Sheet 1 - 4 Sheets.

Brooks & Clark,

Making Wood Screws,

No. 3,893. Patented Jan. 23, 1845.

Fig: 4.

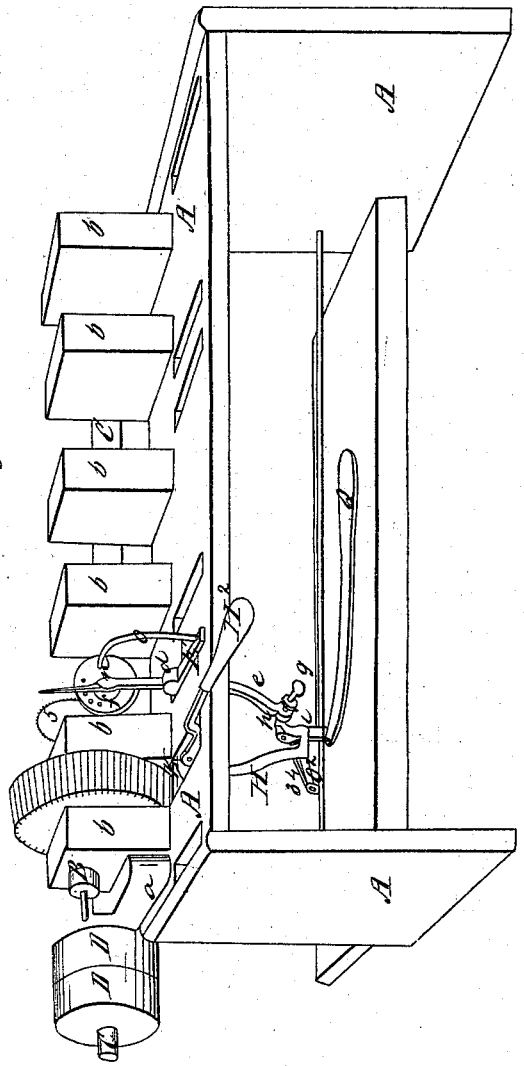

Fig: 2

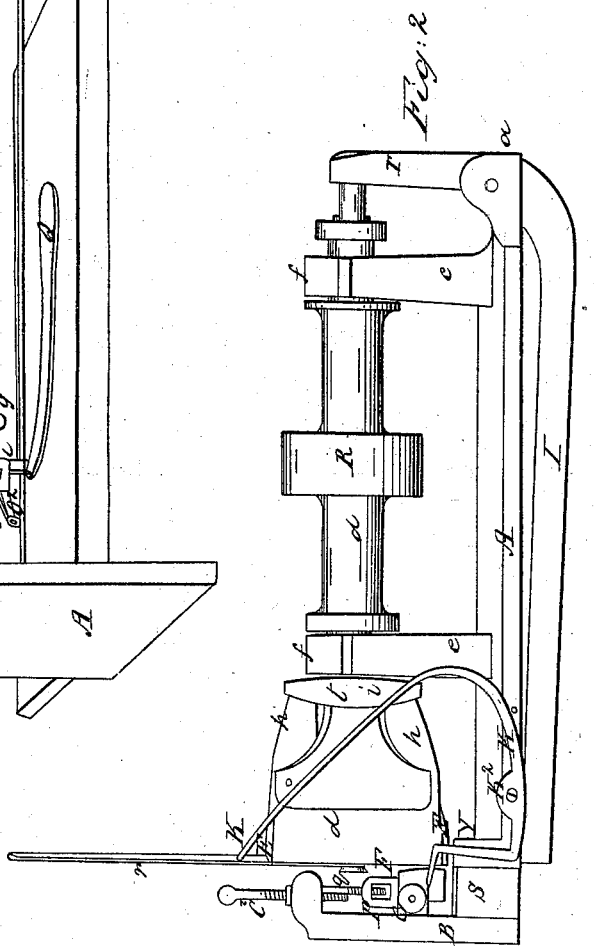

