No. 703,121. Patented June 24, 1902.

W. S. DAVENPORT.

SLOTTING MECHANISM FOR SCREW MACHINES.

(Application filed May 28, 1900.)

(No Model.) 3 Sheets—Sheet 1.

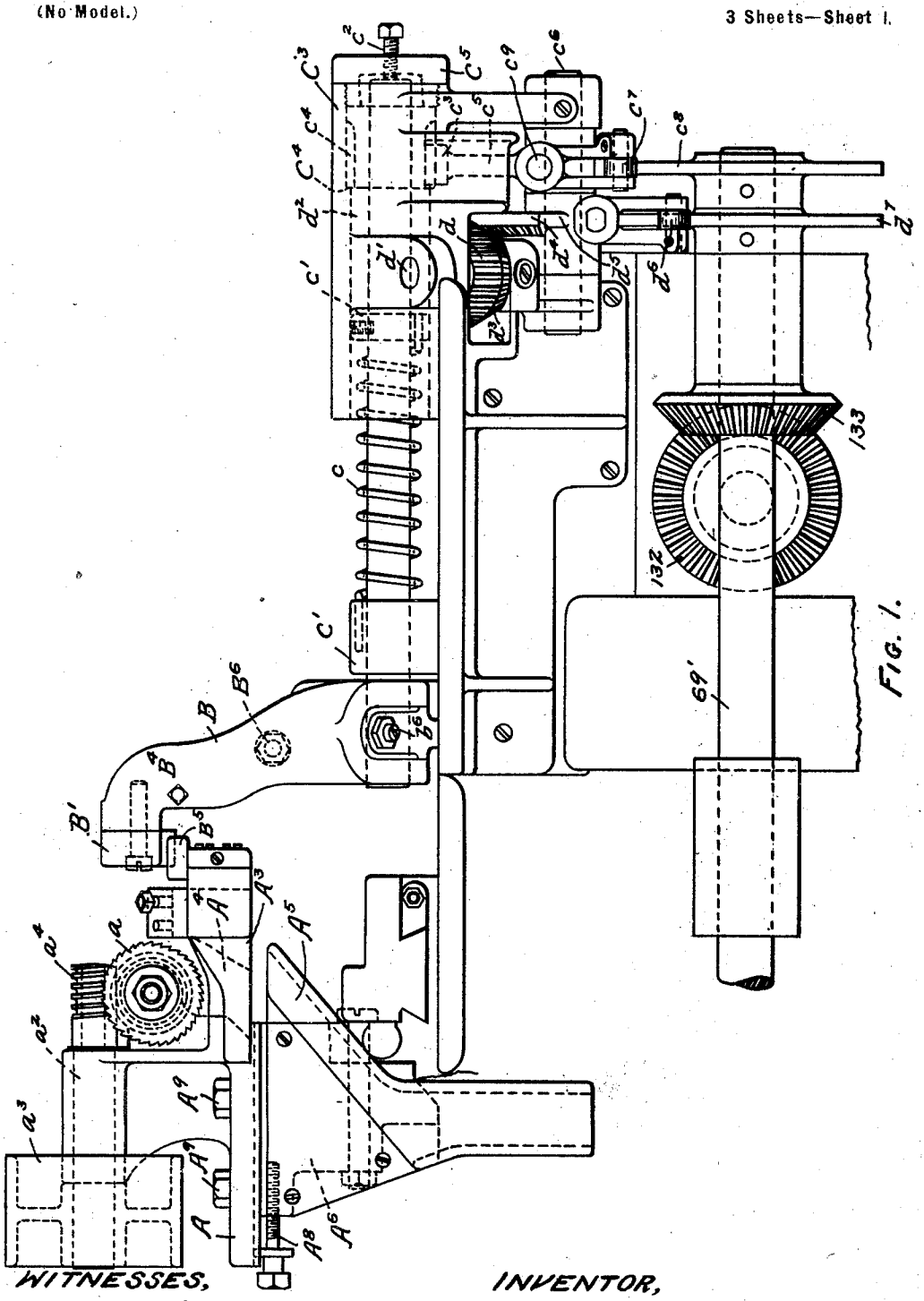


FIG. 1.

