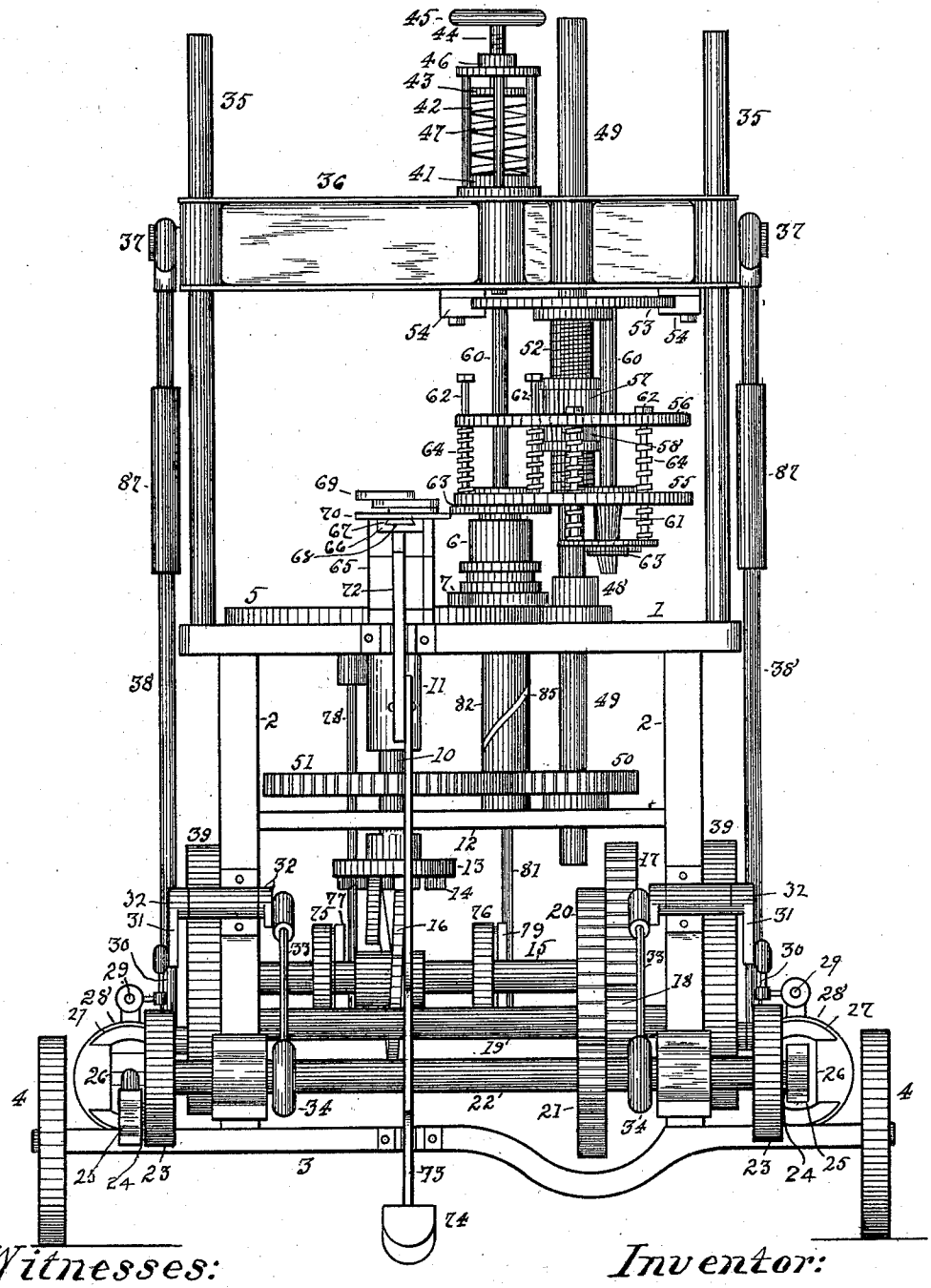
No. 702,425. Patented June 17, 1902.

J. HALEY.

TUMBLER PRESS.

(Application filed Feb. 23, 1901.)

(No Model.) 4 Sheets—Sheet 1.



