

Feb. 15, 1938.

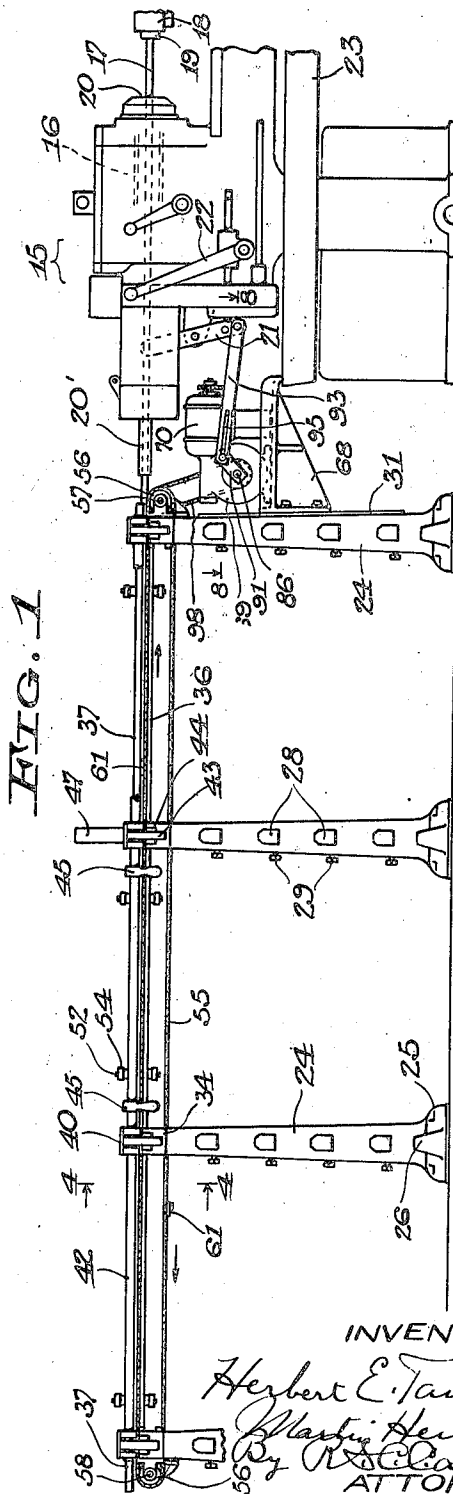
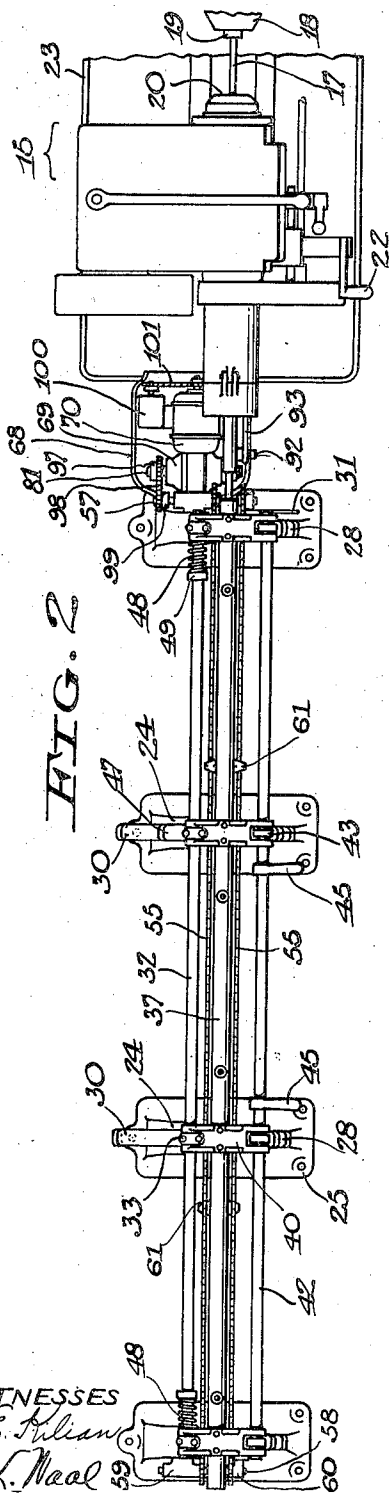
H. E. TAUTZ ET AL

