Aug. 12, 1947. L. H. MORIN 2,425,552

APPARATUS FOR PRODUCING VARIED SPACED CASTINGS ON A MOUNTING

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Fig. 1.

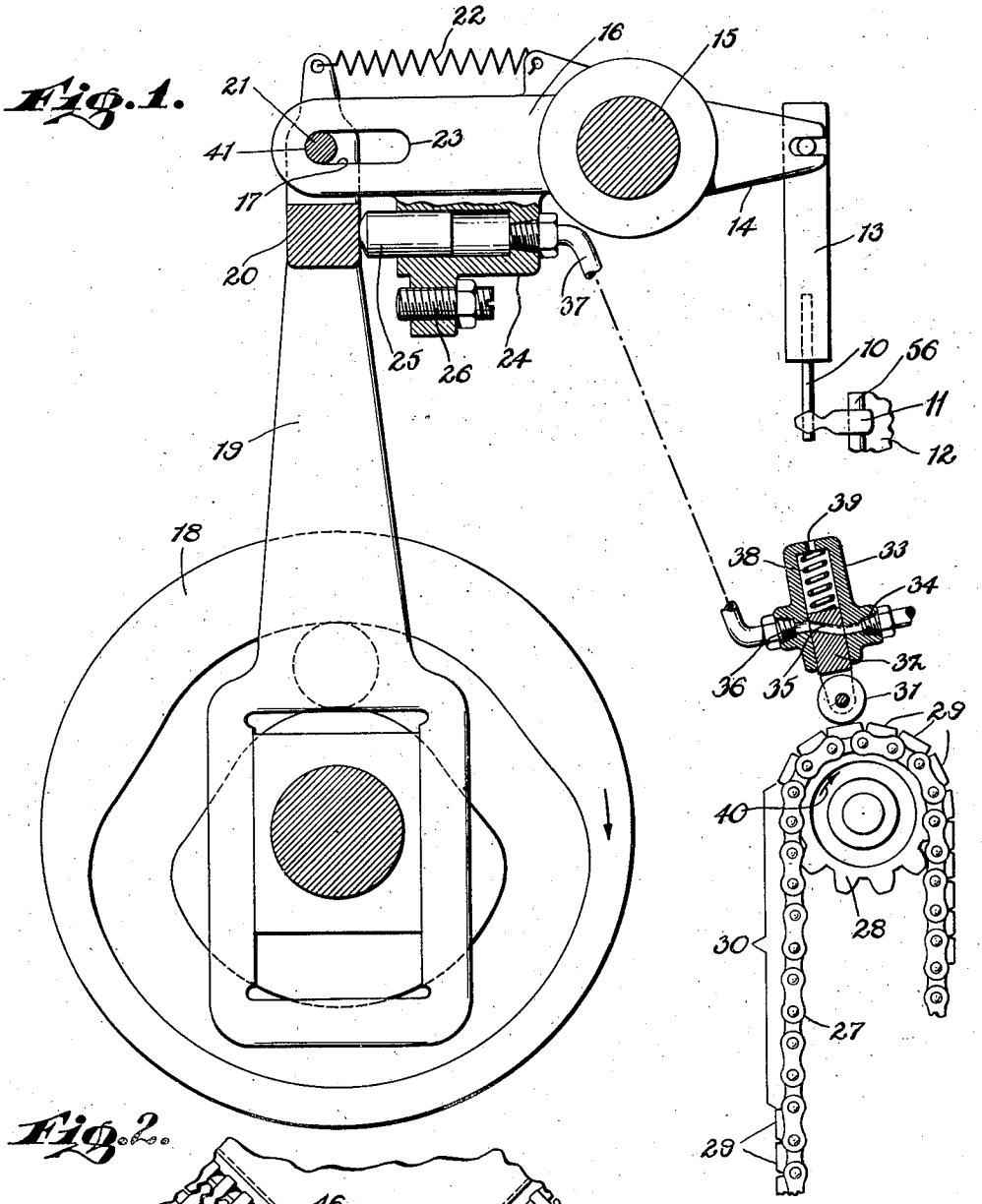
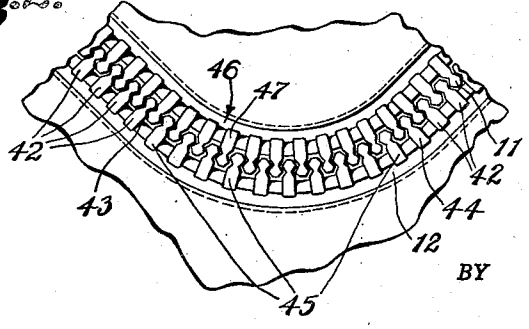


Fig. 2.



