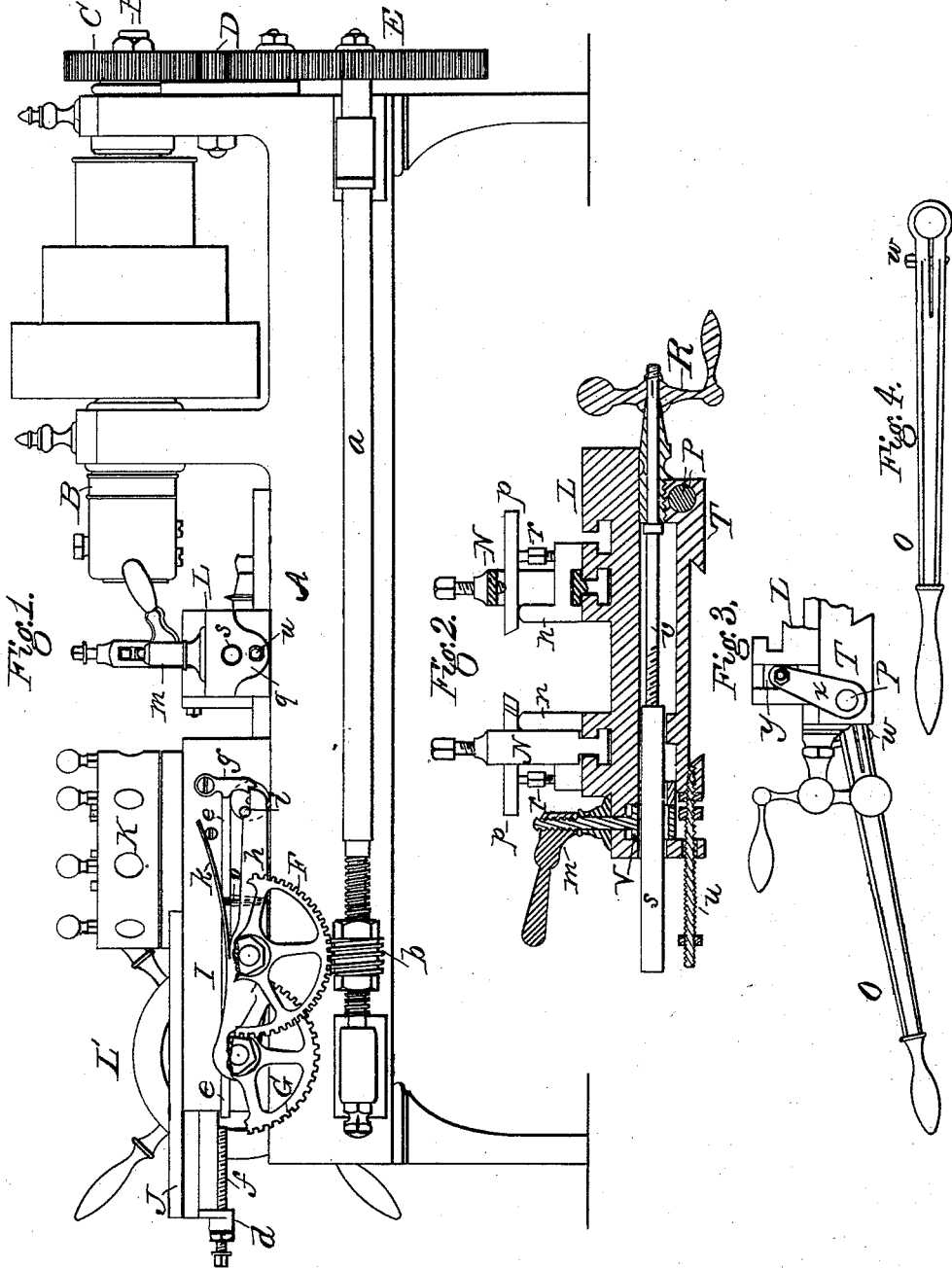


H. D. STONE.
Metal-Screw Machines.

No. 156,107.

Patented Oct. 20, 1874.



Witnesses:
H. H. Dodge
W. E. Chaffer.

Inventor:
Henry D. Stone,
by Dodger & Son
Atty.

UNITED STATES PATENT OFFICE.

HENRY D. STONE, OF WINDSOR, VERMONT, ASSIGNOR OF ONE-HALF HIS
RIGHT TO JONES, LAMSON & CO., OF SAME PLACE.

IMPROVEMENT IN METAL SCREW-MACHINES.

Specification forming part of Letters Patent No. **156,107**, dated October 20, 1874; application filed
August 13, 1874.

