin is more effective to support the pin and the depending cap 31 in the cylinder.

The upper end of the sleeve 6 is threaded for reception of a nut 33 for retention on the sleeve of the hub 12 of the oscillating transfer head, it being noted by reference to Fig. 3 that the sleeve 6 itself is retained in place upon the pintle by means of a washer 34 and a washer-retaining screw 35 at the top of the pintle. Between the nut 33 and the upper end of the hub 12 is one or more fibre or other suitable wear-resisting washers 36, a similar washer or washers 37 being also confined between the lower end of the hub and the shoulder 7 of the sleeve 6. The washers 36 and 37 constitute elements of a slip clutch operatively connecting the hub 12 with the sleeve 6, the nut 33 being adjusted to afford the required amount of frictional resistance to relative angular movement between these elements.

Referring again to Fig. 4, it will be noted that the head 13 is provided with a segmental slot 38 at the under side of and extending transversely of the arm 14, and in assembly this slot 38 receives a pin 39 which projects upwardly from a bracket 41 secured to the member 3 by means in the present instance of screws 42. This pin being relatively fixed constitutes a stop for limiting the throw of the head 13, and an adjusting screw 43 is provided at each end of the slot in position for engagement with the pin 39 so that the throw of the head is adjustable. This variability of the throw of the head is permitted by the slipping clutch 36—37 described above which provides for lost motion between the sleeve 6 and the hub 12 of the head. As hereinafter set forth, the adjustment of the throw is primarily for the purpose of establishing the position of the cylinder 15 at each end of the traverse movement of the head so that the lower end of the cylinder may register accurately with other elements of the device in the transfer operation.

As previously described, the function of the transfer device described above is to transfer the sub-assembly consisting of the firing pin 29 and the cap 31 from a source of supply of this sub-assembly to the priming head casing which are carried on a rotary work-table. The work-table is designated in the present instance by the reference numeral 44, and this table is provided with a peripherally arranged series of sockets 45 which receive the priming head casings 46. The manner in which the said casings are supported in the sockets is best shown in Figs. 3 and 7. The transfer head receives the sub-assembly at a position designated in Fig. 1 by the reference character A. In accordance with the principle set forth in my aforesaid copending application, the firing pins 29 and the caps 31 are fed toward the position A on belts 48 and 49 respectively, and are displaced from the belts by plungers 51 and 52 to a relatively superimposed position at station A, and from this station, the parts are displaced upwardly by means of the plunger 47 into the opening 28 of the cylinder 15 of the transfer head, which at that moment overlies the station A, the suction then taking effect to retain the sub-assembly in the head, as shown in Fig. 7 and as previously described. From this point, subsequent movement of the head about the pintle 2 carries the cylinder 15 to a position overlying the series of sockets 45 on the table 44, and over the path of travel of the casings 46 which occupy said sockets. The table 44 is given an intermittent movement which advances the casings one at a time to a predetermined position, designated by the reference character B in Fig. 1, in which the cylinder 15 of the transfer head is in exact registration at one end of its oscillatory movement with one of the casings 46, and at this point means is provided in the form of a plunger 53 for depressing the plunger 17 of the transfer device to displace the sub-assembly 29—31 into the registering open upper end of the casing 46, said displacement being illustrated in Fig. 8. This downward movement of the plunger 17 does not in the present instance interrupt the application of suction to the port 23 of the plunger, but since the cap 31 of the sub-assembly by action of the plunger 17 is force-fitted into the casing 46, the suction is insufficient to retain the sub-assembly in the lower end of the plunger when the latter moves upwardly after release by the plunger 53, the sub-assembly thereby remaining in place within the casing 46 and completing the assembly operation. Since the oscillatory movement of the sleeve 6 is in excess of the limited oscillatory movement of the transfer head, wear resulting in the transmission means associated with the sleeve will have no effect upon the accuracy of the registration of the cylindrical portion 15 of the transfer head with the station 47 and with the casing 46 on the table 44, this registration being controlled by the screw 43.

I claim:

1. Transfer mechanism comprising in combination a pintle, a sleeve oscillatable on the pintle, a hub element embracing and frictionally attached to the sleeve so as to oscillate with the latter and to provide for lost motion between the hub and the sleeve, an arm projecting from the hub, a transfer member on the arm, stop means for limiting the angular movement of the hub, said means being adjustable to regulate the position of the transfer member at each end of said angular movement, and mechanism for oscillating the sleeve through an angle exceeding the angular movement of the hub.

2. Transfer mechanism comprising in combination a pintle, a sleeve oscillatable on the pintle, a hub element embracing and frictionally attached to the sleeve so as to oscillate with the latter and to provide for lost motion between the hub and the sleeve, an arm projecting from the hub, a transfer member on the arm, stop means for limiting the angular movement of the hub, said means comprising a relatively fixed abutment, a stop element at each side of said arm, and a screw in each of said elements for engagement with said abutment and adjustable to regulate the position of the transfer member at each end of said angular movement, and mechanism for oscillating the sleeve through an angle exceeding the angular movement of the hub.

HOWARD THOMAS HALLOWELL, JR.