2,108,274

STOCK FEEDING APPARATUS FOR SCREW MACHINES

Filed May 22, 1936

3 Sheets-Sheet 1



INVENTORS

Herbert E. Tautz &
Martin Heinrich
By R. C. Calandrelli
ATTORNEY

WITNESSES
L. C. Sullivan
C. L. Neal

Feb. 15, 1938.

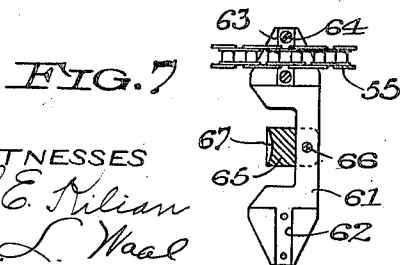
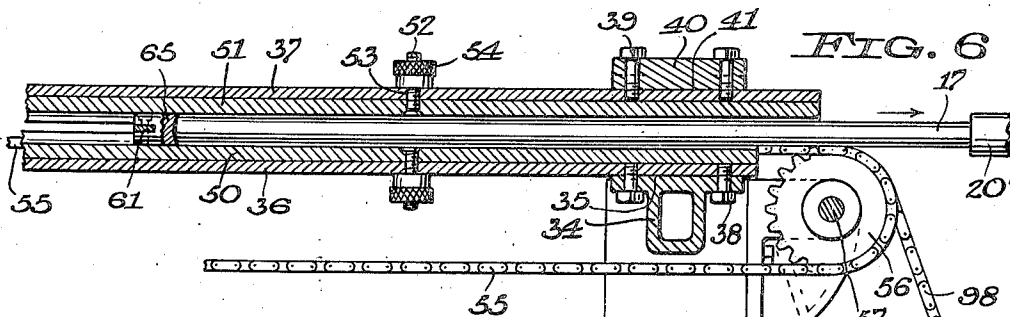
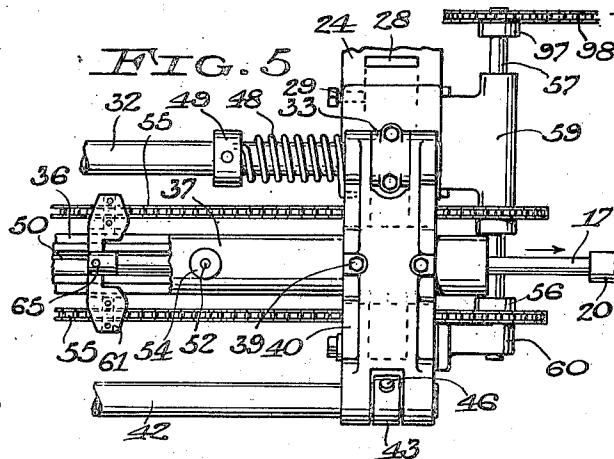
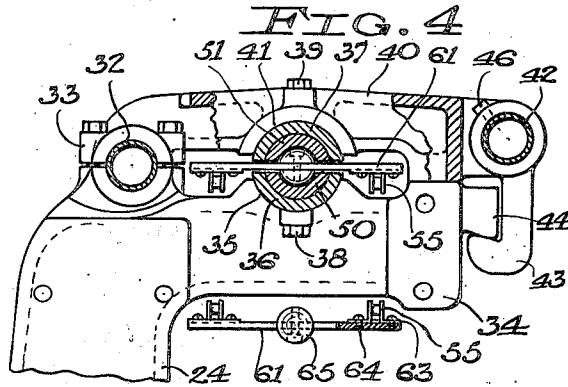
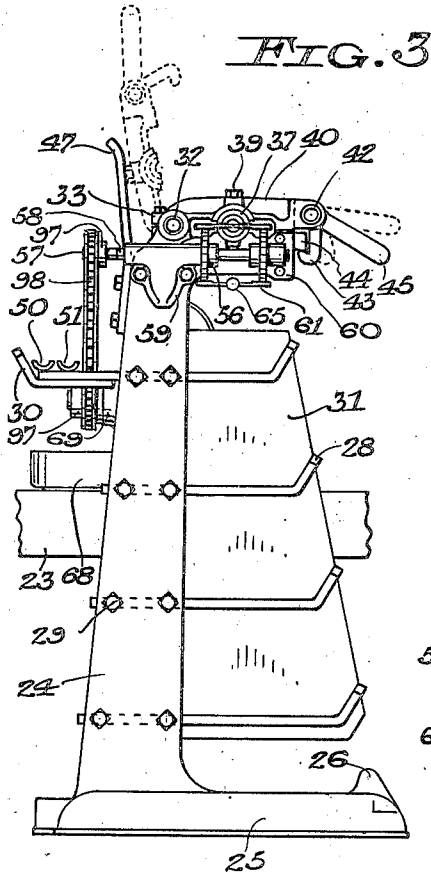
H. E. TAUTZ ET AL