To all whom it may concern:

Be it known that I, HENRY D. STONE, of Windsor, in the county of Windsor and State of Vermont, have invented certain Improvements in Turret-Lathes, of which the following is a specification:

My invention relates to certain improvements in that class of machines used for making machine-screws, and usually known as screw-machines or turret-lathes, the invention consisting in a combination of devices whereby a power-feed is applied to move the slide that carries the turret, and which is provided with an automatic stop device, together with means for disconnecting the power-feed and operating it by hand, when desired. It further consists in an improved tool-holder for use on the cutting-off slide, and also in novel arrangement of devices for moving said slide, whereby it can be operated either by a lever or by a screw-feed at will, all as hereinafter more fully described.

Figure 1 is a rear side elevation of the lathe complete. Fig. 2 is a longitudinal vertical section of the cutting-off slide with the tool-holders in position; Figs. 3 and 4, portions of the same, shown in detail.

The body or frame A, and the spindle B, with the slides I and J and turret K, are all constructed in the usual manner, except in so far as the slides are modified to adapt them to the improvements hereinafter described. Upon the rear end of the spindle or arbor B I mount a gear-wheel, C, which, through the medium of an idler, D, connects with a wheel, E, attached to the end of a shaft, *a*, mounted in bearings on the rear side of the bed, as shown in Fig. 1. On this shaft *a*, near its opposite end, is secured an adjustable worm wheel, *b*, which engages with a wheel, F, on the shaft of which is a pinion, that, in turn, engages with another wheel, G, the shaft of this wheel G having a pinion on it arranged to engage with a rack on the under face of the upper slide J, this pinion and rack not being shown, as they are well known devices in this class of machinery. The wheel F is secured to a bar, *h*, which has its outer end pivoted on the shaft

of wheel G, so that its inner end is free to be raised or lowered vertically, whereby the wheel F can be thrown in or out of gear with the worm *b* at pleasure, there being a spring-arm, *k*, attached to the bar *h*, with its free end bearing on a stud, *e*, whereby the bar *h*, with its wheel F, is raised when not held down by the detent or pawl *g*, which is pivoted to the slide I in such a position as to engage with the end of bar *h*, as shown in Fig. 1. To depress the bar *h*, and also release the pawl *g*, a hand-wheel is used on the front side of the slide I, the shaft of this wheel extending through the slide, and having secured to its rear end a plate, from the face of which projects a pin, *i*, so arranged as to strike against the bar *h* when turned in one direction, thus depressing the bar far enough to allow the pawl *g* to engage over the end of the bar *h*, and thus hold it down, thereby holding the wheel F in gear with the worm *b*, as shown in Fig. 1. This pin *i*, when turned over in the opposite direction, also bears against the face of the pawl *g*, and, shoving it back, thereby releases the bar *h*, which is immediately raised by the spring *k*, thus disconnecting the wheel F from the worm *b*, the hand-wheel, through the medium of the eccentric pin *i*, thus serving to throw the power-feed in or out of gear at will. Upon the rear end of the slide J, as shown in Fig. 1, is secured an arm, *d*, in which is held an adjustable rod, *f*, which, as the slide moves forward, is brought in contact with the end of a sliding bar or rod, *e*, fitted in a groove in the rear face of the slide I. This slide *e* has its front end pivoted or otherwise connected to the pawl *g*, a spring, *o*, serving to draw both toward the outer end of the slide, the rear end of bar *e* being in line with the stop or screw rod *f*, so that when the slide J has been moved forward far enough to cause the rod *f* to strike the bar *e* the latter releases the pawl *g* from the bar *h*, thus automatically throwing out of gear the wheel F, and thereby stopping the feed or movement of the slide J with its turret K.

As the stop-rod *f* can be adjusted so as to strike the bar *e* sooner or later it follows that

the feed can be increased or decreased in extent, as may be desired, to adapt the machine to the work to be done.

A hand-wheel, *L'*, is secured to the shaft of wheel *G*, so that, when desired, the slide *J*, with its turret, may be operated by hand by means of the rack and pinion, as is customary with these machines, the power-feed at such times being disengaged.

The idler-wheel *D* is mounted on an adjustable bearing, whereby it can be changed in position to engage with wheels of various sizes, to be substituted for the wheel *E*, on shaft *a*, and thus increase or decrease the speed of the feed, as may be desired, this being a feature common to screw-cutting lathes.

As the lower slide *I* is to be moved back or forward on the bed *A* to adjust the upper slide *J* with its turret *K* to the work to be performed, the worm *b* is also made adjustable on its shaft *a* to correspond therewith, so it may be made to engage properly with the wheel *F*, which, being connected to the slide *I*, is moved therewith.

By these means it will be seen that the machine is provided with an automatic feed and stop, whereby one person is enabled to operate or tend two or more of the machines, he being at liberty to adjust the work and tools in one, while the other is performing its work, they stopping automatically as soon as they have completed their movement and finished the cut.