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Fig. 3

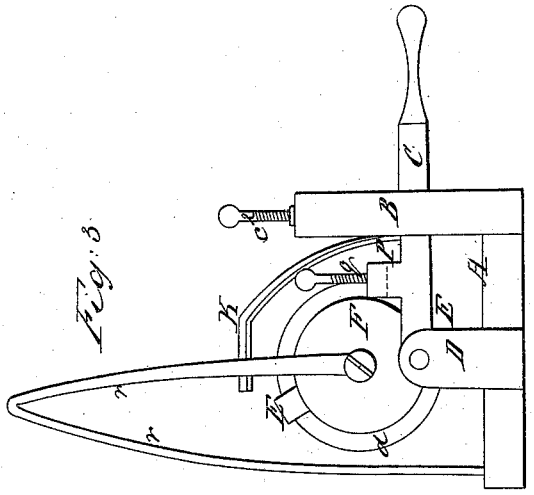
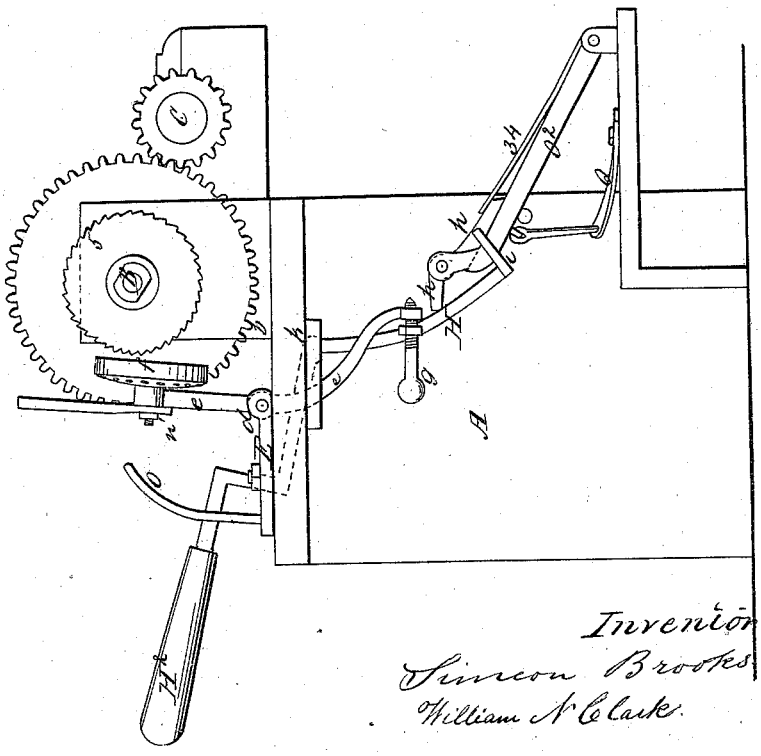


Fig. 5



Witnesses

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No. 3,893. Patented Jun. 23, 1845.

