

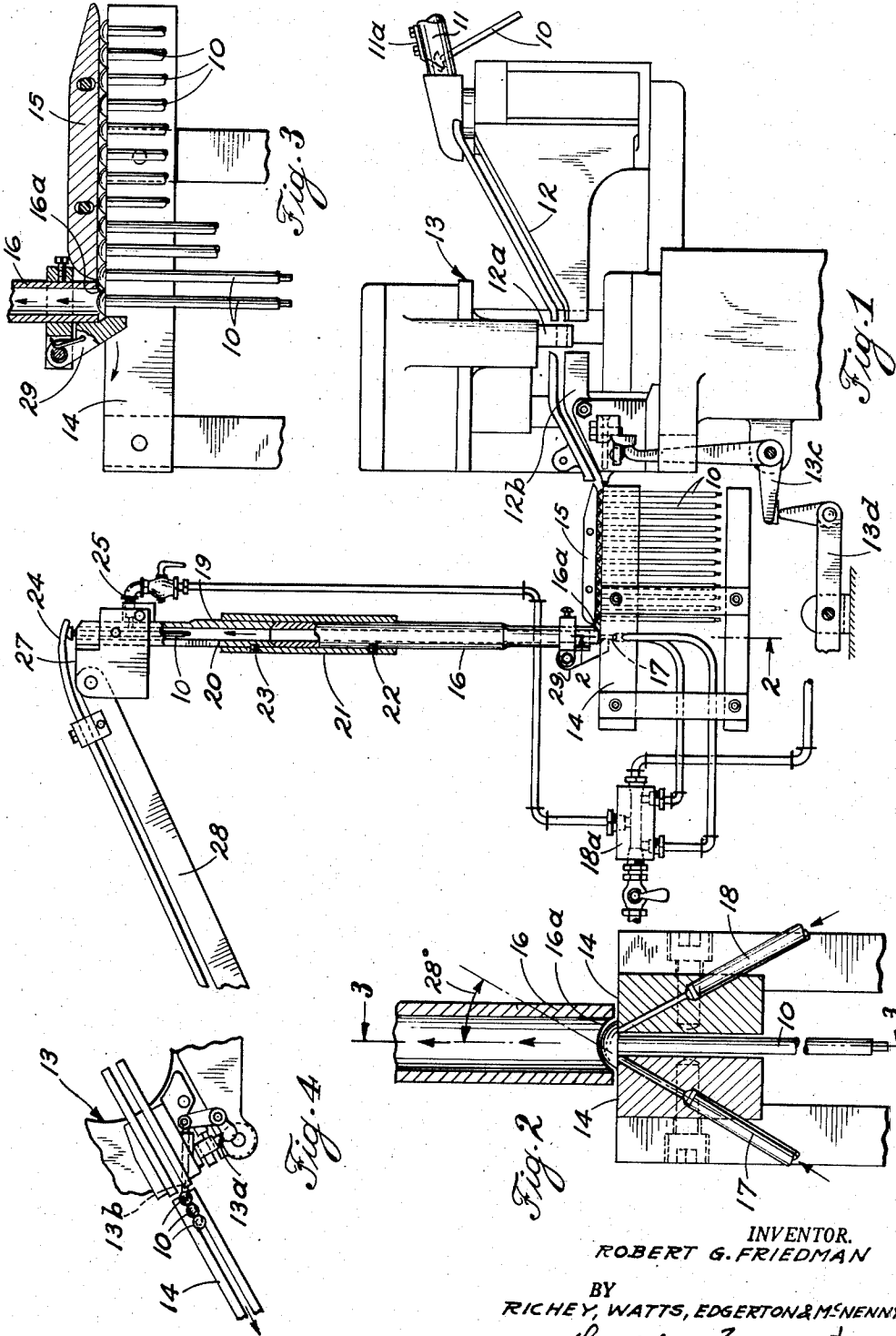
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PNEUMATIC ELEVATING AND HANDLING MEANS

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PNEUMATIC ELEVATING AND HANDLING MEANS

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This invention relates to machines for making bolts and more particularly to means for elevating bolt blanks for feeding to a roll threader.