2,108,274

STOCK FEEDING APPARATUS FOR SCREW MACHINES

Filed May 22, 1936

3 Sheets-Sheet 2



WITNESSES
L. E. Nilius
C. L. Neal

INVENTORS
Herbert E. Tautz
Martin Heinrich
By R. B. Caldwell
ATTORNEY

Feb. 15, 1938.

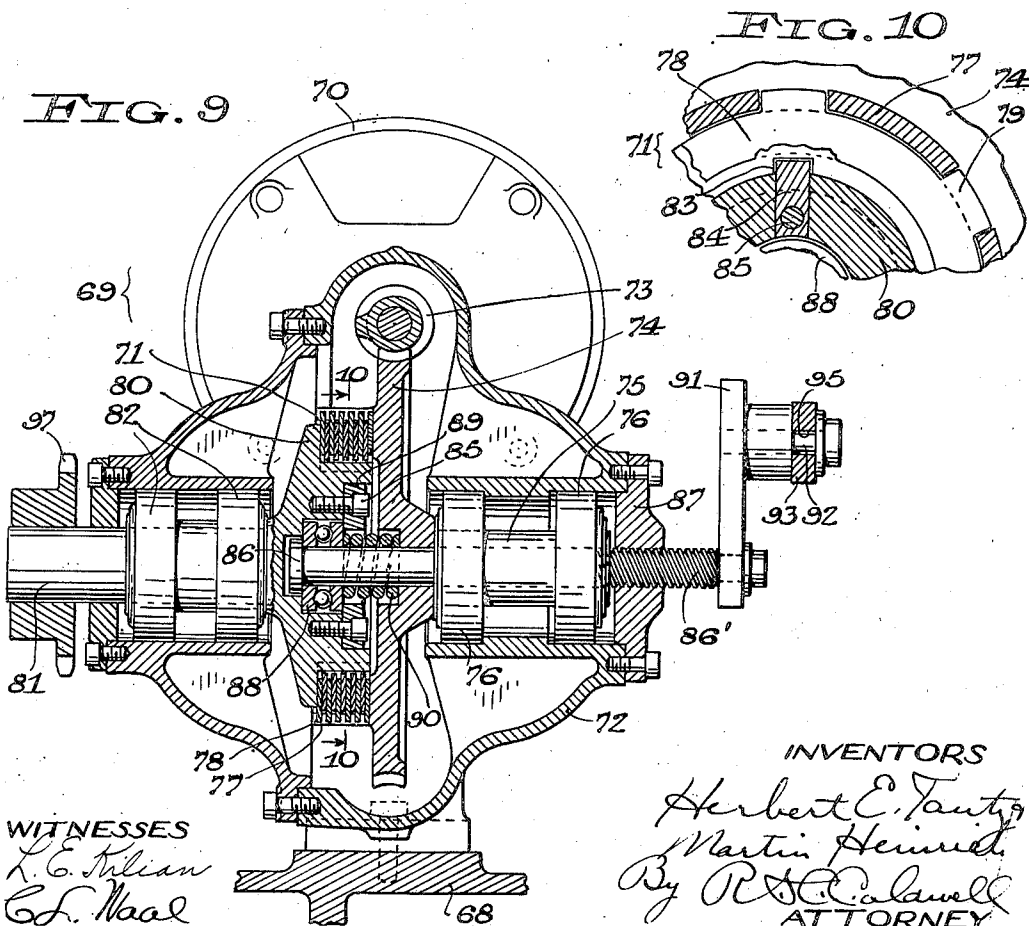
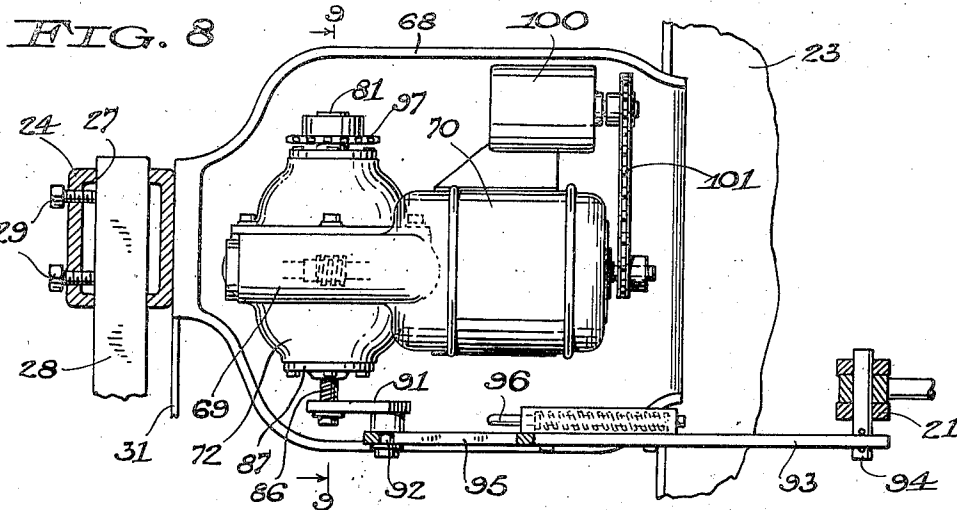
H. E. TAUTZ ET AL