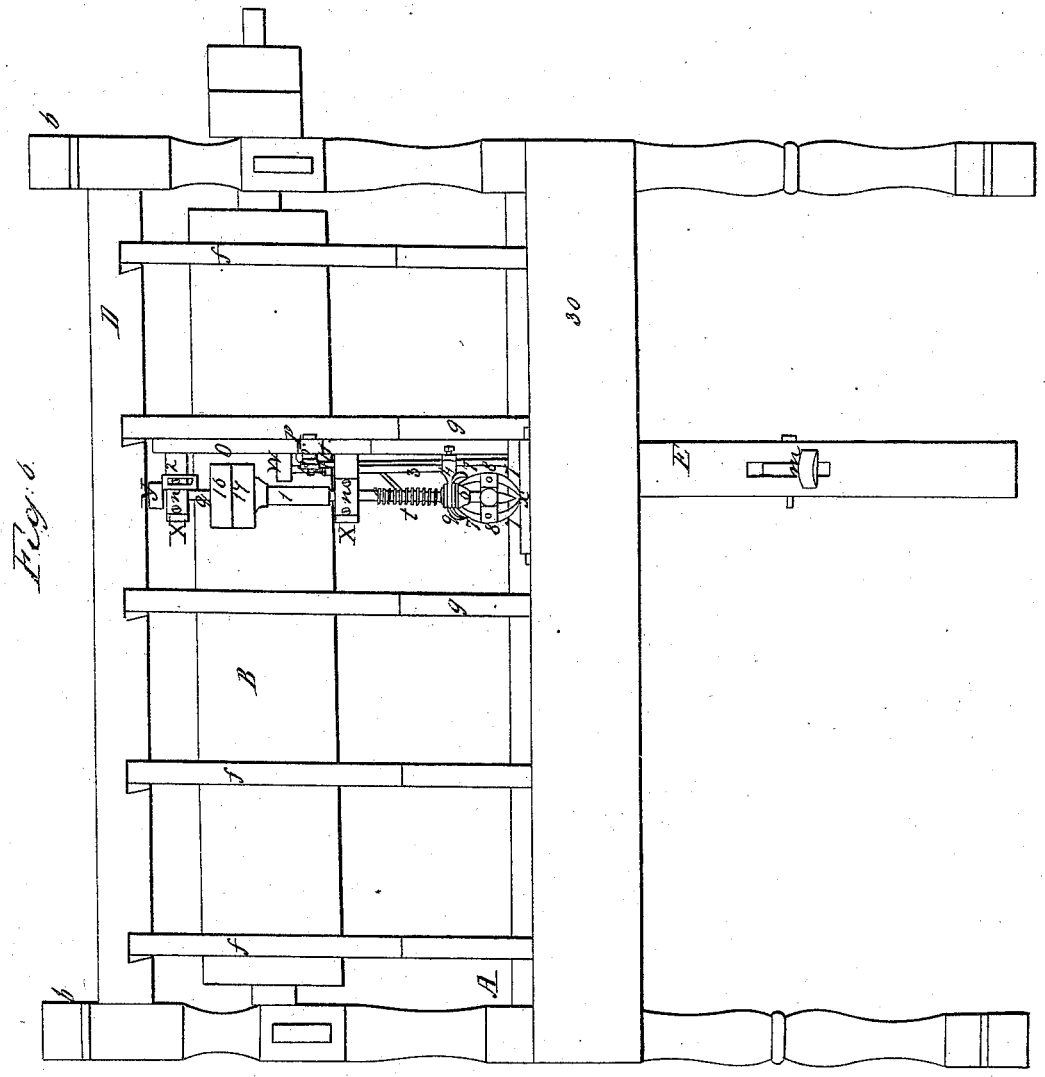

Fig. 6.