Witnesses:

Walter Bowman

Bessie Crook.

Fig. 1.

Inventor:

Jonathan Haley,

by Humphrey & Humphrey,

Attorneys.

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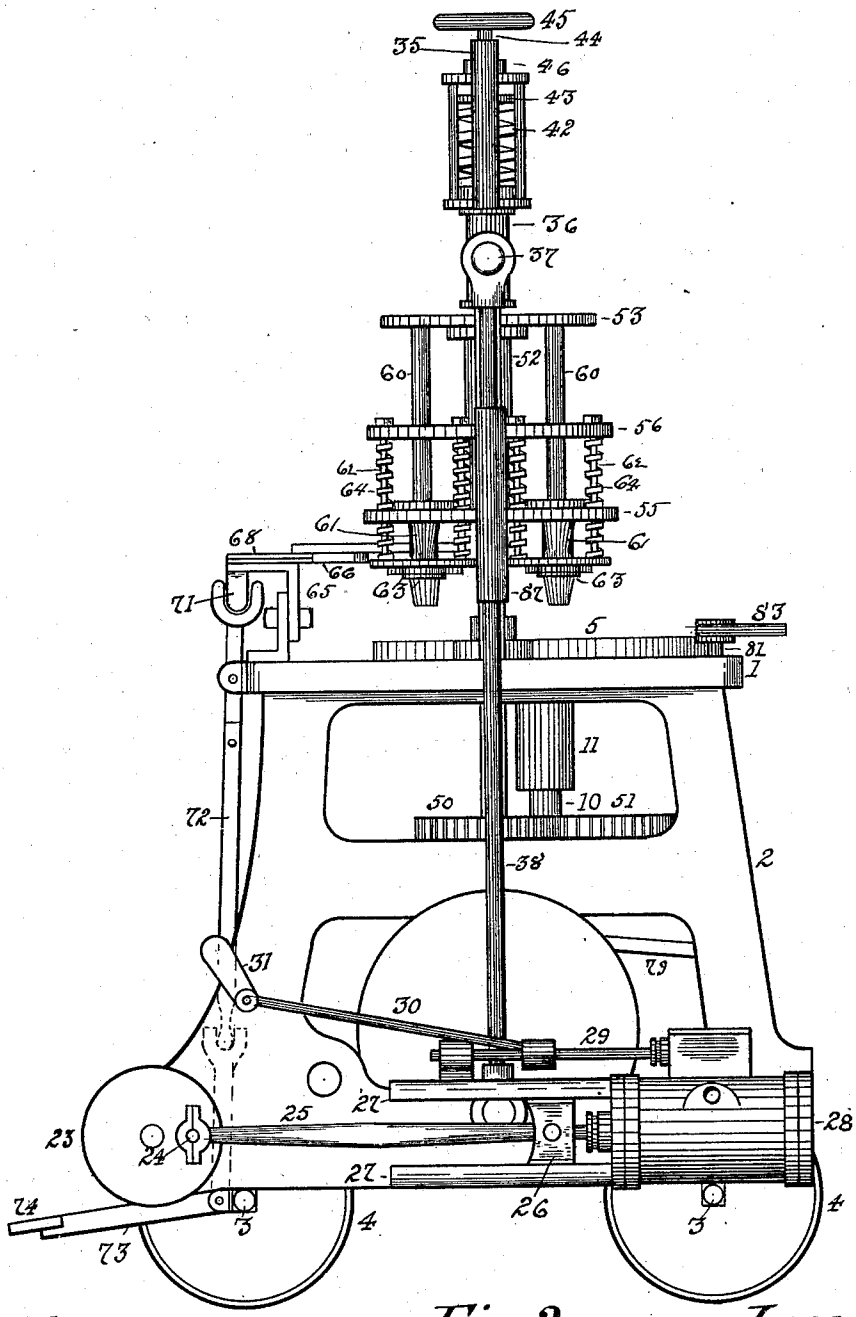

Fig. 2.

Witnesses:

Walter Bowman.

Bessie Crook.