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APPARATUS FOR PRODUCING VARIED SPACED CASTINGS ON A MOUNTING

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12 Claims. (Cl. 18—30)

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This invention relates to die casting machines for forming die castings on a mounting member. More particularly, the invention comprises an apparatus in machines of the class described for automatically forming die castings at different spaced intervals on a suitable mounting member in producing various articles of manufacture, such for example as contour separable fasteners, as defined in my Patent No. 2,345,880 which matured from my application Serial No. 460,364 filed October 1, 1942, of which this application is a division. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic view of such apparatus of a casting machine, as will illustrate automatic production of varied spaced castings on a mounting member; parts of the construction being broken away and in section, and

Fig. 2 is a fragmentary plan view showing one form of product produced by the apparatus as shown in Fig. 1.

In the accompanying drawing, I have illustrated one adaptation and use of the apparatus, for example, in producing separable fastener stringers. In articles of the kind under consideration, it has been a common practice to provide flexure between adjacent links sufficient to operate a fastener around relatively sharp corners, that is to say, by folding or flexing the tape of the stringers transversely. There are other uses of fasteners, where it is desirable to bend or fold the stringers in the plane of the tapes and conventional fasteners of the kind under consideration are not adaptable for such uses.

To satisfy these special uses, I have conceived an apparatus for producing stringers, which comprises the formation of a varied spacing of links or scoops in at least one of the stringers, where the bend or curvature is desired therein and to incorporate as many of such spacings as may be desired to produce the necessary bends or curvatures in the complete stringer length. In addition to the particular use of the invention, which is herein shown to illustrate one adaptation of the invention, there are many instances where varied bends or curvatures are required, particularly in using separable fasteners on coverings for large machinery, apparatus, vehicles, boats and the like or in controlling pockets or flaps of such coverings where access is required to certain parts of

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the equipment or apparatus or to compartments in the covering or article itself.

It will be apparent that any type of separable fastener stringers or scoop structures on stringers may be employed, as the present method deals primarily in varying the spacing of scoops on a mounting tape or strand, regardless of the type and kind of scoop structure employed. Furthermore, it will be apparent that the extent of the curvatures in the stringers may be varied to extend the stringer ends to any desired degree or from the normal straight line, which would mean any degree from the straight line to lines which parallel each other and, in some instances, the stringer ends may actually converge. Furthermore, my apparatus is adaptable for the production of products of any type or kind, wherein it is desired to vary the spacing of die castings on a mounting member for any purpose whatever.

In using my apparatus, an automatic die casting machine of the general type and kind covered by Patent No. 2,244,425, June 3, 1941, may be employed.

In Fig. 1 of the drawing, 10 represents a core on which a link or scoop 11 is cast in relatively movable dies, which envelop the core and also part of the mounting tape 12, on which the scoop is formed. The core 10 is supported in a holder 13 and is actuated by a lever 14, pivoted as seen at 15.

The lever has a long arm 16, provided at its outer end with an elongated slot 17.

At 18 is diagrammatically illustrated the core actuating cam, in connection with which a cam follower 19 operates and this follower has at its free, forked end 20 a pin 21, which operates in the slot 17. A spring 22 is also employed between the end 20 of the follower and the lever 14 to move the pin 20 in the direction of the end 23 of the slot 17.

Supported below the arm 16 is an air cylinder 24, in which is arranged a piston or plunger 25. Also supported in connection with the cylinder is a stop screw 26 which is employed to vary the movement of the pin 21 in the direction of the end 23 of the slot 17. In the construction shown, the screw or stop is illustrated as having a fixed adjustment, but this stop may be varied in the cycle of operation of the machine for purposes later described.