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Fig: 7

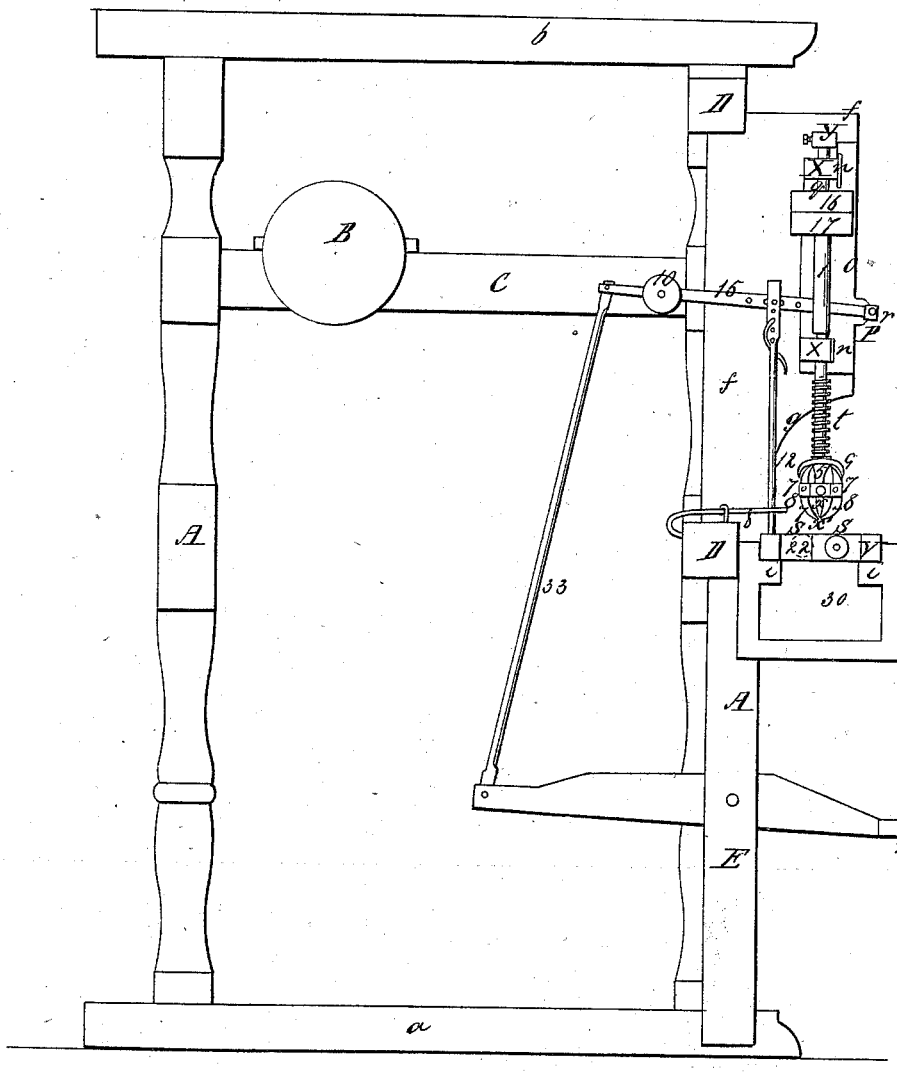


Fig: 8

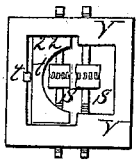
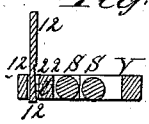


Fig: 9



Witnesses

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UNITED STATES PATENT OFFICE.

SIMEON BROOKS AND WILLIAM N. CLARK, OF CHESTER, CONNECTICUT.

IMPROVEMENT IN THE MANUFACTURE OF WOOD-SCREWS.

Specification forming part of Letters Patent No. **3,893**, dated January 23, 1845.

To all whom it may concern:

Be it known that we, SIMEON BROOKS and WILLIAM N. CLARK, of Chester, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Machinery for Manufacturing Screws, which are described as follows, reference being had to the annexed drawings of the same, making part of this specification, of which—

Figure 2 is a side elevation of the combination of machinery for paring the head of the screw. Fig. 3 is an end elevation of the same. Fig. 4 is a combination of machinery for nicking or scoring and discharging the screw as arranged for the operation of scoring, the clip-catch being engaged with the gage-screw. Fig. 5 is a side elevation of the same, showing the trip-lever disengaged from the gage-screw. Fig. 6 is a front elevation of the machine for threading the screw, showing one spindle and pair of jaws. Fig. 7 is a vertical transverse section of the same. Fig. 8 is a horizontal section of the dies for cutting the thread on the shanks. Fig. 9 is a vertical transverse section of the same through the center of the dies.

Machinery for paring the head of the screw, represented in Figs. 2 and 3.—The bed A, standards B D, thumb-screw C^2, for engaging the lever C, the lever C, for holding the paring-tool, standards or pillars *e e*, spindle *d*, jaws E, for holding the blank screw to be pared, lever I, for moving the wedge for closing the jaws on the blank, and other parts of the combination of machinery may be made in the usual or in the most improved manner.