Inventor:

Jonathan Haley,

By Humphrey & Humphrey,

Attorneys

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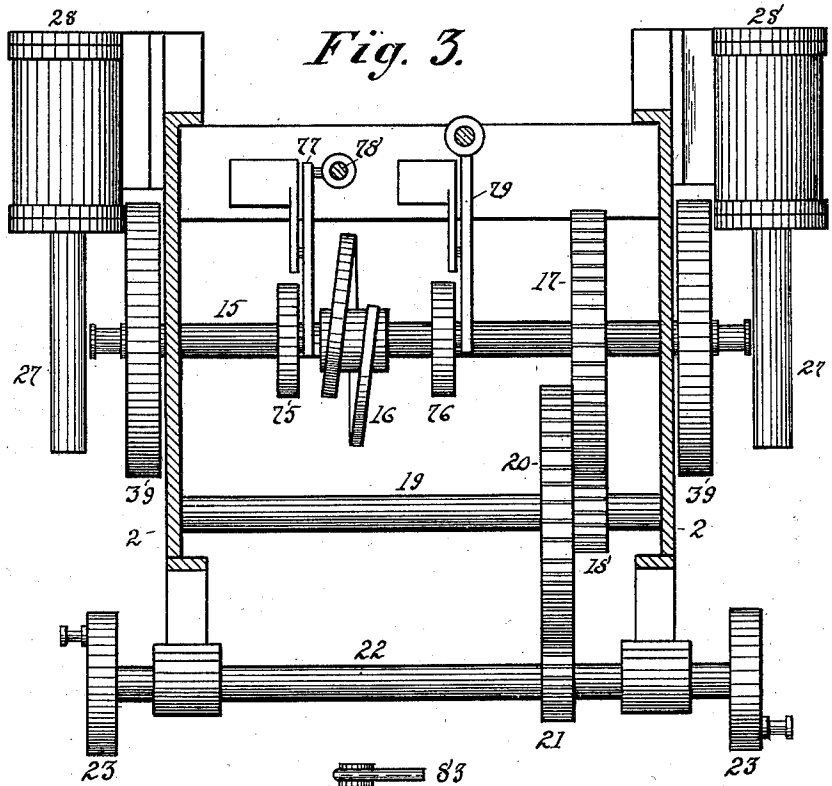
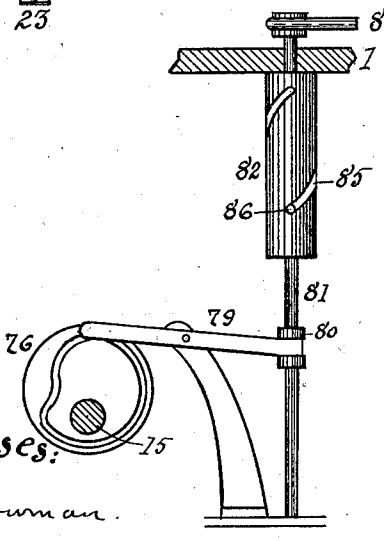
Fig. 3.





Witnesses:

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Bessie Crook.

Fig. 4.

Inventor:

Jonathan Haley,

By Humphrey & Humphrey,

Attorneys.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

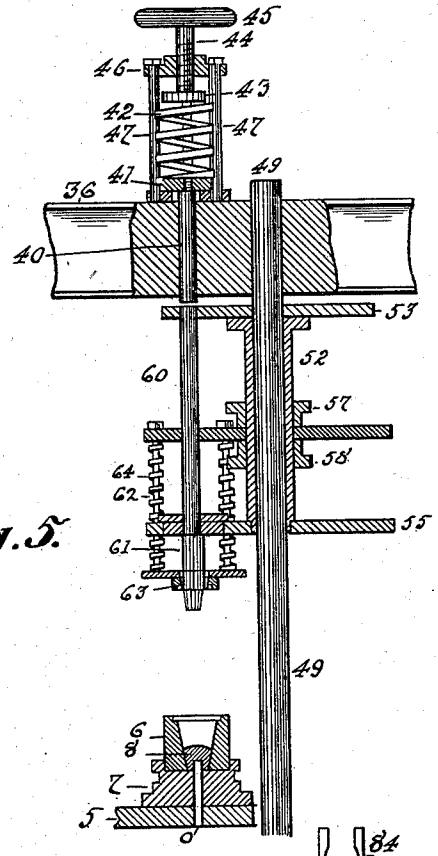

Fig. 6.