In machines of the kind under consideration, a chain 27 is employed to automatically control stringer lengths, the length of the chain governing the number of links formed in a given stringer length, all as taught in the patent hereinbefore

cited. The chain 27 operates a sprocket 28, which is driven in synchronism with the machine as will be apparent.

For illustrative purposes, the chain 27, partially shown in Fig. 1 of the drawing, will be designed to produce a fastener, the central portion of which is illustrated in Fig. 2 of the drawing. For this the chain 27 will have link portions with raised tripping elements 29 thereon. Intermediate these portions, for example in the bracketed portion indicated at 30, the tripping projections 29 will be omitted.

Suitably supported to engage the chain 27, where it rides over the sprocket 28, is a roller 31 on the end of a plunger valve 32, which is arranged in a valve casing 33. Compressed air is supplied to the casing 33 through an intake port 34 and is adapted to pass through a port 35 in the plunger valve 32 and out through an exhaust 36, which leads to the cylinder 24 through a pipe 37. A spring 38 normally supports the valve plunger 32 with the roller 31 in constant engagement with the chain. An exhaust port for the cylinder 24 is also provided at 39 on the casing 33.

In the diagrammatic illustration of Fig. 1, the roller 31 is shown operating over the elements 29 on the chain 27, the sprocket being rotated in the direction of the arrow 40. In this position, the plunger valve 32 is in position to constantly admit air to the cylinder 24; thus supporting the piston or plunger 25 in engagement with the cam follower to support the pin 21 at the extreme end 41 of the slot 17. In this operation of the machine, the scoops 11 are cast on the stringer tape 12 in what might be regarded as the normal spacing, for example, as indicated at 42 at both ends of the outer tape 12. This normal spacing ends with the scoop 43 and again begins with the scoop 44. Between the scoops 43 and 44, the scoops of this tape are spaced wider apart and this is accomplished when the roller 31 drops from the tripping section 29 of the chain onto the section bracketed as at 30. This operation closes the passage 35 and allows the air in the cylinder 24 to be exhausted through the port 39. Thereupon, the spring 22 will move the pin 21 against the end 23 of the slot 17 or the cam follower against the screw 26 according to the spacing which may be required. The end of the slot would determine the maximum spacing; whereas the screw 26 would control any degree of spacing between the maximum and minimum.

From the foregoing, it will be apparent that between the scoops 43 and 44, all of the scoops 45 will be spaced apart a distance greater than the normal minimum spacing of these scoops. In fixing the adjustment of the stop 26, this spacement will be constant; however, by automatically varying the stop screw, the spacing may be gradually increased and then gradually decreased in the cycle between the scoops 43 and 44.

Considering Fig. 2 of the drawing, the stringer 46 having the scoops 47 thereon, will be a standard type of stringer, that is, a stringer wherein all of the scoops will have the minimum spacing on the stringer tape. In other words, in producing separable fasteners of the kind under consideration, one stringer of each fastener will be standard and the other stringer of the special type constructed in accordance with the method herein defined.

The chain 27, illustrated in part in Fig. 1 of the drawing, shows at least two of the tripping

portions 29 thereon and the number of these tripping portions employed and the length thereof will govern the number of respective groups of castings having different spacings in a successive series of casting operations governed by the chain length, after which this same series would be repeated.

It will, of course, be apparent that in each cycle of operation of the machine in producing a product of predetermined length which is controlled by the length of the chain 27, the roller 31 operates over the raised or tripping portions 29 and the non-tripping portions 30 automatically actuating the plunger valve 32 in controlling movement of the pin 21 back and forth in the slot 17. This movement controls the degree of feeding by the core pin 10. In stripping this pin from each casting or scoop 11, in the minimum spacing, a definite stop is provided on the dies employed, against which the casting rests in the stripping operation. However, in the wider spacing of the castings, the dies are partially closed but brought into sufficient engagement with the mounting tape 12 to support this tape against movement and the scoops are stripped against the same stop and the flexure in the tape will compensate for the control of accurate spacing. In this last operation, the dies may be moved into close proximity to each other leaving sufficient clearance only between the dies to provide free movement of the core pin, while at the same time, establishing a firm engagement with the usual beaded edge 56 of the tape 12, which is indicated in Fig 1 of the drawing.

