A. BATES.

MACHINE FOR HANDLING ARTICLES

APPLICATION FILED APR. 13, 1908.

1,142,136.

Patented June 8, 1915.

2 SHEETS—SHEET 1.

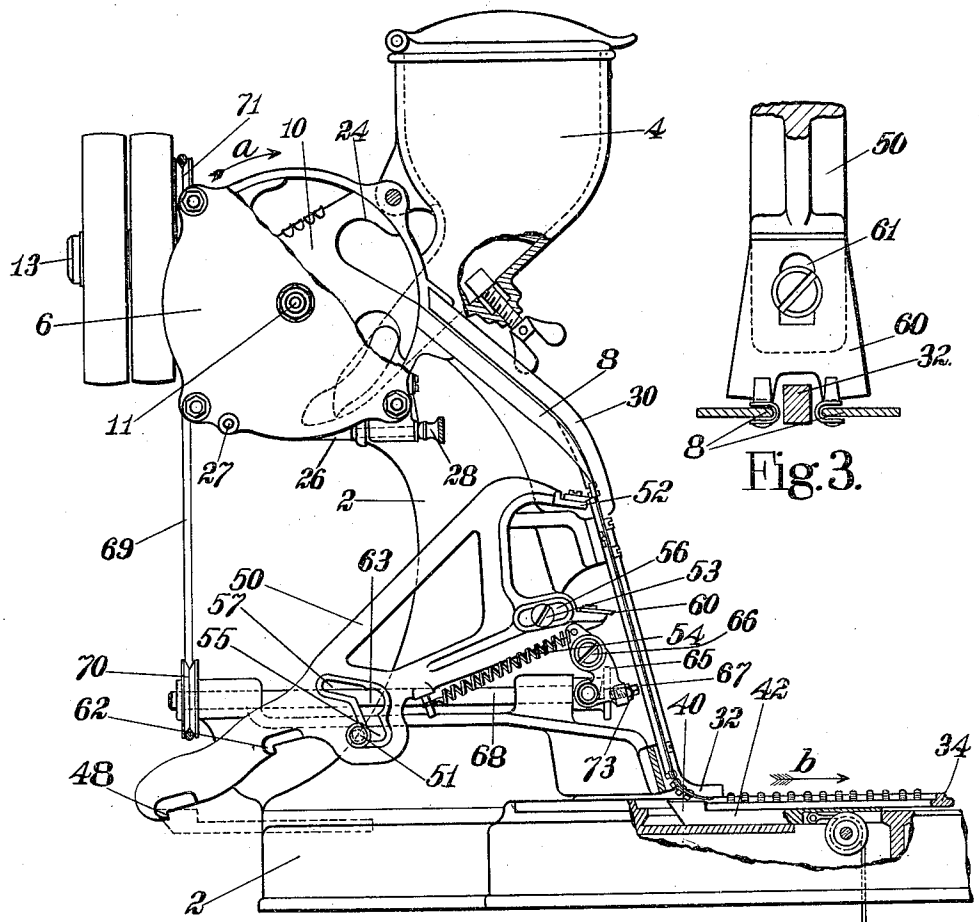


Fig.1.

Fig.3.

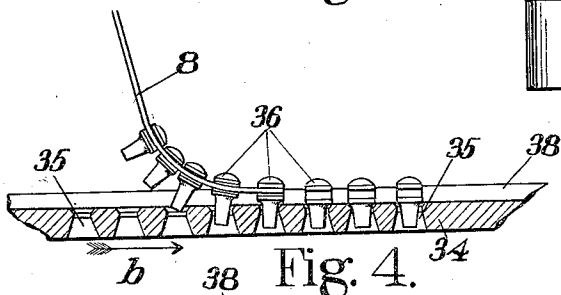


Fig. 4.

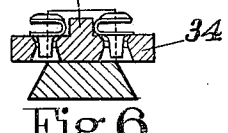
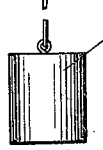


Fig.6.