The improvement desired to be secured by Letters Patent consists in the combination of the two levers C and K with the spring *r*, by which the blank when pared is removed from the jaws of the spindle. The lever C, which is of the second order, is connected to the top of the standard D by a bolt which serves as its fulcrum, having on its upper side, near the middle, a protuberance P, containing a socket, into which is inserted the shank of the paring-tool, and a screw *q*, by which it is screwed therein. This tool pares the head of the blank, which is inserted into the aperture in the center of the face-plate F of the revolving spindle *d*. The lever K, operated by the descent of the aforesaid lever C for throwing out the spring-bow *r* for discharging the blank from the jaws, is bent from its fulcrum K^2 to its end that comes in contact with the lever C, in the figure of the letter *z*, and from the fulcrum in the opposite direction it is bent round in the form of an inverted **C**-spring, and then is bent horizontally toward the spring-bow *r* and in contact there with it and behind it. The spring-bow *r*, for discharging the blank after it is pared, is bent in the form of a bow made broader and thinner at one end than at the other end, the narrow end being secured firmly in a vertical position in the bed A or other convenient place and the flat end bent over and brought down in front of and against the face-plate F of the spindle *d* opposite the central aperture, into which the blank is inserted, where said flattened end of the bow-spring *r* is forked or made concave for catching the head of the blank. In putting in a blank to be pared the aforesaid concave or forked end of the spring-bow will embrace the upper half of the blank immediately behind the head. When the head is pared, the lever C is depressed, and coming in contact with the short end of the lever K it depresses said short end and at the same time elevates and brings forward the long or curved end against the spring-bow *r*, which it pushes outward from the face-plate F, carrying with it the blank, which it discharges from the jaws, leaving them ready to receive another blank. The lever C being then raised and liberated from the lever K, the spring-bow *r* will return to its former position against the face-plate F.

Combination of machinery for nicking or scoring the blanks, (see Figs. 4 and 5.)—The improvement in this part of the machinery that we have made, and which we desire to have secured to us by Letters Patent, consists in the form and arrangement of the lever *e*, to which the face-plate *f* is attached, in combination with the lever O^2 and trip-lever *h*, with the lever H, for re-engaging the trip-lever with the gage-screw *g*. The frame A of this machine is made of wrought or cast iron or any suitable material in sections and slotted inside for the reception of levers and other intermediate parts. On one side are any convenient number of stands or pedestals *b*. On the top of these pedestals are boxes, in which short shafts B run with cog-wheels. On the ends of these short shafts are fitted circular

saws 5. Each outside stand has a piece of iron fastened on its outer side and projecting outward, serving as boxes for a counter-shaft C, which is about three feet long. On this counter-shaft are fitted other cog-wheels, which gear into the aforesaid cog-wheels on the said short shafts. On the counter-shaft are two pulleys D D—one tight and the other loose. The machine is driven by means of band and the tight pulley at the rate of about one hundred revolutions per minute. To each of these saws is applied an apparatus for producing the required motions for nicking the blanks for the screws, the construction of which apparatus is as follows: E represents a plate of iron adjusted and fastened to the frame with a bolt. One end of this piece of iron is throated out at *d* for the reception of a lever *e*. In a position nearly vertical at about one-third of the length from the upper end is a hole with a pin put through it for a fulcrum. On the upper end of this lever opposite to the saw is a round face-plate *f*, in which is drilled a set of holes of different sizes, in which the blank for the screw is placed for nicking. This face-plate has a rotary motion given to it by the hand of the operator when necessary to shift for different-sized blanks. This is done by slacking a nut *n* on the bolt that passes through the face-plate and the said lever *e*, to which it is fastened; or, instead of a bolt passing through the face-plate, a center may be turned, serving as a bolt by which it may be fastened. This lever is constructed with an ogee bend in it, so as to cause the face-plate to fall back from the saw against the punch *o*, by which the blank is removed from the face-plate for the reception of another blank, the punch being set on the end of said piece of iron E and bent forward in such a position as to force the end of the blank out of the face-plate. On the lower end of this lever is a screw *g*, which serves for a gage for determining the depth of this nick or score in the blank when put to its proper place and fastened with a stop-nut. Beneath the lever obliquely is a lever O^2 of the third order, one end whereof is attached to the floor or frame by a hinge or joint, as may be most convenient, and the other end is elevated to an angle of forty-five degrees, bearing on a rest H, and in the upper end is a clip-catch *h*, in the form of a lever about three or four inches long, having the fulcrum about one inch and one-fourth from the lower end, the short end of which is widened and made concave on the under side. At the other end is placed a light spring 34, fastened on the upper side of the lever which is always bearing against the upper side of the aforesaid clip-catch, being thus arranged for the purpose of bringing it to its proper place. The clip-catch is raised and brought upon the gage-screw *g* by means of the lever H, which is depressed at the one end and raised at the other, bringing the end *i* against the under side of the lever O^2, by means of which connection of the catch *h* with the screw *g* the blank is borne up against the saw, and by another spring Q, which is attached to the before-mentioned lever O^2, bears the blank on the face-plate against the saw until the nick or score is deep enough. The clip-catch *h* then disengages itself from the gage-screw *g* and the clip-catch drops on the lever H beneath, where it rests till another blank is ready to be nicked. This trip-catch *h* has a trip motion, which it receives from the lever H. The lever H has a square turn or bend about the middle of it at K, where its fulcrum *k* is placed, and on the outer end of which lever there is a handle H^2, and on the lower end of said lever there is another bend *i*, made sidewise about three inches from the end. This passes under the lever O^2 opposite the clip-catch *h* and gives said catch its trip motion, so as to engage itself with the gage-screw *g* when the blank is required to be nicked. At the lower side of the face-plate a guide may be attached to conduct the blanks into a box when nicked.