2,108,274

STOCK FEEDING APPARATUS FOR SCREW MACHINES

Filed May 22, 1936

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,108,274

STOCK FEEDING APPARATUS FOR SCREW-MACHINES

Herbert E. Tautz and Martin Heinrich, Milwaukee, Wis., assignors to said Herbert E. Tautz

Application May 22, 1936, Serial No. 81,256

5 Claims. (Cl. 29—59)

The invention relates to stock feeding apparatus for screw-machines and other machine tools.

Apparatus heretofore devised for feeding bar stock to machine tools, such as screw-machines, has been open to various objections, such as awkward and unsafe loading of long bar stock and interruptions in the feeding operations.

An object of the present invention is to provide stock feeding apparatus which can be loaded conveniently and without danger to the operator or to other persons in the vicinity of the apparatus.

Another object of the invention is to provide feeding apparatus by which one bar of stock will be fed to the machine by the succeeding bar.

A further object is to provide stock feeding apparatus controlled conjointly with the stock clamping means of the machine tool.

A further object is to provide stock feeding apparatus which can readily be adjusted to take bar stock of different thickness or diameter.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawings, illustrating an embodiment of the invention,

Fig. 1 is an elevation of a screw-machine stock feeding apparatus constructed in accordance with the invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is an end view thereof, an open elevated position of a swingable frame of the apparatus being indicated in dotted lines;

Fig. 4 is a sectional detail view taken on the line 4—4 of Fig. 1;

Fig. 5 is a top plan view of the delivery end of the feeding apparatus;

Fig. 6 is a sectional elevation of the delivery end of the apparatus;

Fig. 7 is a detail view of one of the stock feeding elements, parts being broken away and parts being shown in section;

Fig. 8 is a sectional view taken generally on the line 8—8 of Fig. 1;

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 8, and

Fig. 10 is a detail sectional view of the clutch means taken generally on the line 10—10 of Fig. 9.