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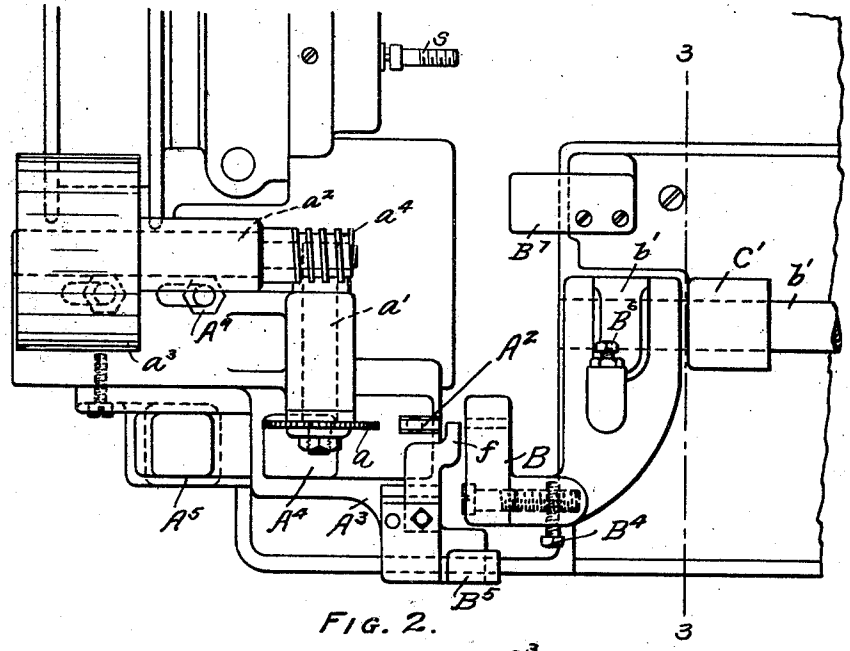


FIG. 2.

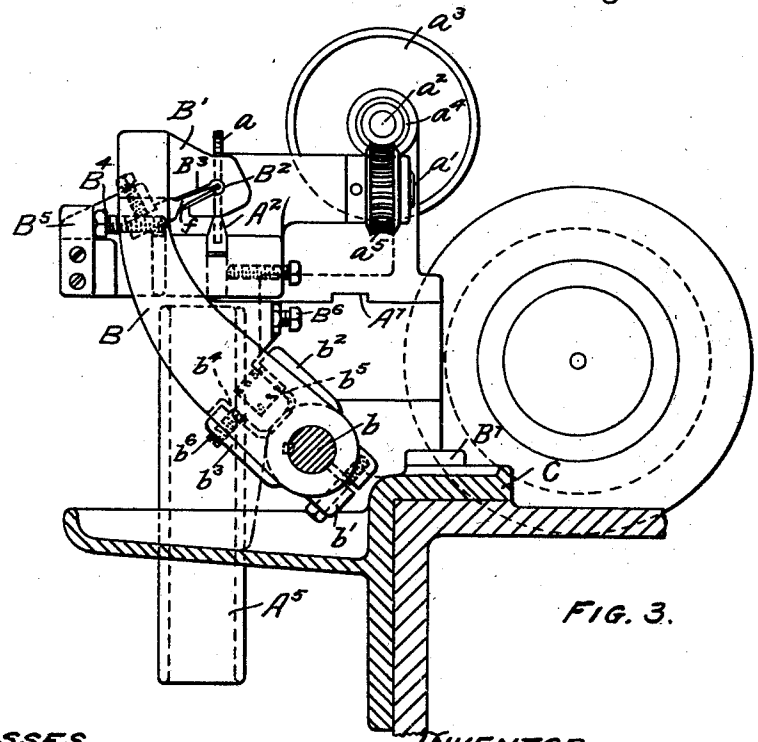


FIG. 3.

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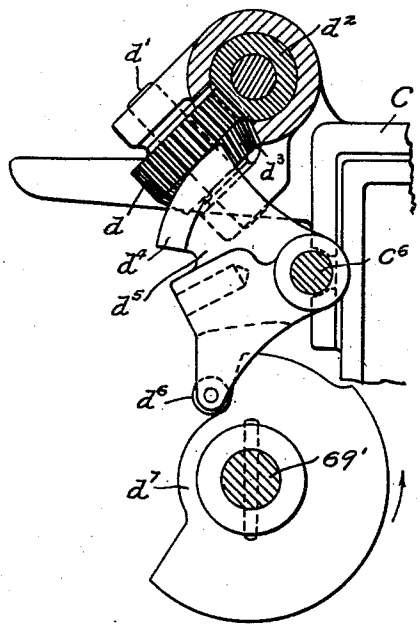


FIG. 4.

