

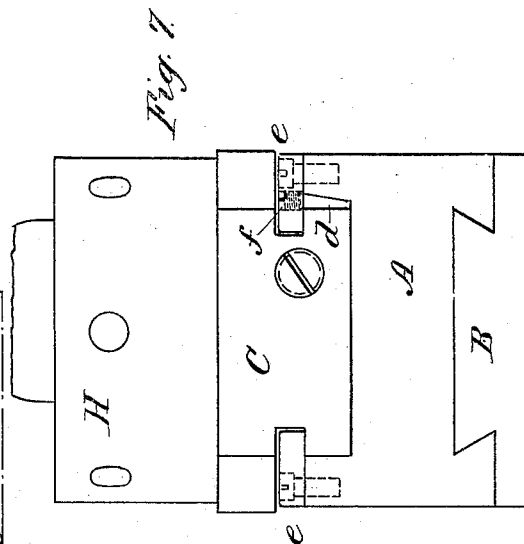
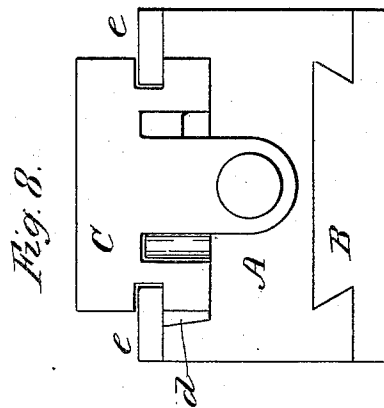
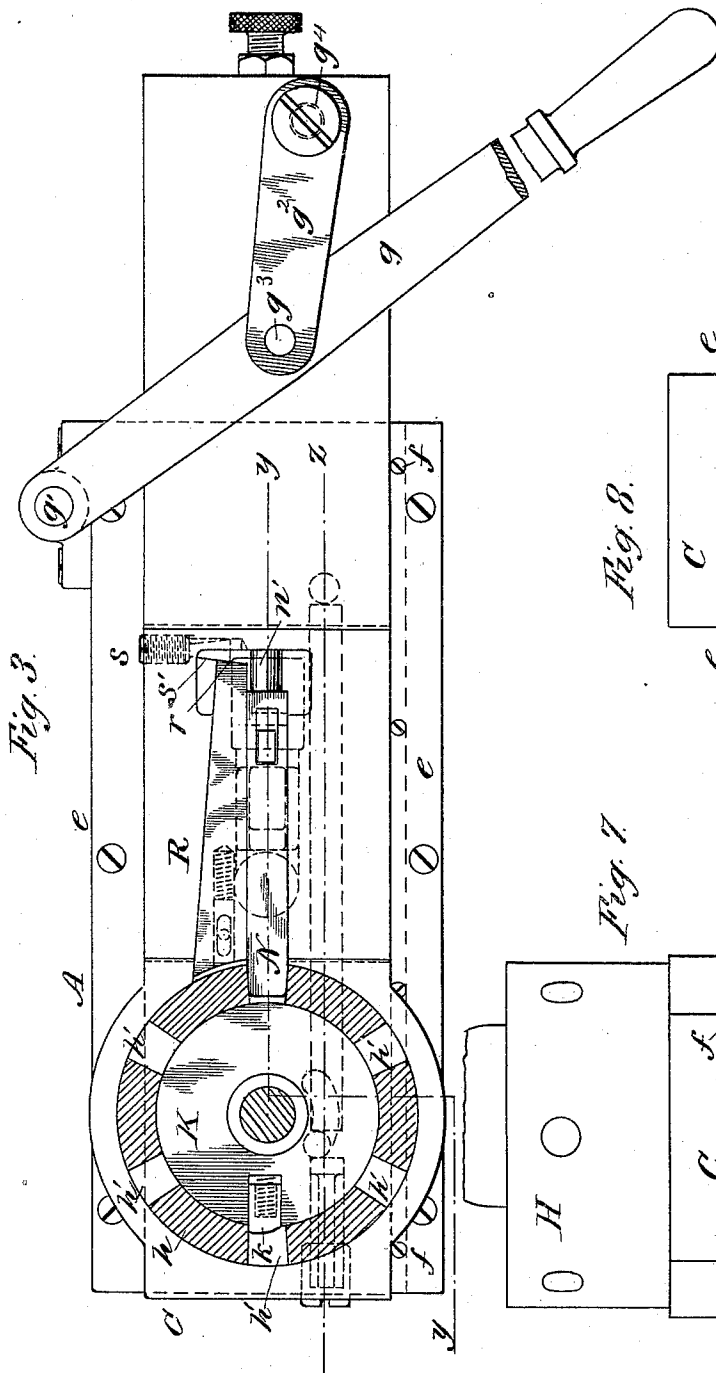
(No Model.)