In these drawings, 15 designates a machine tool of the screw-machine type, here indicated to be a turret lathe having the usual horizontal hollow spindle 16 through which round or polygonal bar stock 17 is fed. The lathe has the usual turret 18 which carries a stop 19 to limit the feeding

travel of the stock. The lathe also has the usual stock clamping collet or chuck 20 which is operated by suitable mechanism including a rocker arm or lever 21 and a hand lever 22, the stock being fed to the collet through the usual tubular member 20' forming part of the lathe. In certain types of machines the collet is operated automatically instead of manually. The machine is provided with the usual chip tray or basin 23.

A number of spaced hollow cast metal standards 24 are arranged in a row parallel to the lathe spindle axis and have bases 25 rigidly secured to the shop floor. The bases form storage supports for bar stock and are provided with upstanding projections 26 to confine the stored stock. The standards have a series of slots 27 to receive forwardly projecting stock-supporting bars or brackets 28 which are secured in position by set screws 29. Some of the brackets have rearwardly projecting parts 30 to support other loose members hereinafter described. The standard nearest the lathe is provided with a vertical stop plate 31 for the stored bar stock.

The standards are rigidly connected on their upper portions by a tubular bar 32 which is seated in the standards and is secured by clamping caps 33 bolted to the respective standards. The standards have forwardly projecting upper portions 34 provided with respective arcuate seats 35 in which the lower of a pair of complementary semi-cylindrical pipe or housing sections 36 and 37 is rigidly secured by screws 38, the lower pipe section 36 being parallel to the tubular bar 32 and connecting the several standards. The standards and the connecting bar and pipe section 36 form a rigid stationary frame or rack.

The upper pipe section 37 is rigidly secured by screws 39 to a series of hollow ribbed arms 40 which have forked rear ends pivotally carried on the bar 32 and embracing the respective clamping caps 33, the arms being provided with respective arcuate seats 41 to receive the pipe section 37, and the arms and connecting pipe section forming a swingable frame. The arms 40 have front portions resting on the standards 24 and forked front ends in which is journaled a tubular rock shaft 42 connecting the several arms. Hooked latch levers 43 are rigidly secured to the rock shaft 43 between the forked front ends of the respective arms 40 and are engageable with lugs 44 on the standards 24 to hold the arms in normal position. When the arms are in this position the complementary pipe sections 36 and 37 form a pipe or tubular housing which

is axially aligned with the hollow spindle of the lathe. The shaft 42 carries a pair of spaced hand levers 45 which serve to turn the tube through a limited angle for latching and unlatching the arms, and which also serve to raise and lower the swingable frame formed by the arms and attached parts. The arms may be swung to the upper dotted line position seen in Fig. 3, to thereby expose the lower pipe or housing section 36. The angular movement of the rock shaft 42 on its axis may be limited in any suitable manner, as by stop-forming attaching screws 46 (Figs. 4 and 5) on the latch levers engageable with the arms 40 between the front forks of these arms. One of the standards has secured thereto a stop bar 47 to limit the upward travel of the swingable frame formed by the arms 40 and attached parts, as indicated by dotted lines in Fig. 3. The weight of the swingable frame may be counter-balanced as by means of torsion springs 48 surrounding the bar 32, each spring being secured at one end to a collar 49 fastened to the bar and being secured at the other end to one of the arms 40.

Within the complementary pipe or housing sections 36 and 37 are placed respective detachable filler sections 50 and 51 of substantially semi-cylindrical shape forming an aperture of a diameter suited to the bar stock 11 being fed. The filler sections are provided with attaching studs 52 extending through radial bores 53 in the pipe sections 36 and 37 and secured by thumb nuts 54. Several sets of filler sections of different size may be provided, and those which are not in use may be placed on the brackets 30 as seen in Fig. 3.