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2 SHEETS—SHEET 2.

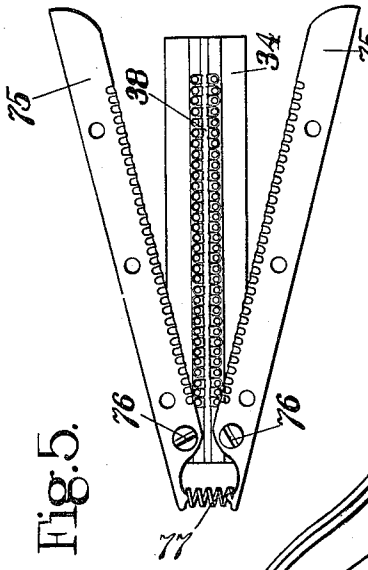


Fig. 5.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR HANDLING ARTICLES.

1,142,136. Specification of Letters Patent. Patented June 8, 1915.

Application filed April 13, 1908. Serial No. 426,865.

To all whom it may concern:

Be it known that I, ARTHUR BATES, a subject of the King of England, residing at Leicester, in the county of Leicester, England, have invented certain Improvements in Machines for Handling Articles, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to improvements in machines for handling small articles such as eyelets, lacing hooks, studs or similar articles and particularly to machines of the above class that are adapted for delivering such articles in predetermined position to a suitable receiver.

While the invention in its broader aspects is applicable to machines intended for handling articles of diverse forms and use, the machine illustrated in the drawings and hereinafter more particularly described as embodying such invention is especially adapted for arranging lacing hooks and delivering them to a suitable holder as one step in the manufacture of such hooks.

In the manufacture of lacing hooks it is customary to arrange the blanks after they have been died out and bent to substantially their final form in predetermined position in a suitable holder or carrier which holds them firmly during the process of applying a coating of celluloid, pyroxylin, or other wear resisting material to their heads. Further steps in the manufacture of the hook consist of applying a sheet of celluloid or other wear resisting material to the heads of the hooks positioned in the holder and in applying a matrix provided with recesses shaped and positioned to correspond to the arrangement of hooks on the holder to force the celluloid into position and to secure it to the hook. These steps, however, form no part of my invention and are not further described.

The principal object of this invention relates to the provision of a machine adapted to position small articles such as lacing hooks and to feed them to a suitable holder in proper position and arrangement to be received thereby, thus avoiding the necessity of positioning such articles and arranging them in the holder by hand.

An important feature of this invention is the provision in a machine of the above type of a raceway and a holder so disposed with relation to each other that movement of one relative to the other causes a series of the articles to be delivered from the raceway upon the holder in regulated order. Preferably a mechanism is provided that automatically controls the number of articles that shall be delivered to the holder at each operation of the machine and there may be means for readily adjusting said automatic mechanism to vary the number of articles that are automatically delivered.

A second feature of this invention is a construction in which movement of the holder to its position to receive the articles causes mechanism to be actuated for automatically delivering thereto a predetermined number of articles, and a third feature relates to the construction of the holder by which it is adapted to engage the articles while they are still in position on the raceway and positively to remove them therefrom. Preferably a portion of the raceway may be so constructed and arranged that the articles when traversing such portion shall have such portions as are to be engaged by the holding means on said holder spread apart to a distance substantially equal to that between the said holding means. With this construction the relative movement of the carrier and raceway and the movement of the articles along this portion of the raceway will cause said holding means and articles to register successively and thereby insure that the articles shall be delivered to said holding means on the holder with precision and despatch. The means by which this result is accomplished constitutes another and important feature of the invention.

Still another feature of the invention relates to the provision of means for locking the articles delivered to the carrier in their proper position thereon, and means for automatically actuating said locking means when the carrier is brought into position to receive articles or is removed from such position.