Whenever it is desired to vary the standard or minimum spacing of the castings on a stringer tape or mounting member, the slot 17 may be increased in its dimension to the left as shown in Fig. 1 and a screw similar to the screw 26 employed to limit movement of the pin 21 in this direction, as will be apparent. In such instances, however, the normal stop on the dies against which the scoop rests in the stripping operation, will, of course, have to be changed. By providing the means for increasing as well as decreasing normal minimum spacing between the scoops of a stringer, it is possible for me to produce any desired contour in a complete stringer length, while at the same time, providing free coupling and uncoupling engagement of the stringers.

Further, different effects can be accomplished by the varied degree of spacing of castings on a mounting member.

While no other specific illustration is given for the adaptation and use of the invention, it will be apparent that the contour of the dies will control the spacing and contour of the respective castings formed on the mounting member, which member might constitute a tape strand or the like.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a die casting machine, a mechanism for automatically controlling the spacing of castings on a mounting member, said mechanism comprising a core on which a casting is formed, means for actuating the core to feed a casting formed thereon and the mounting member on which the casting is arranged a predetermined distance in one spacing of one series of castings on said member, and automatically actuated means for controlling the core actuating means to feed the casting and member a distance different from the first feed thereof for another predetermined series

of successive casting operations to space the castings of the second series on said member a distance different to the spacing of the first named group of castings formed on said member and with adjacent castings of both series spaced apart a distance equal to the spacing of the castings in one of said series.

2. In a die casting machine, a mechanism for automatically controlling the spacing of castings on a mounting member, said mechanism comprising a core on which a casting is formed, means for actuating the core to feed a casting formed thereon and the mounting member on which the casting is arranged a predetermined distance in one spacing of one series of castings on said member, automatically actuated means for controlling the core actuating means to feed the casting and member a distance different from the first feed thereof for another predetermined series of successive casting operations to space the castings of the second series on said member a distance different to the spacing of the first named group of castings formed on said member and with adjacent castings of both series spaced apart a distance equal to the spacing of the castings in one of said series and an endless element to control the formation of the groups of differently spaced castings.

3. In a die casting machine adapted to form a plurality of castings on an elongated mounting, a core on which a casting is formed, a rocker arm for actuating said core to control the spacing of successive castings on said mounting, a cam follower having a free end portion operably connected with and movable longitudinally of the rocker arm into different positions to control different movements of said core in the varied spacing of castings on said mounting, means normally supporting the last named means in one position on the arm during a plurality of intermittent operations of said core to form equally spaced castings on said mounting, automatically actuated means for moving and supporting the first named means in a different position on said arm to form another series of castings on said mounting spaced differently from the spacing of the first group of castings, said last named means comprising an endless chain having a predetermined number of trip elements thereon, an air valve actuated by said trip elements, and a plunger operatively engaging the first named means and operated by the air from said air valve.

4. In a die casting machine adapted to form a plurality of castings on an elongated mounting, a core on which a casting is formed, a rocker arm for actuating said core to control the spacing of successive castings on said mounting, a cam follower having a free end portion operably connected with and movable longitudinally of the rocker arm into different positions to control different movements of said core in the varied spacing of castings on said mounting, means normally supporting the last named means in one position on the arm during a plurality of intermittent operations of said core to form equally spaced castings on said mounting, automatically actuated means for moving and supporting the first named means in a different position on said arm to form another series of castings on said mounting spaced differently from the spacing of the first group of castings, said last named means comprising an endless chain having a predetermined number of trip elements thereon, an air valve actuated by said trip elements, and a plunger operatively engaging the first named means and operated by the air from said air valve.