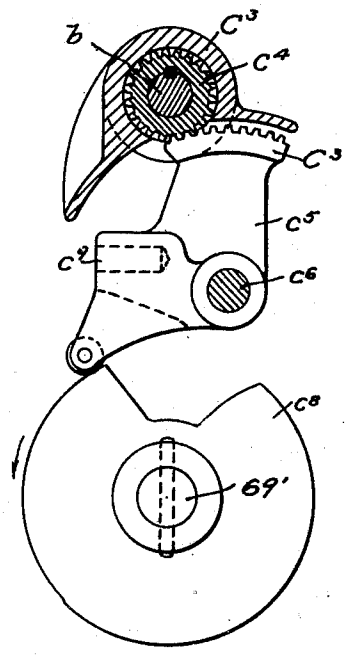


FIG. 5.

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UNITED STATES PATENT OFFICE.

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SLOTTING MECHANISM FOR SCREW-MACHINES.

SPECIFICATION forming part of Letters Patent No. 703,121, dated June 24, 1902.

Application filed May 28, 1900. Serial No. 18,212. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. DAVENPORT, of the city and county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Slotting Mechanism for Screw-Machines; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The object of the invention is to provide a simple and efficient mechanism for automatically slotting the heads of screws or other articles.

The mechanism embodying the invention may be constructed in the form of an attachment to be applied to the main machine for forming the screws or other articles, or the mechanism may be arranged in the main frame and form a permanent part of the machine.

The mechanism embodying the invention comprises a slotting device and a carrier for transferring the articles from the position where they are acted upon by the cutting and forming tools of the machine directly to the slotting device. The carrier is provided with a socket which fits over the article and in which the article is supported as it is transferred to the slotting device. The article is brought into this socket by bringing the socket into line with the article and then moving the carrier forward, and thus a very small or delicate article may be introduced into the socket without any pressure thereon or injury thereto. After the carrier has received the article it moves directly into position in front of the slotting device and presents said article to said device, after which the article is ejected from the socket preparatory to the slotting of the succeeding article.

The invention may be applied to any form of so-called "screw-machines" or "turret-lathes," the particular arrangement and operating connections being varied to suit the particular conditions of each case.

In the accompanying drawings a preferred form of mechanism embodying the invention is shown constructed and arranged as an attachment for use in connection with the machine shown in United States Patent No. 604,306, granted to me May 17, 1898, to which reference may be made for an understanding of the devices for operating the forming and cutting tools and for feeding the stock.

Figure 1 of said drawings is a side elevation of the mechanism embodying the present invention and so much of the machine as is necessary to show the manner of applying said mechanism. Fig. 2 is a plan view of a portion of the mechanism. Fig. 3 is a sectional elevation on the line 3 3, Fig. 2. Figs. 4 and 5 are details of the carrier-operating mechanism.

In explaining the construction and operation of the mechanism shown it will be presumed that the machine is "set up" or adjusted to form the screw shown in Fig. 2 and that the slotting mechanism is adjusted and timed to take the screw as it is severed from the rod of stock and present said screw to the slotting device, which cuts the slot in its head. The parts are shown in the various views in the position they occupy just previous to the movement of the carrier into a position in line with the screw.

The slotting device shown consists of a rotary saw a, secured to the end of a shaft a', which is mounted in a bearing formed on a bracket A. The saw is constantly rotated from a driving-shaft a^2, carrying a pulley a^3 and a worm a^4, which engages a worm-wheel a^5, secured to shaft a.

The screws S are transferred from the chuck to the slotting device and presented thereto by a carrier in the form of an arm B, mounted on a rock-shaft b, by which it is swung back and forth between the chuck and the slotting device. The arm B has detachably secured to its upper end a plate or block B', provided with an opening or socket B^2 of a size to fit the screw S, the blocks being changed for different sizes of screws. A slot B^3 is cut across the block B' and extends into the opening or socket B^2 for a purpose to be described. The rearward swinging movement of the carrier is determined by an adjustable stop B^4 in the form of a screw mounted on the arm