Witnesses:

Walter Bowman

Bessie Crook.

Inventor:

Jonathan Haley,

By Humphrey & Humphrey,

Attorneys.

UNITED STATES PATENT OFFICE.

JONATHAN HALEY, OF AKRON, OHIO.

TUMBLER-PRESS.

SPECIFICATION forming part of Letters Patent No. 702,425, dated June 17, 1902.

Application filed February 23, 1901. Serial No. 48,510. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN HALEY, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Tumbler-Presses, of which the following is a specification.

My invention has relation to improvements in machines for pressing tumblers, jelly-glasses, and kindred articles from molten glass.

The object of my invention is to produce an improved machine of the class designated, whereby such articles may be rapidly produced, that embodies motors as part of the apparatus, so that the necessity for taking power by means of belts or shafts from a power-shaft will be obviated and the machine will be complete in itself.

A further object is to render the machine largely automatic, so that the several functions of the various parts will be accurately and successively performed without other attention, and a final object is to provide ejectors and removing devices actuated by the machine to take away the completed article.

I accomplish these objects by means of the mechanism shown in the accompanying drawings, which are made a part hereof, as hereinafter described and then specifically pointed out in the claim.

In the accompanying drawings, in which similar reference-numerals indicate like parts in the different figures, Figure 1 is a front elevation of my machine; Fig. 2, a side elevation looking from the right of Fig. 1. Fig. 3 is a plan below the table, showing the horizontal shafts and their attachments and connected parts; Fig. 4, a detached view of the mechanism for operating the removing device; Fig. 5, a vertical section of the upper part of the machine, showing the vertical revoluble shaft that carries the plungers with its connected and associated parts in vertical section; and Fig. 6, a plan of the table-top, mold-carrier, and plunger-carrier, with the part in section above the latter.

Referring to the figures, 1 is a table sustained by side supports 2, that rest on and are secured to axles 3, having wheels 4. Above and resting on the table 1 is a revoluble circular platform 5, and hereinafter called the "mold-carrier," on which are mounted in a concentric circle a number (usually six, as shown) of molds 6. To avoid confusion of lines, but a single mold is shown in Figs. 1, 2, and 5, these being deemed sufficient to an understanding of their construction and operation, all being alike. Each of these molds rests on a base 7, secured to the mold-carrier 5, and consists of a metallic sleeve open at the top and bottom, having an internal form to give the required shape to the article to be made and having in the lower end a movable bottom 8, Fig. 5, provided with an opening extending through the mold-base 7 and mold-carrier 5 and terminates flush with the down face of the latter. The mold-carrier is secured to the upper end of a shaft 10, that is journaled in a sleeve 11, secured and depending from the table 1, and in a bar 12, that extends across the machine and is secured at each end to one of the side pieces 2. On the lower end of the shaft 10 is secured a disk wheel 13, that has in its down face a number of wrist-pins 14, equal in number with the molds on the carrier 5, each preferably having a friction-roller.

Journaled in bearings in the side supports 2 is a horizontal shaft 15, that bears a worm-wheel 16, arranged to run between the wrist-pins 14 and cause the shaft 10 and its connected parts to make one-sixth ($\frac{1}{6}$) of a revolution at each complete revolution of the worm. This worm is of peculiar construction and performs a distinct function, beyond that of turning the mold-carrier, in this: The worm-flange is at first in a true plane perpendicular to its shaft, and hence when it enters between the wrists 14 it holds the shaft 10 and mold-carrier against rotation for a brief interval, which interval is the time when the article in the press is being formed. The motion of the shaft 15 is constant, and it bears a large gear 17, that meshes in a pinion 18 on a counter-shaft 19, that bears a gear 20, driven in turn by a pinion 21 on a second counter-shaft 22 and hereinafter called the "engine-shaft." The shaft 22 has circular crank-heads 23, bearing wrist-pins 24, on which is journaled one end of connecting-rods 25, that are secured on wrists in the cross-heads 26 in the guides 27, attached to the cylinders 28 of engines mounted on the frame of the machine, adapt-

ed to be run by steam or, preferably, compressed air. These engines are of the common type and have valve-chests with valves operated by valve-rods 29, moved by connecting-rods 30 from arms 31 on rock-shafts 32, journaled in suitable boxes on the side supports 2. The rock-shafts 32 bear cranks at their opposite ends, rocked by rods 33, moved by eccentrics 34 on the engine-shaft 22. It has not been deemed necessary to show the inlet or exhaust pipes of these engines, as their location and purpose are obvious, and these engines are operated by steam or, preferably, compressed air.