The bar stock 17 is housed loosely within the tubular housing formed by the pipe sections 36 and 37 and is fed along the filler sections 49 and 50 therein by impelling means including parts movable between the pipe sections. The impelling means comprises a pair of endless chains 55, one on each side of the pipe sections, and passing over sprockets 56 at the end standards, the sprockets at the standard nearest the lathe being mounted on a shaft 57, and the sprockets at the other end standard being mounted on a shaft 58, each shaft being journaled in a pair of bearing members 59 and 60 bolted to the standard. The chains 55 are transversely connected by a pair of spaced pusher members 61 which when carried on the upper flights of the chains are movable between the vertically spaced pipe sections 36 and 37. Each pusher member 61 is in the form of a plate having aligned grooves 62 near its ends in which angle brackets 63 are secured by screws 64, the brackets being formed by links of the chains. The intermediate portion of the plate 61 is reduced in width and has secured thereto a cylindrical pusher plug 65, the plug having a diametrically slotted rear end fitting over the plate and detachably fastened thereto by a screw 66. If desired, sets of plugs of different diameter may be provided. The pusher plug 65 preferably has a concave front end 67 to engage the rear end of the bar being fed. The pusher plug slides along the lower filler section, or the plate 61 slides along the lower walls of the slots between the housing sections, as desired.

A platform 68 is bolted or otherwise secured to the standard 24 adjacent the lathe and overhangs the basin 23 of the lathe to drain therein. A driving unit 69 is mounted on the platform and in the present instance is in the form

of a speed reducer having an electric motor 70 and an intermittently operated slipping clutch 71. The driving unit includes a suitable split housing 72 to which the motor is secured, the motor shaft having a worm 73 meshing with a worm wheel 74, and the latter having at one side a sleeve or hub 75 journaled on ball bearings 76, not shown in detail. The worm wheel carries at its other side a slotted cylindrical flange 77 in which clutch disks 78 are disposed, alternate clutch disks having projections 79 (Fig. 10) which are slidably keyed to the flange 77. A driven member 80 coaxial with the worm wheel has a shaft portion 81 mounted in floating ball bearings 82, not shown in detail, and has a peripherally flanged inner end to which the other set of clutch disks are slidably keyed, the latter disks having notches 83 (Fig. 10) slidably engaging the outer edges of radially extending key members 84 secured on the driven member by screws 85. The driven member is urged axially to clutching position by a headed rod 86 passing through the hub of the worm wheel and provided with a screw-threaded portion 86' extending through an internally threaded cover plate 87 for the housing. The headed end of the rod bears against a thrust bearing 88 confined in the driven member by an annular plate 89 secured by the screws 85, and is urged out of clutching position by a coiled spring 90 surrounding the rod and pressing on the thrust bearing. The outer end of the rod carries an arm 91 which is connected by a pin 92 to one end of a link 93, the other end of the link being connected by a pin 94 to the rocker arm 21 of the stock clamping mechanism of the lathe. The link 93 has a longitudinal slot 95 in which the pin 92 slidably fits to form a lost motion connection. A spring-pressed plunger 96 on the link is engageable with the pin 92 to effect engagement of the clutch, and also to limit the friction between the clutch disks so as to permit slipping. The shaft portion 81 of the driven member carries a sprocket 97 which is connected by a chain 98 to a sprocket 99 on the shaft 57 for the stock impelling means.

If desired, the motor 70 which runs continuously and is preferably of a constant speed type, may also be used to drive a lubricant or coolant pump 100, as by means of a chain and sprocket connection 101.