This machine may be made to stand on legs or a bench, as may be most convenient, and it may be constructed with a greater or less number of saws, and its dimensions and proportions changed to suit the views of the constructer.

The machine for threading the blank, (see Figs. 6, 7, 8, and 9.)—In this machine we claim the manner of combining the gage 12, that operates the slide 22, containing the movable die *s s*, with the spindle 1, containing the jaws 7, and driver *x*, for holding and turning the blank by means of the lever 15 and lifting-rod 3 for simultaneously cutting the thread and giving it the required taper. The frame A is made of suitable size, strength, and material for containing and supporting the parts hereinafter to be described. On the under side of the upper string-piece D of the frame A gains or grooves are cut about nine inches distant from each other and corresponding gains are made in the upper side of the lower string-piece D. In these gains are inserted the uprights *f*, which are fastened by keys. These uprights are each about sixteen inches wide and two inches thick, the lower end of each being circled out of the center, as at *g*. On these uprights are fastened the machines for threading. In front, under these uprights, is arranged a trough, Fig. 30, running lengthwise of the frame and made tight, so as to hold liquids. In the inside of this trough are ways *i i*, made of iron or wood, on which the frames containing the dies for the threading rest. This trough is attached to the lower string-piece D. Beneath this trough are short posts E to each machine, through which a mortise is made for the reception of a lever *m*, which serves for a treadle. A vertical revolving spindle 1 works in an iron frame, which may be made of any convenient size; but the frame which we generally use consists of a bed-plate *o*, of