In bolt making machines, enjoying wide current usage, sections of rod stock are sequentially extruded and headed and transferred to a pointing mechanism for pointing the tip of the shank and are thereafter transferred to a roll threader. Heretofore in such machines the mechanism employed to transfer the blank from the pointing station to the roll-threading station included a reciprocating elevator device for lifting each blank in sequence to an inclined track from which the blanks were fed down the track to a roll threader or the blanks were pushed up an inclined track to an elevated position for gravity feed to a roll threader. Such devices satisfactorily transferred and elevated blanks which were provided with heads such as hex heads having substantial vertical extent. The present invention is directed particularly to an improved blank-handling apparatus adapted to handle blanks having rounded heads, such as for example, carriage bolts or connecting rod bolts. It will be understood by those skilled in the art that difficulties are encountered when it is attempted to move a series of bolt blanks up an inclined track where the heads of the blanks are rounded as in a carriage bolt or an eccentric head as in a connecting rod bolt. There is a tendency when such blanks are pushed up along an inclined track when suspended by their heads, for the head of one blank to ride up over or under the head of the next preceding blank. This tilts the blank and produces a jam of haphazardly tilted blanks. The problem is particularly acute when it is attempted to advance a series of bolt blanks up an inclined track where such blanks have rounded irregular heads. According to the present invention, the bolt blanks are elevated to feeding position by a stream of air moving vertically and the blanks are advanced in sequence from the pointer to the roll threader with the shank of the blank maintained in a vertical position. The environment of the present invention is that of a bolt making machine corresponding to that shown in the U. S. patent to Friedman No. 2,020,660. In said patented machine means are provided to transfer headed and extruded blanks from the last work station in the die breast to a pointing mechanism and to advance the blanks from the pointing mechanism to a track leading to a roll threader.

It is among the objects of my invention to provide a blank-handling apparatus whereby headed blanks suspended by their heads are moved in parallel relation along a horizontal track into the path of a vertically moving column of air whereby the blanks are carried by the moving air to an elevated position where they may be fed downwardly by gravity to a roll threader.

It is a further object of my invention to provide a blank-handling apparatus wherein bolt blanks are carried vertically by a moving column of air and wherein the head of the vertically moving blank strikes a fixed

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curved member so as to cam the blank laterally out of the vertically moving stream of air.

It is a further object of my invention to provide a blank-handling apparatus wherein a vertically disposed tube is provided with means at the lower end of the tube to blow the blank upwardly and means at the upper end of the tube to blow the blank laterally out of the tube at the top thereof. Further objects and advantages relating to simplicity in construction and efficiency in operation will appear from the following description and the appended drawings wherein:

Fig. 1 is an elevation showing a pointer mechanism terminating in a horizontal track with means to advance bolt blanks along the track and pneumatic means to elevate blanks from the track to an inclined track leading to a roll threader;

Fig. 2 is a sectional elevation through the horizontal track showing the arrangement of the air nozzles for elevating the blanks;

Fig. 3 is an enlarged detailed showing with parts in section of the horizontal track and the elevating tube; and

Fig. 4 is a detailed showing of the feed mechanism for advancing the blanks along the horizontal track leading from the pointer.

Referring to the drawings, particularly to Fig. 1, the pointer mechanism is indicated in its entirety as at 13. The pointer mechanism includes an inclined track section 12 leading to a pointer chuck 12a which grips the head of the blanks to be pointed in the pointing station. The blanks are introduced to the pointing station by way of the tube 11 which is slotted at its under side so that blanks indicated at 10 being moved along through the tube 11 are tilted from a horizontal position in the tube to a depending position by an element 11a extending downwardly into the tube 11. The pointing mechanism per se forms no essential part of the present invention and for further details on the pointing mechanism reference is made to said Friedman Patent No. 2,020,660.

After the blanks are pointed and released by the chuck 12a they are advanced along a track section leading from the pointer indicated at 12b. The track section 12b is provided with a pair of oscillating feeding fingers 13a and 13b. As best shown in Fig. 4 the reciprocating finger 13b advances each blank in sequence along the track 12b on the horizontal track 14. The fingers 13a and 13b are alternately oscillated to gate and advance blanks in sequence, the finger 13a operating transversely of the track 12b and the finger 13b having a component of motion along the direction of the track 14. The oscillation of the fingers 13a and 13b is accomplished by means of the bell crank 13c and the lever 13d driven from the main crank shaft of the bolt making machine so that a blank is fed along the track 14 for each complete cycle of the machine's operation. The horizontal blank track 14 includes a pair of spaced parallel rails so that the blanks may be suspended by their heads and the shank of the blank 10 hangs free between the spaced rails. An elevating tube for the blanks is made up of two sections 16 and 19 secured to each other in aligned relation by a sleeve 21. The sleeve 21 is telescoped over the adjoining sections 16 and 19 and is secured by set screws 22 and 23 to the respective tube sections. The elevating tube is arranged vertically above the horizontal blank track 14. Each of the side rails of track 14 is provided with an air jet as shown in Fig. 2, air line 17 leading to the air jet at the left-hand side of Fig. 2 and air line 18 leading to the jet at the right side of Fig. 2.

The lines 17 and 18 are connected to the manifold 18a which is connected to a source of air under pressure, such as for instance, 60 pounds per square inch. When

the machine is in operation the valve leading to the manifold block 18a is opened so that there is a continuous stream of air impinging on the under side of the head of each blank as it is moved horizontally beneath the lower end of the tube 16. The lower end of the tube 16 is arcuately cut away at each side in alignment with the path of the blanks as at 16a. The arcuate cut-out at the lower end of the tube at one side admits the rounded head of the blank into alignment with the lower end of the tube 16. The arcuate cut-out at the other side of the tube 16 permits a blank to be moved out from alignment with the tube and along the track 14 so that blanks may be ejected from the machine at this point in the event they are not to be roll threaded. In the event the elevating tube should become jammed or air supply failure preclude the elevation of blanks the spring pressed latch 29 will be moved clockwise as shown in Fig. 3 by the advancing blanks.