When a length of bar stock 17 is to be placed in the feeding rack, the operator grasps the handles 45 of the swingable frame 37, 40 and lifts them to first release the latch levers 43 and to then swing the frame upwardly, with the assistance of the torsion springs 48, to the dotted line position shown in Fig. 3, thereby exposing the lower pipe section 36. The bar stock is then lifted to a position directly above the lower pipe section, and is lowered into the filler sections 50 of the lower pipe section, the pusher plates 61 being near opposite ends of the rack. The frame 37, 40 is then swung downwardly to enclose the bar stock, the latch levers 43 again engaging the lugs 44. The use of a stock-enclosing housing formed by separable sections obviates the necessity for endwise loading of the housing, reduces the floor space required for loading and minimizes danger to the operator and to the other persons in the vicinity. To enter the stock through the hollow spindle of the lathe, the operator releases the stock clamping chuck or collet 20 by swinging the hand lever 22 and connected rocker arm 21, thus engaging the clutch 71 of the driving unit 69 by means of the link 93 and lever 75

91, the screwthreaded rod 86 being urged outwardly by the lever 91 to press the clutch disks 78 together. The driven shaft 81 of the driving unit is thereby rotated and moves the chains 55 on which the pusher plates 61 are carried. The plug 25 on one of the pusher plates engages the bar stock 17 and pushes it through the lathe spindle and against the stop 19, whereupon the clutch 71 will slip to avoid damage to the mechanism. The collet 20 is then actuated to stock-clamping position by the hand lever 22 which also releases the clutch 71. The stock is then subjected to one or more tooling operations and is cut off to form the desired article. During the rotation of the bar stock, the rear end of the stock is confined within the housing 36, 37 to prevent whipping and bending. The collet 20 is then released and the operation is repeated. When the shortened bar stock 17 is about to leave the housing 36, 37 a new length of bar stock is placed in the housing and pushes the shortened bar stock to tooling position.

In the embodiment of the invention shown and described, the stock impelling means is driven from a separate source of power, but it will be obvious that the machine tool or its source of power may be used to drive the impelling means.

While the stock housing and feeding means of the invention is here shown to be applied to a turret lathe, it is also applicable to other machine tools operating on bar stock.

What we claim as new and desire to secure by Letters Patent is:

1. The combination, with a machine tool having means for clamping bar stock, of a supporting guide for receiving the bar stock, means for impelling the stock along said supporting guide to said clamping means, and means controlled conjointly with said clamping means for actuating said impelling means upon the release of said clamping means, said actuating means including a friction clutch and a resiliently mounted movable member for engaging said clutch and for limiting the frictional engagement of said clutch.

2. A stock rack for a machine tool, comprising a plurality of standards and complementary upper and lower housing members forming an open-ended housing for bar stock, the lower housing member being fixed to said standards, arms secured to the upper housing member and pivotally carried by said standards to shift said upper housing member to closed and open positions

with respect to said lower housing member, said upper housing member when in open position exposing the lower housing member to permit lateral loading of bar stock onto said latter member, latch means for securing said upper housing member in closed position, and a hand lever for actuating said latch means and for shifting said upper housing member.

3. A stock rack for a machine tool, comprising a plurality of standards and complementary upper and lower housing members forming an open-ended housing for bar stock, the lower housing member being fixed to said standards, arms secured to the upper housing member and pivotally carried by said standards to shift said upper housing member to closed and open positions with respect to said lower housing member, said upper housing member when in open position exposing the lower housing member to permit lateral loading of bar stock onto said latter member, a rock shaft journaled in said arms, a latch lever carried by said rock shaft, and a hand lever carried by said rock shaft for actuating said latch lever and for swinging said arms.

4. A stock rack for a machine tool, comprising supporting means having a guide adapted to support a work piece, a frame having a retaining member for holding the work piece on said guide, said frame being pivotally carried by said supporting means for access to said guide, means for moving the work piece along said guide, a rock shaft journaled in said frame, a latch lever carried by said rock shaft and engageable with said supporting means to hold said frame in work-retaining position, and a hand lever carried by said rock shaft for actuating said latch lever and for swinging said frame.

5. A stock rack for a machine tool, comprising a plurality of spaced standards, a bar rigidly connecting said standards, a pair of complementary upper and lower housing members forming a housing to receive bar stock, the lower housing member being rigidly secured to said standards, arms rigidly secured to the upper housing member and pivotally mounted on said bar to permit said upper housing member to be swung to open and closed positions with respect to said lower housing member, and means movable between and along said members for urging the stock therealong.

HERBERT E. TAUTZ.
MARTIN HEINRICH.