B and arranged to strike a block B^5, secured to the bracket A. By adjusting the stop B^4 the socket B^2 may be brought into exact register with the slotting device, so that the slot will be accurately centered in the head of the screw. The forward position of the carrier is accurately determined by an adjustable stop B^6 in the form of a screw mounted on the arm and arranged to engage a block B^7, secured to the bracket C, which supports the carrier and its operating mechanism. The shaft b is rocked to carry the arm B forward by a spring, and it will accommodate its movement in this direction to the adjustment of the stop B^6. The shaft is returned, however, by the action of a cam, and therefore its backward movement is fixed. A yielding connection, therefore, is made between the shaft b and the arm B, which allows any slight movement of the shaft with relation to the arm which may be required because of the adjustment of the stop B^4. As shown in Figs. 2 and 3, the arm B is loosely mounted on the shaft b and is connected thereto by means of a yoke b', keyed to the shaft and located in a slot in the end of arm B. The yoke b' has two arms b^2 and b^3, which extend upon opposite sides of a lug b^4 on the arm B. The lug b^4 is recessed on the side opposite the arm b^2, and a spring b^5 is mounted in said recess and presses the arm b^2 away from said lug. The amount of space between the arm b^2 and the lug b^4 is regulated by a screw b^6, mounted in arm b^3 and engaging the lug b^4. When the stop B^4 strikes the block B^5 as the shaft b is rocked, the spring b^5 may yield to allow a further movement of the shaft b, if necessary.

A torsional and compression spring c surrounds the shaft b, one end of said spring being secured to the bearing C', in which said shaft is mounted, and the other end being connected to a collar c', secured to the shaft b. This spring tends to force the shaft longitudinally against an adjustable stop c^2 and also to rotate it into position in front of the chuck. The shaft is rocked against the tension of the spring to move the carrier back into line with the slotting device by means of a gear-segment c^3, which engages a pinion c^4, keyed on the shaft, so that said shaft turns with said pinion while being free to move longitudinally therein. The pinion is mounted in a bearing C^3, formed in the bracket C, and forms the support for the rear end of the shaft b. The pinion is held in position in said bearing between a shoulder C^4 and a cap or plug C^5, screwed into the end of the bearing and also carrying the stop-screw c^2. The segment c^3 is formed on a lever c^5, pivoted on a stud c^6 and carrying a roll c^7 at its opposite end, which rides on a cam c^8. The cam c^8 is secured to the shaft 69' (shown in the patent referred to) and may be changed in setting up the machine for different pieces of work. As shown, the lever c^5 is provided with a socket c^9 to receive a handle for operating the carrier in adjusting the mechanism for the particular work to be done.

The shaft b is advanced longitudinally at the proper intervals through a pinion d, which is mounted on a stud d', carried by bracket C, and engages rack-teeth formed on a sleeve d^2, mounted on the shaft b and engaging the collar c'. The pinion d is connected with a bevel-pinion d^3, which is engaged by a segment d^4, formed on the end of a lever d^5. The lever d^5 is pivoted on the stud c^6 and carries a roll d^6, which rides on a cam d^7, detachably secured to the shaft 69'. The cams d^7 and c^8 are so proportioned that the carrier moves down into line with the screw S just before the cutting-off tool severs the screw from the rod of stock. The carrier then moves forward, the screw passing into the socket B^2, which supports it after it is severed from the stock. The carrier then swings back into position in front of the saw a, the block B' standing just above a supporting and steadying block A^2 and the head of the screw S resting against the face of the block and just in front of the saw a. The carrier then advances, forcing the head of the screw against the saw, which cuts a slot therein. The carrier then moves back into the position shown in the drawings and remains in this position until another screw is about to be severed, when the same cycle of movements is repeated. During the backward movement of the carrier the screw is ejected by a finger f, which passes through the slot B^3, before referred to. This finger is secured to an arm A^3 of the bracket A and is arranged to lie behind the screw when the carrier brings the screw into position in front of the saw. When the carrier moves back, the finger engages the end of the screw and arrests its movement, so that said screw is ejected and falls through an opening A^4 in bracket A into a chute A^5.

In order to enable the slotting device to be adjusted for screws having different lengths of heads, the bracket A is adjustably mounted on a second bracket A^6, which is secured to the main frame of the machine. The bracket A is guided on a way A^7, Fig. 3, formed on the bracket A^6, and is adjusted by means of a screw A^8, Fig. 1, bolts A^9, Fig. 2, being provided for clamping the bracket in its adjusted position.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a slotting mechanism for screw-machines, the combination with a slotting device of a carrier having a socket for supporting the article being formed, mechanism for moving the carrier to bring the socket in line with the article, advancing the carrier to bring the article into the socket, moving the carrier directly into position in front of the slotting device, advancing the carrier to bring the article under the action of the slotting device and moving said carrier away from the slotting device, and an ejector acting during the

backward movement of the carrier to eject the slotted article.