Referring now to the accompanying drawings which represent a preferred embodiment of this invention in a machine especially adapted for handling lacing hooks, and in which—

Figure 1 represents such a machine and

holder member in side elevation, parts being shown as broken away; Fig. 2 is a plan view showing the machine with parts broken away and the upper part of the machine in section; Fig. 3 is a transverse section of the raceway showing the hooks in position thereon and illustrating the action of one of the detents; Fig. 4 is a longitudinal section of the holder member showing the manner in which the hooks are removed from the delivery end of the raceway; Fig. 5 is a plan view of the holder member; and Fig. 6 is a transverse sectional view thereof.

On the drawings, 2 represents the frame of the machine which supports at its upper end a hopper 4 within which the hooks are placed in bulk and from which they descend by gravity to the drum 6 which contains any usual or preferred mechanism for delivering them in proper position to the raceways 8. The particular form of mechanism for delivering the hooks in proper position that is illustrated in the drawings comprises two plates 10 secured to a spindle 11 that is mounted in bearings in the drum 6 and rotated intermittently by suitable connections with a main shaft 13, such as, for instance, a lever 14 operated by a cam (not shown) on said shaft and connected to a carrier 16 for a pawl 18 which engages a ratchet wheel 20 mounted on the said spindle 11. To prevent breakage in case the plate 10 should be jammed by the mass of hooks in the drum 6, the connection between the spindle and ratchet wheel is preferably of a frictional or otherwise yielding character. As shown, this connection comprises a spring 22 that reacts against a nut 23 on the end of said spindle to press the ratchet wheel 20 against a shoulder, not shown, on the spindle so that the spindle and ratchet wheel normally rotate together but are capable of relative movement should the rotation of the spindle be for any cause retarded or stopped. Each plate 10 is cut away to form one or more portions 24 which, as the plate rotates in the direction indicated by the arrow *a* in Fig. 1, engages some of the hooks in the drum 6 and carries them along until one edge of said portion is in alinement with the raceway 8 when the hooks pass from said cut-away portion 24 to the upper end of the raceway, a suitable aperture being provided in the casing of the drum 6 to permit the hooks to pass. As shown in Fig. 2 the plates 10 are arranged in close proximity to the sides of the drum 6, the space between each plate and the adjacent side of the drum being slightly greater than that occupied by the head of a hook but considerably less than that occupied by the shank so that each plate shall pick up and deliver to its coöperating raceway hooks having their heads extending only in one direction and it shall be impossible for a plate to pick up a hook with its head extending in the opposite direction. For purposes of inspection or to enable the drum to be readily emptied, a door 26 is provided that is hinged at 27 and may be locked in closed position by a spring-pressed bolt 28.

As indicated in Fig. 2, two raceways 8 are provided, one coöperating with each of the plates 10, and each is provided with a guard 30 for preventing the hooks from falling off. Each raceway is twisted through an angle of substantially 90° between its receiving and its delivering ends and approaches its companion, see Fig. 2, while at the same time the guards 30, which are likewise twisted so as to maintain unaltered their relations to the raceways, are merged into a single bar 32, as shown in Figs. 1 and 3.

A holder member 34 hereinafter more particularly described is mounted to travel in guideways formed in the frame 2 immediately below the delivery end of the raceway. The holder member has recesses 35 formed therein to receive the hooks at the end of the raceway and remove them positively therefrom. To insure the correct presentation of the hooks to the holder member a portion of the raceway near its delivery end is bent to a curvature such that, as shown in Fig. 4, the shanks of the lacing hooks 36 when traversing said portion shall be spread apart a distance substantially equal to that between the recesses or other holding means 35. With such a construction it will be readily apparent that when the holder member moves in the direction indicated by the arrow *b* on Fig. 4 the recesses 35 will register successively with the hooks on the raceway and will positively remove them therefrom. To obviate the possibility of the hooks striking the edges of the recesses 35, each recess is preferably countersunk as indicated in Fig. 4. The retaining bar 32 is curved at its lower end as indicated in Fig. 1 to correspond to the curvature of the adjacent part of the raceway and the holder member 34 is provided with a longitudinally extending rib 38 forming in effect a prolongation of said retaining bar 32 and adapted to engage the hooks while still in position on the raceway and to prevent them from slipping laterally from the raceway before they are fully engaged by the recesses 35 of the holder member.