3 Sheets—Sheet 2.

W. N. WOODRUFF.
TURRET HEAD FOR SCREW MACHINES.

No. 466,646.

Patented Jan. 5, 1892.



Witnesses:

B. B. Jenkins.
J. Stern.

Inventor:

24 William N. Woodruff
Chas L. Burdett,
attorney

UNITED STATES PATENT OFFICE.

WILLIAM N. WOODRUFF, OF HARTFORD, CONNECTICUT.

TURRET-HEAD FOR SCREW-MACHINES.

SPECIFICATION forming part of Letters Patent No. 466,646, dated January 5, 1892.

Application filed September 7, 1891. Serial No. 404,924. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. WOODRUFF, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Turret-Heads for Screw-Machines, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

10 The object of my invention is to provide an improved device in connection with the sliding parts of a machine-tool that provides means for taking up the wear, and it is also my object to provide certain improved mechanism for supporting and rotating a turret-head such as is adapted for use on a screw-machine.

20 To this end my invention consists in details of the several parts making up the sliding mechanism and also the turret supporting and rotating mechanism, and in the combination of such parts as are more particularly hereinafter described, and pointed out in the claims.

25 Referring to the drawings, Figure 1 is a detail top view of a turret and its supporting-slide. Fig. 2 is a detail view in side elevation of the turret block and slide, with parts cut away in vertical section on the plane denoted by line *x x* of Fig. 1. Fig. 3 is a detail top or plan view of the device, with parts cut away in horizontal section to show construction. Fig. 4 is a detail view in side elevation of the device, with parts cut away in vertical section to show construction, the section being taken on the plane denoted by the broken line *y y* in Fig. 3. Fig. 5 is a detail view in vertical central section through part of the device on plane denoted by the line *z z* of Fig. 3, showing the positive stop mechanism. Fig. 6 is a detail view in cross-section of the parts on plane *x' x'* of Fig. 4. Fig. 7 is a detail view in end elevation of the turret-support and turret. Fig. 8 is a detail view in end elevation at the opposite end of the device.

45 In the accompanying drawings my several inventions are shown as embodied in a turret-head support and mechanism that is particularly applicable to a screw-machine, which is not shown in the drawings for the reason that

it may be of common and ordinary construction adapted to support the bed-plate A, that fits upon the slideway of the bed B of the screw-machine, a part only of which is indicated in the drawings.

55 The bed-plate is secured to the bed of the machine by interengaging dovetailed parts, as indicated in the end view in Fig. 7 of the drawings, and it is clamped to such bed by any convenient means. This bed-plate A immediately supports the turret-head slide C in an open socket formed in the upper surface of the bed-plate and extending lengthwise thereof, the slide being of a width that enables it to fit closely between the side parts of the socket, except on one side, where a gib *d* of peculiar construction is employed as a filling-piece. The turret-head slide is held against vertical movement by flange-plates *e*, that are secured, as by means of screws, to the upper surface of the bed-plate A with the inner edges of the flange-plates taking into grooves in the opposite sides of the turret-slide. One side of the turret-slide socket in the bed-plate is formed on an angle sloping outward, and the gib *d* is fitted with one beveled side and one vertical side, the beveled side lying against the sloping side of the socket. At suitable points in the flange-plate *e*, that overlies the gib, adjusting-screws *f* are located in threaded sockets, with the lower end of the screws taking against the upper end of the gib, so that by turning the screws the latter may be forced downward between the side of the slide and the side of the socket. The object of this construction is to prevent any lost motion due to wear of adjacent parts by removing the gib, cutting off slightly the lower edge, and replacing it in the socket and turning down the adjusting-screws until the joint has been made tight enough to allow for the easy lengthwise movement of the slide, but at the same time to prevent any lateral play or lost motion sidewise. The turret-head slide is moved in the bed-plate by means of a slide-lever *g*, one end of which is pivoted to a fulcrum-pin fast to the bed near its inner end, while the outer end of said lever is provided with a handle. Intermediate between the fulcrum-pin *g'* and the handle the lever is con-