5. In a die casting machine adapted to form a plurality of castings on an elongated mounting, a core on which a casting is formed, a rocker arm for actuating said core to control the spacing of successive castings on said mounting, a cam follower having a free end portion operably connected with and movable longitudinally of the rocker arm into different positions to control different movements of said core in the varied spacing of castings on said mounting, means normally supporting the last named means in one position on the arm during a plurality of intermittent operations of said core to form equally spaced castings on said mounting, automatically actuated means for moving and supporting the first named means in a different position on said arm to form another series of castings on said mounting spaced differently from the spacing of the first group of castings, said last named means comprising an endless chain having a predetermined number of trip elements thereon, an air valve actuated by said trip elements, a plunger operatively engaging the first named means and operated by the air from said air valve, and another group of trip elements on said chain in spaced relation to the first named group.

6. An apparatus for forming differently spaced castings on an elongated mounting, said apparatus having a core on which each casting is formed, said core being arranged adjacent and movable longitudinally of the mounting in controlling one movement of said part in one spacing of the castings on the mounting, automatically actuated means providing a different movement of said core in producing a different spacing of castings on said member, and said last named means comprising an endless control member having spaced control elements thereon for actuating the last named means.

7. In a die casting machine adapted to form a plurality of castings on an elongated mounting, a core on which a casting is formed, a rocker arm for actuating said core to control the spacing of successive castings on said mounting, cam actuated means one end of which is movable longitudinally of the rocker arm into different positions to control different movements of said core in the varied spacing of castings on said mounting, means normally supporting the last named means in one position on the arm during a plurality of intermittent operations of said core to form equally spaced castings on said mounting, means for moving and supporting said first named means in a different positon on said arm to form another series of castings on said mounting spaced differently from the spacing of the first group of castings and moving means operably connected to said die casting machine for controlling said last mentioned means.

8. In a die casting machine adapted to form a plurality of castings on an elongated mounting, a core on which a casting is formed, a rocker arm for actuating said core to control the spacing of successive castings on said mounting, cam actuated means one end of which is movable longitudinally of the rocker arm into different positions to control different movements of said core in the varied spacing of castings on said mounting, means normally supporting the last named means in one position on the arm during a plurality of intermittent operations of said core to form equally spaced castings on said mounting, means for moving and supporting said first

named means in a different position on said arm to form another series of castings on said mounting spaced differently from the spacing of the first group of castings and rotary movable means operably connected to said die casting machine for controlling said last mentioned means.

9. An apparatus for forming differently spaced castings on an elongated mounting, said apparatus having a core on which said casting is formed, said core being arranged adjacent and movable longitudinally of the mounting in controlling the spacing of the casting on said mounting, means for actuating said core in one spacing of the casting on the mounting, means for controlling said first mentioned means to provide a different movement of said core in producing a different spacing on said member including a moving control member operably coupled to the moving parts of said die casting machine and adapted to automatically control the different movements of said core in accordance with a pre-set pattern.

10. An apparatus for forming differently spaced castings on an elongated mounting, said apparatus having a core on which said casting is formed, said core being arranged adjacent and movable longitudinally of the mounting in controlling the spacing of the casting on said mounting, means for actuating said core in one spacing of the casting on the mounting, means for controlling said first mentioned means to provide a different movement of said core in producing a different spacing on said member including a rotary control member operably coupled to the moving parts of said die casting machine and adapted to automatically control the different movements of said core in accordance with a pre-set pattern.

11. An apparatus for forming differently

spaced castings on an elongated mounting, said apparatus having a core on which said casting is formed, said core being arranged adjacent and movable longitudinally of the mounting in controlling the spacing of the castings on said mounting, adjustable means for moving said core, means for moving said first mentioned means into one of a plurality of positions in controlling the movement of said core, and moving means operably coupled to the mechanism of said die casting machine for controlling said second mentioned means to produce different movements of said core in accordance with a pre-set pattern.

12. An apparatus for forming differently spaced castings on an elongated mounting, said apparatus having a core on which said casting is formed, said core being arranged adjacent and movable longitudinally of the mounting in controlling the spacing of the castings on said mounting, adjustable means for moving said core, means for moving said first mentioned means into one of a plurality of positions in controlling the movement of said core, and rotary movable means operably coupled to the mechanism of said die casting machine for controlling said second mentioned means to produce different movements of said core in accordance with a pre-set pattern.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,975,966	Morin et al.	Oct. 9, 1934
2,244,425	Marinsky	June 3, 1941