When the holder member 34 is inserted in the machine it engages the head 40 on a slide 42 which is mounted in guideways in the frame 2 of the machine immediately beneath the path of said holder. Slide 42 is normally held toward the front of the machine by any convenient means such as the weight 44, which is secured thereto by a flexible connection passing around a pulley, as shown in Fig. 1. Said slide is however adapted to be moved by the operator to the

rear of the machine in which position it engages catch 48 at one end of a member 50 supported by the pins 51 and 53 taking in the slots 55 and 56 and provided with a detent 52 extending normally in position to prevent the flow of hooks down the raceway. The engagement of catch 48 by slide 42 moves member 50 to the rear and removes detent 52 from the raceway permitting an uninterrupted flow of hooks down the same until the lowermost pair of hooks either engages with the first pair of recesses 35 in the holder member 34 which has moved back with slide 42, or rests upon a non-recessed part of said holder. Upon the release of the slide by the operator, said slide and holder member are moved under the action of weight 44 to pick the hooks from the raceway as before described. On withdrawal of the head 40 of said slide from the catch 48 on the end of member 50 a spring 54 moves said member to again bring the detent 52 into the position shown in Fig. 1, stopping further delivery of hooks from the raceway. The position of the detent 52 with relation to the raceways 8 is such that the number of hooks that are permitted to flow down said raceways on each actuation of the machine is just sufficient to fill all the recesses in the holder member 34. It is sometimes found desirable, however, to employ holders that differ from each other in regard to their capacity for holding hooks and accordingly the machine is shown as provided with means for adjusting the member 50 to determine the number of hooks that are permitted to flow past the detent at each operation of the machine according to the holding capacity of the holder member that is inserted in the machine. To permit the said member 50 to be adjusted readily for the purpose above set forth, slot 55 is connected with a second slot 57 which, when brought into engagement with the stud 51, so positions the member 50 that the detent 52 is withdrawn from the raceways and a second detent 60 is moved into coöperative relationship therewith while a second slide engaging catch 62 is moved into the path of slide 42. When it is desired to fill a holder member of the maximum holding capacity, the member 50 is adjusted to bring the detent 52 and the catch 48 into coöperative relationship respectively with the raceways 8 and the slide 42, while if a holder member of a smaller capacity is to be filled the member 50 is so adjusted that the detent 60 and catch 62 are in operative relation. If desired, the detents 52 and 60 may be secured to the member 50 by screws extending through slots 61 in the said detents and screwing into the member whereby a finer adjustment of the detents with relation to the raceways may be obtained. The slots 55, 57 may also be provided with an enlargement 63 of a size sufficient to allow the head of the stud 51 to pass so that the member 50 may be easily removed from the machine after the stud 53 has been unscrewed.

To assist the passage of the lacing hooks along the raceways, a tapping device is provided in the form of a lever 65 pivoted at 66 to the frame 2 and moved by a cam 67 mounted on a shaft 68 which is driven by a belt 69 connecting pulleys 70 on said shaft and pulley 71 on main shaft 13 of the machine. The spring 54, before referred to, maintains the roller on the lever 65 in contact with the cam 67 and said lever is provided with two adjustable strikers 73, Fig. 2, each of which strikes against one of the raceways 8.