55

60

65

70

75

80

85

90

95

100

ected by a link g^2 to the turret-head slide C. This link is connected to the respective parts by pivot-pins g^3 g^4 , so that a swinging movement of the lever is permitted, such movement carrying with it the slide.

One feature of my invention resides in the peculiar turret-rotating mechanism that embodies the feature of a positive stop, so arranged that all wear due to the sudden stopping and starting in the rotating movement of the turret is taken off the lock-bolt.

Near one end of the turret-head C a circular recess c is formed, the turret being preferably seated on top of the slide and having a flange h projecting into the recess c , this flange being preferably made in a separate piece and secured to the bottom part of the turret by any convenient means. The outer end of this flange preferably fits closely within the recess, as shown in Fig. 5 of the drawings. In this flange h a series of sockets are formed in the form of my invention herein illustrated, the outer ends of these sockets h' being the ones engaged by the lock-bolt, while the inner ends of these sockets serve as shoulders or engaging-points for the pawl k that is borne on the rocking disk K, that is located beneath the turret and inside the annular flange. This disk K has a limited swinging movement about the axial center of the turret, and it forms a part of the turret feed mechanism. A pin k^2 , Fig. 5, projects downward from the under side of the disk, and is located between the end of a sliding rod l and a spring-actuated plunger m . This plunger m is arranged in a socket in the turret-head slide and is held in place by a hollow screw bolt or cap m' , that is located in a threaded socket in line with the plunger-socket. A spring m^2 is seated in the plunger-socket and thrusts against the end of the hollow screw and a shoulder on the plunger operating to normally force the plunger out of the socket. The sliding rod l is located in a socket in line with the plunger, and its outer end is adapted to encounter a pin l' , that is secured in the bed-plate A in such position as to be struck by the outer end of the rod l when the parts are moved toward the right, as shown in the drawings.

The operation of these parts is as follows: When the turret-head slide is to be moved to the right for the purpose of rotating the turret so as to bring a new tool into operative relation with the work, the turret feed mechanism moves with the turret-slide, the disk K being then in the position shown in Fig. 2 of the drawings. The movement continues until the end of the rod l strikes the pin l' , and by opposing its further motion causes it to thrust against the pin or projecting part on the disk and rotate the latter until the end of the plunger strikes the head of the bolt m' , and the parts are so adjusted that this stopping of the rotary movement takes place just

at the time when one of the locking-sockets is in exact alignment with the lock-bolt, which is thrust forward and engages the socket, so as to lock the turret in the new position. It will be seen that the entire shock of the stopping of the rotary movement of the turret is thrown upon these sliding parts l and m and the hollow screw-bolt m' , and is not thrown upon the feed-pawl or the locking-bolt. By this improvement the excessive wear on the locking-bolt and bolt-socket that causes in old forms of turret-rotating mechanisms frequent renewals of such parts is completely obviated. The return movement of the lever g , when the turret is locked, carries the turret-head slide along on the bed and allows the spring m^2 to operate to turn the disk by thrusting against the pin l' and disengages the spring-pawl k from one locking-socket and turns it until it is engaged in another locking-socket in readiness for the next rotary movement of the head to bring a new tool into position.

It is not essential to my invention that the pawl-sockets should be continuous with the bolt-sockets, as shown in the drawings, as any shoulder or projection that affords a place for the engagement and ready disengagement of the pawl borne on the disk will be sufficient. It is simply for convenience in the construction that the pawl-socket and the bolt-socket are made continuous.