It will be understood, of course, that the turret *K* is provided with a series of tools, and made to rotate so as to bring the several tools successively in line with the arbor *B*, as is customary in these machines.

These machines are also provided with a transverse slide, *L*, for carrying the cutting-off tools *p*, this slide being arranged between the turret and the arbor *B*, as represented in Fig. 1. Heretofore this slide *L* has been operated either by a rack and pinion, or a screw, and in some instances they have been provided with both; but when so provided, the two have been so constructed that in order to use the one, the other had to be disengaged. This part of my invention has for its object to so construct and arrange a screw-feed and a hand-lever feed that the screw can be used without disconnecting the other or lever-feed.

To do this I construct the parts as follows: In the bed-plate *T*, I mount a transverse shaft, *P*, as represented in Figs. 2 and 3. One end of this shaft *P* has secured to it an arm, *X*, as shown in Fig. 3, and to the other end of this arm *X* is pivoted a slide, *Y*, which works in a vertical groove in one side of the slide *L*, as shown in Fig. 3. To the opposite end of shaft *P* is secured a hand-lever, *O*, shown in Figs. 3 and 4, this lever being slotted and provided with a screw-bolt, *w*, by which its slotted portion can be drawn together, and thus cause it to adhere by friction to the shaft *P* with suffi-

cient force to operate the slide, this mode of attachment, also, permitting the lever to be adjusted and set at any desired angle on its shaft *P*, to accommodate the wants or convenience of the workman, and adapt it to be used with equal facility by a man or a boy. To the bed-piece *T* is secured a screw-rod, *v*, having a hand-wheel, *R*, attached for turning it, as shown in Fig. 2, this screw-rod engaging in a tubular sleeve, *S*, which has a corresponding screw-thread cut on its inner surface. This sleeve *S* passes loosely through bearings in the rear end of slide *L*, and through a collar, *V*, which has a stem extending up through the slide *L*, and is provided at its upper end with a tightening-nut, *m*, having a handle attached, as shown in Fig. 2.

When it is desired to operate the slide *L* by means of the screw, the hand-nut *m* is turned so as to clamp the sleeve *S* fast to the slide *L*, when, by turning the hand-wheel *R*, the slide *L* will be moved, the lever-feed, of course, being moved thereby, but offering no obstacle to the operation of the parts by the screw. When a quicker movement is desired, the clamp *V* is loosened on the sleeve *S*, when the latter is free to slide in its bearings, and does not then interfere in any manner with the lever-feed. The chisels *p* are held in tool-posts *N*, secured in T-shaped grooves in slide *L*, as usual; but instead of constructing the tool-holders as usual, I make them as represented in Fig. 2, where it will be seen that the posts *N* are slotted nearly their entire length vertically, so as to receive an L-shaped dog or support, *n*, the front part of which projects vertically to the proper height for the chisel *p* to rest thereon, as shown, this projecting point being slightly rounded on its upper surface. Each of these dogs *n* is provided near its outer end with a vertical screw, *r*, which, fitting in a suitable screw-hole, can be adjusted vertically more or less, and thus the chisel *p*, resting on these two points, can have its point adjusted as may be necessary, by simply turning the screw *r*.

As a means of regulating or limiting the movement of the slide *L*, a rod, *u*, is secured to the bed-piece *T* in such a position as to protrude through a hole in a lip, *g*, which projects downward from the end of the slide *L*, as shown in Fig. 2. The rod *u* is threaded its whole length, and has a nut on it each side of the lip *g*, so that by adjusting these nuts the motion of slide *L* with its tool can be limited as desired.

By these several improvements a machine is produced that is adapted to a great variety of work, and that can be operated by power feed and automatically, or by hand, as preferred.

Having thus described my invention, what I claim is—

1. The combination of the worm *b*, swinging bar *h*, having the wheel *F* mounted there-

on, pawl *g*, and eccentric-pin *i*, all constructed and arranged to operate substantially as described.

2. The slide or adjustable bed I, having the swinging bar *h* with its driving-gear, the pawl *g*, eccentric *i*, and sliding rod *e* mounted thereon, in combination with the slide J, provided with the adjustable stop-rod *f*, all constructed to operate substantially as described.

3. The improved hand-feeding device, consisting of the shaft P, mounted in the bed-piece T, with the adjustable lever O and arm X attached, and the slide Y pivoted to said arm X, and fitted to work in a vertical groove

in the slide L, all combined to operate substantially as described.

4. In combination with the bed-piece T and slide L, the screw-rod *v*, sleeve S, and clamp V, with its nut *m*, all arranged to operate as set forth.

5. The tool-support or dog *n*, provided with the adjusting-screw *r*, in combination with the tool-posts N, for supporting and adjusting the tool *p*, as set forth.

HENRY D. STONE.

Witnesses:

D. A. BERNARD,
W. D. TUXBURY.