As herein shown, the holder member 34 has two plates 75 pivoted to it at 76. When the holder member is removed from the machine these plates are held in parallelism therewith by a spring 77 and extend under the heads of the hooks seated in the recesses 35 to secure the hooks in position in said recesses. On the insertion of the holder member 34 in the machine, the free ends of the plates 75 come in contact with guide bars 78 secured to the frame 2 of the machine and as said holder member is moved back to actuate the supplying means said plates are caused to open out as shown in Fig. 2, thereby uncovering the recesses 35 preparatory to the introduction in said recesses of hooks from the raceways. As the holder member 34 is now moved toward the front of the machine in removing the hooks from the lower end of the raceway, plates 75 will gradually approach each other under the action of the spring 77 as they are permitted by the action of guide bar 78 and by the time that the holder member 34 is fully loaded with hooks and in readiness to be removed from the machine the plates 75 will have come into engagement with all the hooks in the recesses and will hold them in position therein so that the holder member can be removed from the machine without danger of the hooks being displaced.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the class described, the combination with a raceway, of a magazine for supplying articles continuously to the raceway, a removable holder member having movement relatively to the raceway and provided with means for receiving a plurality of articles in succession directly from the raceway and for retaining said articles.

2. In a machine of the class described, the combination with a raceway, of a magazine for supplying articles continuously to the raceway, a holder member separable from the machine and movable relatively and provided with means for receiving a plurality

of articles from said raceway during such relative movement and for retaining said articles after the holder member has been moved away from the raceway.

3. In a machine of the class described, the combination with a raceway, of a removable holder member provided with sockets each shaped to surround one of a plurality of articles carried by said raceway, and means for causing a continuous relative movement of said raceway and holder member for effecting transfer of the articles from the raceway to the holder member.

4. In a machine of the class described, the combination with a raceway having spaced side rails adapted to present articles carried thereby in predetermined position, of a holder member adapted to receive articles delivered from said raceway in said predetermined position, and means for causing relative movement of said raceway and holder member in the direction of travel of said articles in the raceway for effecting the transfer of articles from said raceway to said holder member.

5. In a machine of the class described, the combination with a raceway, of a removable holder member adapted to receive from said raceway and retain for removal from the machine a predetermined number of articles carried by said raceway, and means for causing relative movement of said holder member and raceway for effecting such delivery.

6. In a machine of the class described, the combination with a raceway adapted to present articles carried thereby in predetermined position, of a removable holder member adapted to receive articles so presented, means for causing relative movement of said holder member and raceway to effect the delivery of articles from said raceway to said holder member, and means acting to determine the number of articles so delivered at each actuation of the machine.

7. In a machine of the class described, the combination with a raceway adapted to present articles carried thereby in predetermined position, of a holder member adapted to receive articles so presented, means for causing relative movement of said holder member and raceway to effect the delivery of articles from said raceway to said holder member, means acting to determine the number of articles so delivered at each actuation of the machine, and means for adjusting said last-mentioned means to vary said predetermined number.

8. In a machine of the class described, the combination with a removable holder member provided with suitable holding means, of a raceway adapted to deliver articles in position to be removed therefrom by said holder member and so constructed and arranged as to present corresponding parts of adjacent articles in position properly to be engaged by successive holding means carried by said holder member, and a magazine for continuously supplying articles one by one to said raceway.

9. In a machine of the class described, the combination with a removable holder member provided with suitable holding means, of a raceway adapted to deliver articles in position to be removed from the raceway by said holder member and so constructed and arranged as to present corresponding parts of adjacent articles in position properly to be engaged by successive holding means carried by said holder member, a magazine for continuously supplying articles one by one to the raceway, and means causing relative movement of said raceway and holder member to effect such delivery.

10. In a machine for handling hooks or similar articles, the combination with a holder member having suitable holding means for retaining a number of hooks, of a raceway to deliver hooks in position properly to be removed by said holder member and having a bent portion with a radius of curvature such that the hooks while rounding said portion shall have their shanks spread apart a distance substantially equal to that between successive holding means on said holder member.

11. In a machine of the class described, the combination with a raceway adapted to present articles in predetermined position, of a holder member to receive the articles as so delivered from the raceway and to retain a plurality thereof, means for supplying such articles to the raceway, a detent for preventing passage of articles down the raceway, and tripping means for said detent arranged to be actuated when the holder member is moved into position to receive articles.