The turret-locking mechanism comprises a reciprocating lock-bolt N, located in a socket in the turret-head slide, with its end adapted to project into the recess below the turret, so as to engage the locking-socket, as shown in Figs. 3 and 4 of the drawings. A trip device O is pivoted in a socket in the slide underneath the bolt-socket, and while the upper end of this trip device is arranged to operate to withdraw the bolt the lower end projects below the slide a sufficient distance to encounter a block p , that is adjustably mounted in the bed-plate. This trip device O is made up of two sections, an upper o' and a lower o^2 , the latter being forked at the upper end and the two parts so connected that when the upper end is rocked away from the turret the trip device moves as one, but in a return movement of the slide the projecting lower end o^3 of the trip encounters the back of the block p and rocks on a pivot o^4 without affecting the upper part of the trip device. The lower part o^2 of the trip device is so formed that it tends normally to swing downward and stand in a vertical position, as shown in Fig. 4 of the drawings.

When the turret is in proper position for the tools to be used, the turret is locked by the bolt N, that extends into a bolt-socket, and the trip device hangs vertically with the lower end in front of the block p , the bolt being held in engagement in the socket by the spring-actuated plunger n' , seated in the

socket in alignment with the lock-bolt and thrust forward by a spring n^3 back of the plunger, an adjusting-screw n^3 closing the socket and forming a means for changing the tension of the spring n^2 . When the turret-head slide is moved to the right by means of the lever, as indicated by the arrow in Fig. 1 of the drawings, the lower end of the trip device O encounters the front end of the block p , and by tilting it withdraws the lock-bolt N against the pressure of the spring n^2 . The lower end of the trip device drags along the top of the block p and holds the bolt withdrawn a sufficient time to enable the turret feed mechanism to operate to rotate the turret the required distance to bring a new tool into operative position, and as soon as that is accomplished the trip slips off the rear end of the block and allows the bolt to be thrust forward into a locking-socket by the recoil of the spring n^2 . The block p has a sliding play in its socket, and is engaged by a rotary feed-screw p' , as shown in Fig. 4 of the drawings, that is located in a threaded socket in the bed-plate A, with the outer end of the screw in a position that makes it readily accessible for the purpose of adjusting the block into the proper position to correctly operate the locking-plate to effect the purpose described.

In one side of the lock-bolt socket in the turret-head slide a tapered gib R is arranged with the narrow end r seated against the tapered end of an adjusting-screw s . The end r is cut on a bevel that corresponds with the taper of the end s' , and by this device the lengthwise position of the gib is determined by rotating the screw s . A spring r' is arranged within a socket in the gib and thrusts against a shoulder on the slide in such manner as to hold the gib in contact with the tapered end of the screw. If the bolt N becomes worn so as to permit any lateral play in its socket, the screw s is rotated until the tapered end is moved inward a sufficient distance to allow the gib to slide backward until all lost motion of the bolt has been taken up.

In the within application I have illustrated and described a preferred form of embodying my inventions and improvements; but my invention is not limited to the specific construction of the several parts herein illustrated and described.

The separation of the turret-feed device from the turret-locking mechanism—that is, the utilizing of different engaging-points for the feed-pawl and the end of the lock-bolt—forms a main feature of my invention, and that may obviously be accomplished by other means than those specifically shown and described herein. The rotation of the turret by means operating from within the annular flange is new with me, and it is obvious that the result attained can be accomplished by other specific construction of parts than those herein shown, and I do not limit myself to such in the carrying out of my invention.

One of the most important features of my within-described invention resides in the separation of the stop device that limits the rotary movement of the turret from the locking mechanism, and in the construction of these parts the form of arrangement may be obviously changed without departing from my invention.

I claim as my invention—

1. In combination with a slide-support having a socket, a reciprocating slide mounted in said socket, the tapered gib located between the side of the slide and the side wall of the socket, and the adjusting-screws overlying the back of the gib and adapted to seat it, all substantially as described.