To insure that the blanks being advanced along the track 14 remain truly vertical a bar 15 is adjustably carried over the heads of the blanks moving along the track 14. The inclined track 28 leading to the roll threader also comprises a pair of spaced rails designed to support the blanks by their heads and permit the shank portion to hang free between the spaced rails. The slot 20 at the upper end of the elevator tube is in alignment with the space between the rails of the track 28 so that the bolt blanks may be moved laterally from the upper end of the elevator tube on to the inclined track 28. An air supply line 25a leads from the manifold 18a to the upper end of the elevator tube where it terminates in a horizontal air nozzle 25. A long bolt blank is shown at the upper limit of its travel in the elevator tube and the air nozzle 25 is directed toward the side of the blank so as to blow the blank laterally out of the end of the tube with the shank of the blank moving through the slot 20. A bar 24 has a downwardly curved end disposed over the upper end of the elevator tube. The curved portion of the bar 24 functions to cam the head of the bolt blank laterally so that the bolt blank remains in an upright position as it travels laterally out of the elevator tube 19.

When the air supply line is open to the manifold 18a there is established a continuous upward flow of air through the elevator tube. The small diameter air jets in the track 14 impinge against the under side of the heads and start the blanks up the tube at a high speed and air is induced through the notched lower end of the tube 16. The upward motion of the column of air in the elevator tube is augmented by the nozzle 25 blowing laterally at the upper end of the tube. A bolt blank 10 is advanced into the tube by the pusher finger 13b during each cycle of the machine's operation. The inclined tracks 12 and 12a in the pointer and the inclined track 28 leading to the roll threader, may accumulate blanks in the usual manner. It will also be understood that bolt blanks with hex heads or other irregularly shaped headed articles may be satisfactorily handled by the apparatus illustrated.

Although I have shown and described one form of my invention in considerable detail, it will be appreciated that numerous modifications may be made therein without departing from the scope of the appended claims.

What is claimed is:

1. In a machine for making bolts, a horizontal track for supporting the bolt blanks at the under side of the heads of the blanks, means to intermittently advance a series of blanks along said track, an elevator tube vertically arranged above said track with the lower end of the tube terminating adjacent the head of a blank in said series, said track being provided with an air nozzle arranged to direct air to the under side of the head of said

blank to move the blank upwardly out of the track through said tube and means imparting a transverse thrust to said blank at the upper end of said tube.

2. In a machine for making bolts, a horizontal track comprising spaced horizontal rails for supporting suspended bolt blanks between the rails, means to advance a series of bolt blanks suspended in said horizontal track from one end of the track toward the other, a vertical elevator tube mounted above said track with the lower end of the tube notched at one side thereof to provide an opening for the admission of blanks being moved along the horizontal track, means to introduce air into the lower end of said elevator tube to propel bolt blanks upwardly through the tube, the upper end of said tube having a vertical slot on one side of the tube and having an air nozzle admitting air to the other side of the tube whereby blanks propelled to the upper end of the tube are moved laterally out of the tube through said slot.

3. Means for handling headed articles such as bolt blanks comprising a pair of spaced horizontal rails whereby blanks may be suspended by their heads with the shank portion of the blank depending between the rails, an elevator tube mounted vertically above said track, said tube being notched at the lower end thereof on one side in alignment with the blanks supported on said track so as to admit the head of a blank to be moved into alignment with the tube, means to introduce air under pressure at the lower end of said tube and propel a blank upwardly in the tube, a curved guard member extending transversely across the upper end of said tube to arrest the upward travel of a blank in the tube and cam the blank transversely of the axis of the tube, the upper end of said tube being provided with a vertically disposed slot running downwardly from the open end of the tube to accommodate the shank portion of the blank as the blank is moved transversely out of the tube and means imparting a transverse thrust to said blank at the upper end of said tube.

4. In a machine for making bolts or the like, a horizontal track comprising a pair of spaced rails to support a series of headed blanks in alignment between the rails with the heads of said blanks resting on said rails, an elevator tube vertically disposed above said rails with the axis of the tube substantially in alignment with the blanks carried by said rails, means operating in conjunction with said tube to move said blank from said rails through said vertical tube, a notch formed at one side of the tube at the lower end thereof to admit blanks moved along said rails, a notch formed at the other side of said tube at the lower end thereof to permit blanks to move out from beneath the lower end of said tube when a jamming occurs in said vertical tube, and a spring pressed latch normally urged to a position closing said last named notch but adapted to be overcome by the movement of the series of blanks along said rails when said blanks cannot exist through said vertical tube, and a horizontally disposed guide bar flexibly mounted in spaced relation above said rails to prevent tilting of bolt blanks moved along said rails.

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