Secured in and rising from opposite sides of the table 1 are two parallel guide-rods 35, on which is a sliding cross-head 36, having wrist-pins 37 at each end, on which is journaled the upper end of one of two connecting-rods 38. The lower ends of these rods are journaled on wrist-pins extending from two like crank-wheels 39 on the opposite ends of the shaft 15 outside of the side supports 2, by which means the cross-head 36 is reciprocated to and from the table. In the cross-head 36 is a sliding bolt 40, bearing at its upper end a disk 41, on which presses a coiled spring 42, adjustably pressed down at its upper end by a plate 43 on the end of a screw 44, provided with a hand-wheel 45, that runs in a circular nut 46, held by rods 47, secured in a plate attached to the cross-head.

Journaled in suitable boxes in the cross-bar 12, cross-head 36, and a box 48 on the table 1 is a revoluble shaft 49, which bears on its lower end a small gear 50, that meshes in and is driven by a gear 51 on the shaft 10. Inclosing the shaft 49 for a portion of its length below the cross-head 36 is a hollow shaft 52, externally screw-threaded. On the upper end of the hollow shaft 52 is placed a circular plate 53, suspended by cleats 54, which cleats are bolted to the cross-head 36, and as the cross-head 36 rises and falls the cleats will cause the plate 53 and the shaft 52 to slide on the shaft 49, while at the same time the hollow shaft 52 and its attached plate 53 are capable of a horizontal revoluble motion around the shaft 49 while suspended vertically by said cleats. The shaft 52 is by means of a feather (not shown) compelled to revolve with the shaft 49. The lower end of the shaft 52 is secured in a circular plate 55, and a corresponding plate 56 is also adjustably secured thereon by upper and lower nuts 57 and 58. In each plate 53, 55, and 56 there are corresponding series of holes 59 (three in the machine, as illustrated) in vertical alinement, and in each series is secured a plunger-rod 60, bearing at its lower end a plunger 61, adapted to form the interior of the article to be made. At equidistant intervals and in a circle about each hole in the plate 56 for the press-rods are the series of holes in which are fitted to slide bolts 62, having heads that abut against the plate, and these bolts pass through larger holes in vertical alinement in the plate 55 and bear at their lower ends rim-mold plates 63, adapted when brought to the molds 6 to fit and form annular covers therefor. Surrounding each rod 62 is a coiled spring 64, that is held between the flanges of the rim-mold plate and the plate 56. The rim-mold plate has central orifices to permit the passage of the plunger 61 and substantially fit their largest part.

Secured to the table 1 is an upright bracket 65, made vertically adjustable, as shown in Fig. 2, so as to adapt it to molds of different height adjacent to the edge of the mold-carrier 5, and bearing at its top a fixed horizontal plate 66, having in its face a channel 67, dovetailed at the sides and radial to the mold-carrier, in which is fitted a slide 68. Pivotally secured in the top of the plate 66 are two shear-blades 69, having outward-curved adjacent edges and arranged to exactly overhang a mold at each rest in the movement of the mold-carrier. The outer ends of the shear-arms are pivotally connected by links 70 with the slide 68. The under front end of the slide 68 has a depending lug 71, that rests in a fork in the upper end of a lever 72, pivoted between ears in the edge of the table 1. The lower end of the lever 72 rests between jaws in the vertical arm of a bell-crank lever 73, pivoted between ears on the axle 3, the other arm of which lever extends horizontally in front of the machine-arm and bears a pedal 74. Hence by depressing the pedal the shear-blades will be closed and opened as the pedal is raised.