12. In a machine of the class described, the combination with a raceway adapted to present articles in predetermined position, of a holder member to receive articles so delivered, means for supplying articles to the raceway, a detent for preventing passage of articles down the raceway, and tripping means for said detent extending into the path of said holder member when the holder member is moving into position to receive the articles and arranged to be actuated by said holder member when it has reached such position.

13. In a machine of the class described, the combination with a raceway adapted to present articles in predetermined position, of a holder member to receive articles as so delivered directly from the raceway and to retain a plurality thereof, and a detent for preventing passage of articles down the raceway, said detent being arranged at a point in the raceway such that the number of arti-

cles that can be carried on said raceway from such point to the delivery end of the raceway is substantially equal to the number that the holder member is adapted to receive from the raceway.

14. In a machine of the class described, the combination with a raceway adapted to present articles in predetermined position, of a holder member to receive articles in said predetermined position from the raceway and to retain a plurality thereof, means for supplying articles to said raceway, a detent for preventing passage of articles down the raceway arranged at a point in the raceway such that the number of articles that can be carried on the raceway from such point to the delivery end of the raceway is substantially equal to the number that the holder member is adapted to receive from the raceway, together with tripping means for the detent arranged to be automatically actuated when the holder member is in position to receive articles.

15. In a machine of the class described, the combination with a raceway adapted to present articles, of a holder member adapted to receive articles from the raceway, a plurality of detents, one of which is arranged to extend across the raceway and prevent movement of articles down the raceway, and a member carrying said detents and arranged to be actuated to trip said detents when the holder member has been moved into position to receive said articles, said member being adjustable to permit another of the detents to extend across the raceway.

16. In a machine of the class described, the combination with a raceway adapted to present articles, of a holder member adapted to receive articles from the raceway, a plurality of detents one of which is arranged to extend across the raceway and to prevent movement of articles down the raceway, and a member carrying said detents, said member being adjustable to permit another of the detents to extend across the raceway.

17. In a machine of the class described, the combination with means to deliver articles to a holder member in suitable position, of a holder member having recesses to receive articles so delivered, means independent of said recesses for securing articles in position on the holder member, and means serving to move said securing means to inoperative position when said holder member is in position to receive articles.

18. In a machine of the class described, the combination with means to deliver articles in suitable position, of a holder member to receive articles so delivered, and means movable with the holder for successively securing a plurality of articles in position on said holder member.

19. In a machine of the class described, the combination with means to deliver articles in suitable position, of a holder member to receive articles so delivered, means serving to successively secure a plurality of articles in position on said holder member, and means for causing said securing means to become operative as the holder member receives the articles.

20. In a machine of the class described, the combination with means to deliver articles in suitable position, of a holder member to receive articles so delivered, and means for successively locking a plurality of articles in position on the holder member, said means being arranged to be moved to inoperative position when the holder member is in position to receive articles and to become operative as the holder member receives the articles.

21. In a machine of the class described, the combination with a pair of raceways, of means for supplying articles to the raceways, a tapping device including a pair of adjustable strikers arranged to facilitate passage down the raceway by simultaneously striking both raceways, and a common actuator for both strikers.

22. In a machine of the class described, the combination of a raceway adapted to present articles in predetermined position, and a holder member adapted to engage the articles while still in position on the raceway and to positively remove them from the raceway, said holder member having a rib coacting with said raceway to insure that the articles leave said raceway in proper position.

23. In a machine of the class described, the combination with a raceway, of a removable holder member adapted to receive from said raceway a predetermined number of articles carried by said raceway and to retain said articles, said raceway and holder member being so constructed and arranged that relative movement thereof causes the delivery of said predetermined number of articles to said holder member.

24. In a machine of the class described, the combination with a raceway arranged to deliver articles, of a holder member provided with means for successively engaging a plurality of such articles while still in position on said raceway and transferring them positively from the raceway to the holder member.