2. In a slotting mechanism for screw-machines, the combination with a slotting device, of an oscillating arm, means for oscillating said arm to a position in front of the chuck of the screw-machine, a socket in said arm for supporting the article being formed, means for advancing said arm to bring the article into the socket, means for swinging said arm directly into position to bring the article in line with the slotting device, means for advancing said arm to feed the article against the slotting device and means for retracting said arm.

3. In a slotting mechanism for screw-machines, the combination with a slotting device, of an oscillating arm, a socket therein for supporting the article being formed, a rock-shaft to which said arm is secured, means for rocking said shaft to swing the arm to a position in front of the chuck of the screw-machine, means for moving said shaft longitudinally when the socket is in line with the article being formed, means for swinging said arm directly into position to bring the article in line with the slotting device, and for advancing and retracting said shaft longitudinally when the socket registers with the slotting device.

4. In a slotting mechanism for screw-machines, the combination with a slotting device of a carrier, having means for supporting and carrying the article being formed, means for operating said carrier to present an article to the slotting device, means for retracting said carrier, and a stationary finger for ejecting the article from the carrier during its retracting movement.

5. In a slotting mechanism for screw-machines, the combination with a slotting device of a carrier, having a socket for the article being formed, a slot extending into said socket, an ejector arranged to pass through said slot as the carrier is retracted and means for retracting the carrier.

6. In a slotting mechanism for screw-machines, the combination with a slotting device of an oscillating carrier for presenting the articles being formed to the slotting device, a rock-shaft to which said carrier is secured a pinion keyed to said shaft, a segment engaging said pinion, a cam for operating said segment, a rack connected with said shaft, a pinion engaging said rack, and a cam connected to operate said pinion.

7. In a slotting mechanism for screw-machines, the combination with a slotting device of an oscillating carrier for presenting the article being formed to the slotting device, a rock-shaft to which said carrier is secured, means for rocking said shaft, a rack connected with said shaft, a pinion engaging said rack, a bevel-pinion connected to said pinion, a lever having a segment engaging said bevel-pinion and a cam for operating said lever.

8. In a slotting mechanism for screw-machines, the combination of the carrier B, rock-shaft b to which said carrier is secured, spring c acting on said shaft, pinion c^4 connected with said shaft, lever c^5 having segment c^3 engaging pinion c^4, cam c^8, sleeve d^2 on said shaft, pinion d engaging teeth on said sleeve, pinion d^3 connected with pinion d, lever d^5 having segment d^4 engaging pinion d^3 and cam d^7.

9. In a slotting mechanism for screw-machines, the combination with a slotting device, of a swinging carrier having a socket for supporting the article, an adjustable stop for determining the swing of the carrier, a rock-shaft on which said carrier is mounted, a lug on said carrier, a yoke secured to said shaft and having arms straddling said lug and a spring between one of said arms and said lug.

10. In a slotting mechanism for screw-machines, the combination with a saw a, of a carrier B, having a socket B^2 and a slot B^3 extending into said socket, an ejector-finger f and a chute A^5 into which the articles are discharged by the finger f.

11. In a slotting mechanism for screw-machines, the combination with a slotting device, of a carrier having a socket to receive the article being formed, means for moving said carrier to bring said socket in line with the article in the chuck of the screw-machine, means for advancing said carrier to bring the article into said socket, means for moving said carrier directly to a position to bring the article in line with the slotting device, means for advancing said carrier to feed the article against the slotting device, and means for retracting said carrier.

12. In a slotting mechanism for screw-machines, the combination with a slotting device, of a carrier having a socket to receive the article being formed, means for moving said carrier to bring said socket in line with the article in the chuck of the screw-machine, means for advancing said carrier to bring the article into said socket, means for moving said carrier directly to a position to bring the article in line with the slotting device, means for advancing said carrier to feed the article against the slotting device, a fixed ejector located in the path of the socket in the retracting movement of said carrier, and means for retracting said carrier and moving it past said fixed ejector from one side thereof to the other.

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