2. In combination with the bed-plate having a lengthwise socket on the upper surface with the outward-inclined side wall, a turret-slide movably arranged in said socket, a tapered gib having one vertical wall adjacent to the side of the slide, and a sloping side in contact with the sloping wall of the socket, a flange secured to the bed-plate and overlying the gib, and the adjusting-screws passing through the flange-plate and taking against the upper edge of the gib, all substantially as described.

3. In combination with a bed-plate, a turret-slide movably supported thereon, a rotary turret mounted on the slide, a lock-bolt borne in the slide, and the turret-rotating mechanism having a stop device that operates independently of the lock-bolt, all substantially as described.

4. In a turret feed mechanism, in combination, a reciprocating turret-slide having a turret-socket and a lock-bolt, the rotary turret mounted in the socket and having on the under side an annular flange with crosswise openings, the lock-bolt with its operating mechanism adapted to engage the openings from outside of the flange, and the turret-rotating mechanism with a ratchet-bolt adapted to engage the flange from the inner side, all substantially as described.

5. In a turret feed mechanism, in combination, a reciprocating turret-slide, a rotary turret mounted on the slide and having on the under side an annular flange with crosswise openings, a reciprocating lock-bolt with its operating mechanism and adapted to engage the openings from the outside of the flange, and the turret-rotating mechanism with a pawl engaging the sockets from within the flange, all substantially as described.

6. In combination with a turret-slide, a rotary turret mounted thereon, and a turret-stopping mechanism, whereby the rotary movement of the turret is arrested independently of the turret-locking mechanism, all substantially as described.

7. In combination with a turret-slide, the lock-bolt and means for reciprocating it, and the turret-rotating mechanism comprising the sliding sectional plungers, a swinging cam bearing a spring-pawl, and a fixed stop-pin

borne in the bed-plate, and the bed-plate supporting the slide, all substantially as described.

8. In combination with a turret-slide, a rotary turret mounted thereon, lock-bolt sockets in the turret, the reciprocating lock-bolt borne in a socket in the slide, a trip device with one end in engagement with the lock-bolt and the other arranged in operative relation to a block secured on the slide-support, and the adjustable block borne in the slide-support, all substantially as described.

9. In combination with a turret-head slide, a rotary turret mounted thereon, bolt-sockets formed in the turret, a spring-actuated locking-bolt, and an adjustable gib with tapered side located in the bolt-socket and having a bevel end, an adjustable screw located in a threaded socket in the slide and with a tapered end forming the end support of the gib, all substantially as described.

10. In combination with a turret-head slide having a socket, a rotary turret mounted in said socket and having an annular flange projecting therein, a series of bolt-sockets opening to the outer surface of said flange, and a series of pawl-sockets formed on the inner side of said flange, a reciprocating lock-bolt with its tripping mechanism, a swinging disk located within the turret-socket and bearing a spring-pawl, a projection from the disk arranged between the reciprocating plungers, the reciprocating plungers and their actuating-spring, and the fixed pin arranged to be encountered by the plungers in the sliding movement of the turret-head, all substantially as described.

11. In combination with a turret-head slide, a rotary turret mounted on the slide and having lock-bolt sockets, a reciprocating lock-bolt supported in the slide, a tilting trip device pivoted to the slide and comprising an upper and a lower section, the latter held in operative position by gravity, and a block mounted on the turret-head slide support in the line of movement of the trip device, all substantially as described.

12. In combination with a turret-head slide, a rotary turret having lock-bolt sockets, a spring-actuated reciprocating lock-bolt, a trip device pivoted to the slide and comprising an upper and a lower section rigid against flexure in one direction, and a block held on the slide-support in the line of movement of the lower end of the trip device, all substantially as described.

13. In combination with the turret-slide support, the turret-slide, a lever pivoted to the slide-support and pivotally connected to the slide by a link at a point between the fulcrum of the lever and the lever-handle, a rotary turret mounted on the slide and having an annular flange projecting into the turret-socket, and having crosswise openings forming locking-sockets, means, as described, for rotating the turret, and the locking mechanism comprising a reciprocating bolt and the trip device, and the stop device operating independently of the locking mechanism, all substantially as described.

WILLIAM N. WOODRUFF.

Witnesses:

CHAS. L. BURDETT,
A. B. JENKINS.