25. In a machine of the class described, the combination with a raceway arranged to deliver lacing hooks, of a removable holder member having sockets for the hook barrels and being constructed and arranged to withdraw and retain hooks from said raceway by a uniform movement in one direction relative to said raceway.

26. In a machine of the class described, the combination of parallel raceways ar-

ranged to deliver articles, of a holder member having parallel rows of recesses and being arranged to withdraw such articles from said parallel raceways by engaging them in the recesses during a uniform movement in one direction relative to said raceways and to retain the articles so withdrawn.

27. In a machine of the class described, the combination with a hopper for receiving articles in mass, of a raceway communicating with said hopper, a holder member movable relatively to the raceway and provided with means for receiving in rapid succession, and directly from the raceway, a plurality of articles carried by said raceway, said holder member being removable with the articles from the machine.

28. In a machine of the class described, the combination with a raceway for delivering a plurality of headed articles having reduced shanks, of a removable holder member constructed and arranged to draw such articles by their shanks in rapid succession from said raceway.

29. In a machine of the class described, the combination with a raceway for articles having reduced shanks, of a holder member having spaced recesses, said raceway being curved tangent to the line of movement of said holder member whereby the shanks of articles thereon are spaced to correspond with the recesses of said holder member, the holder being movable to cause the spaced shanks to enter the recesses.

30. In a machine for handling hooks, the combination with a raceway, of a removable holder member for hooks having spaced recesses and being guided for movement relatively to said raceway, said raceway being so constructed and arranged as to regulate the spacing of the hooks adjacent to the holder member whereby they may be engaged in the recesses thereof.

31. In a machine for handling hooks or the like, the combination with a raceway, of a holder member arranged to receive and retain hooks in parallel positions, said raceway being so constructed and arranged as to present hooks with their barrels extending in substantially radial directions adjacent to the holder member.

32. In a machine for handling hooks or the like, the combination with a raceway arranged to sustain slidingly the heads of hooks, of a removable holder member having recesses to receive the barrels of the hooks, said raceway and holder member being so disposed that movement of one relatively to the other causes the hook barrels to enter the recesses of the holder member before the hook heads leave the raceway and the hooks to be drawn off the raceway by their barrels.

33. In a machine for handling hooks, the combination with a pair of raceways, of a relatively movable holder member having oppositely arranged sockets for the hook barrels and being constructed and arranged to draw successive pairs of hooks disposed back to back from said raceways.

34. In a machine of the class described, the combination, with a raceway for supplying articles, of a rigid removable holder member arranged to draw articles from said raceway in rapid succession by rectilinear movement relatively thereto.

35. In a machine of the class described, the combination with a raceway constructed to permit the passage of articles in one direction, of a holder member having a line of contiguous sockets with countersunk openings constructed and arranged to draw articles from said raceway by movement in the same direction as that of the articles as they pass along the raceway.

36. In a machine for handling hooks, the combination with a raceway for supplying a holder member, of a holder having a line of sockets to receive the hook barrels, and a locking plate movably mounted upon the holder member and arranged to enter the hook openings of the hooks held in one line of sockets after the hooks have been delivered from the raceway.

37. In a machine for handling hooks, the combination with a raceway for supplying a holder member, of a holder having a line of hook retaining sockets, said holder member being arranged to be filled by the raceway, and locking means movable during the filling operation and acting to lock all the hooks in the holder member after the filling operation is completed.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR BATES.

Witnesses:
GRACE HOLMES,
ARTHUR ERNEST JERVAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."

Correction in Letters Patent No. 1,142,136.

It is hereby certified that in Letters Patent No. 1,142,136, granted June 8, 1915, upon the application of Arthur Bates, of Leicester, England, for an improvement in "Machines for Handling Articles," an error appears in the printed specification requiring correction as follows: Page 6, lines 89 and 98, claims 36 and 37, after the word "holder," second occurrence, insert the word *member;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of February, A. D., 1916.

[SEAL.]

R. F. WHITEHEAD,

Acting Commissioner of Patents.

Cl. 18—37.