On the shaft 15 are two eccentrics 75 and 76, having annular cam side grooves. In the groove in the eccentric 75 there runs a pin extending from the side of a lever 77, pivoted in a support attached to a cross-bar of the machine. The opposite end of the lever raises and lowers a rod 78, that extends vertically through the table 1 and into the opening 9 in the bottom of the molds and in a position reached by the molds after the article is completed and the plunger withdrawn. The parts are so arranged that at each rest of the mold-carrier the rod 78 will be in alinement with the opening 9 and during such rest will rise and push the article from the mold. In the groove in the eccentric 76 there runs a pin from the side of a lever 79, similarly pivoted in a support attached to the same cross-bar of the machine. The opposite end of this lever is forked and rests in a grooved collar 80 on a shaft 81, Fig. 4. The shaft extends through a sleeve 82, secured to the top 1, and through said top and bears a horizontal arm 83 above the table, terminating in a lateral horizontal fork 84, adapted to fit the finished article below the largest diameter. As this portion of the device must be adapted to articles of different sizes, the fork 84 is made detachable and interchangeable with other forks of suitable size. The fork and its shaft are so adjusted that when the former is swung around, as indicated in dotted lines in Fig. 6, it will pass ac-

curately centrally over one of the molds and inclose an article raised out of it. To cause the arm to swing, the sleeve 82 has a spiral groove 85, in which runs a pin 86 on the shaft 81. The adjustment of this portion of the machine is such that immediately upon the pressed article being raised from the mold by the rod 78 the arm 83 will swing around and the fork 84 inclose the article, and simultaneously with the recession of the rod 78 the arm 83 will swing back to the position shown in Fig. 6, carrying the article, which may there be taken by any suitable appliance.

In operation, the machine being in motion driven by its engines, the attendant pours a quantity of molten glass between the shear-blades into the mold that is temporarily at rest beneath, cutting off from the mass he has in his ladle as much as is necessary to form the article by pressing the pedal 74, and as the mold-carrier 5 moves forward with periodical rests similarly treats each succeeding mold. The apparatus is so adjusted that during the movement of the mold-carrier the cross-head 36 will be at its highest upward stroke, as appears in Fig. 5. At the end of each movement of the mold-carrier and at the beginning of the rest caused by the straight portion of the worm 16 being between two wrist-pins 14 of the wheel 13 one mold 6 will be directly under one of the plungers 61 and its rod 60 will be in vertical alinement with the sliding bolt 40. During this rest the cross-head 36, drawn by the rod 38, descends to the position shown in Fig. 1 with its associated and connected parts. In this descent the rim-mold 63 first meets and rests on the mold, forming an annular top therefor, and then by the continuance of the movement the plunger 61 enters the mold and forms the article passing through the rim-mold and which yields owing to the spring 64. By the return stroke the plunger 61 first rises from the pressed article, the latter being prevented from rising with the plunger by the rim-mold until the former is wholly withdrawn, when the heads of the bolts 62 engage the plate 56, when they, with the rim-mold, are raised to the position shown in Fig. 5, thus leaving the completed article free in the mold. The rod 78 is then pressed up by its eccentric 75 and pushes the completed article up in its mold and immediately the shaft 81 is raised, thus swinging by means of the spirally-grooved sleeve 82 to permit the fork 84 to inclose and lift the completed article and by its return stroke to swing it around to the position shown in solid lines in Fig. 6. The mold-carrier will then be given another partial revolution and the operation repeated.

As the various articles to be made by the apparatus will vary in height, it will be necessary to vary the distance between the table 1 and the cross-head 36. To do this, the connecting-rods 32 are made longitudinally adjustable by being formed of two pieces, with their adjacent ends oppositely screw-threaded and united by a tubular nut 87.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

In a machine of the kind designated, the combination with a revoluble mold-bearing table, arranged to be moved with progressive rests, and a vertically-reciprocating plunger to meet one of said molds at each rest, and an ejector to force the pressed article from the mold of a horizontally-moving arm arranged to reciprocally swing over and from said table, and having a fork to seize the pressed article and remove it, substantially as shown and described.

In testimony that I claim the above I hereunto set my hand in the presence of two subscribing witnesses.

JONATHAN HALEY.

In presence of—
C. P. HUMPHREY,
C. E. HUMPHREY.