suitable length, breadth, and thickness, fastened to the uprights, as before mentioned, either by bolts or screws. Near each end of this bed-plate is an arm X, extending outward horizontally and parallel to each other, made of any convenient length. Near the ends of these arms are boxes *n*, let in by the front side and fastened by screws. On the front end of this bed-plate is a piece P, extending outward about two inches, being of the same thickness as the bed-piece, having a hole drilled through the outer end to receive a pin *v*, serving as a fulcrum to the lever 15. On the middle of this pin is turned a collar, one side of which sets against the projecting piece, and on the ends of the pin are screw-nuts, one of which confines the pin to the frame and the other keeps the lever in place. On the upper side of the bed-piece O, a little below the central point between the said two arms is another piece W, extending outward horizontally about two inches long, through the end of which a hole is drilled vertically, through which the top of the lifting-rod C^3, hereinafter described, works, which lifting-rod also passes through a hole made vertically in the lower arm. The said spindle 1 is about two feet two inches long. On the upper end of the spindle is a journal *q* about four inches long. Between the said arms, commencing at the upper journal, the spindle is one inch in diameter for ten inches of its length. Near the journal, at the upper end, are a tight and loose pulley 16 and 17, the upper pulley 16 being tight and the lower one loose, the remaining part of said spindle being five-eighths of an inch in diameter. On the lower end of the spindle is inserted a screw-driver *x*. Beneath the lower arm X of the frame, on the lower part of the spindle, a spiral spring *t* is wound around the spindle, bearing at its lower extremity and acting on a wedge 5, while the upper end of the said spiral spring acts against a collar on the spindle or a pin passing through it, which gives it more or less stiffness, as required. This wedge, before mentioned, is of the shape of the frustum of an inverted cone bored through vertically, in order that it may slide up and down on the spindle, according as the spiral spring is compressed or extended. 77 represents two small curved levers, the concave sides being toward each other and turning on pins 88 as fulcrums, the levers being placed between two cross-bars, which are fastened to the spindle. These cross-bars may be made separate and boxed into each side of the spindle, and through their centers a screw or rivet may pass to secure them; or, if the bars be made together, then let a hole be drilled through the center of a piece of iron or steel of suitable size or length and let the spindle pass through this hole and be fastened by a set-screw. The ends of this piece of iron or steel are throated out for the reception of said levers, and near the ends of said piece holes are drilled, in which pins are inserted for the fulcrums to the said levers. This is done whether the cross-bars are made separate or together. These levers are so constructed that the extremities of their lower arms constitute a pair of jaws or nippers, between which the head of the screw is held during the process of threading, while the extremities of their upper arms are constantly made to press firmly against the conical wedge just described by means of the curved spring 9, attached to these arms. These jaws are closed by means of the downward motion of the conical wedge forcing the upper extremities of the levers apart, and they are opened as the wedge slides upward by the contraction of the curved spring 9. 3 represents the said lifting-rod playing up and down through said orifice or holes in the frame above, while below it is inserted into one end of the cross-head 4, to which it is fastened by means of a set-screw. The other end of this cross-head is throated out and let into a groove cut into the upper part of the conical wedge before described. 15 represents a lever turning on the aforesaid fulcrum *r* and moved by the foot of the operator, it being connected with said treadle underneath the frame by means of a connecting-rod 33.. This lever is attached to the lifting-rod by a small crank 11, the upper extremity of which in the rise and fall of the lever performs a slight curvilinear motion, the crank being made of two separate parts. The upper part passing through the lever is in the shape of a knee at an angle of ninety degrees, the other part being a collar through which the lifting-rod passes. The two parts are connected by a set-screw passing through the knee part and also through the collar and setting or screwing against the lifting-rod 3. As the lever 15 is raised by means of the treadle *m*, the lifting-rod 3, by its connection with the cross-head 4, draws the conical wedge 5 upward. This motion, in consequence of the stiffness of the spiral spring *t*, raises the whole spindle until it presses strongly against the stationary spindle-bar 2, when by increased pressure on the treadle *m* the contraction of the spiral spring allows the conical wedge to slide upward on the spindle. This upward slide of the wedge occasions the opening of the jaws for the reception of the blank to be threaded. The pressure being then partially removed, the spiral spring extends itself and drives the conical wedge downward, so as to close the jaws firmly on the screw, while a weight 10, attached to the lever, presses the spindle down, at the same time causing the shifting of the pulley-band from the loose to the tight pulley 16. The spindle being thus put in motion at a speed of from twelve to fifteen hundred revolutions per minute and its downward motion continuing, the pressure of the foot is gradually lessened until the screw reaches a pair of cutting-dies *s s*, when it is entirely withdrawn. The distance to which the spindle descends is determined by a gage *y*, attached to it near its upper extremity. This gage regulates the distance

of descent by resting on the upper side of the upper arm X, since it is so constructed as to admit of being fastened by a set-screw to the spindle in any position that the length of the screw may require. The said weight 10, attached to the lever 15 and bearing down the spindle 1, is made to slide on the lever, being set to any convenient position on the lever by a set-screw, or a weight may be attached to the lever in any other manner to suit the views of the operator, and if more convenient it may be carried down by a spring. When the threading of the screw is completed, the spindle is restored to its former position by renewing the pressure on the treadle *m*, and the jaws 77 being opened, as before, the screw is removed. The tapering form of the screw is determined by a wedge-shaped gage 12, attached to the gage-rod, which has a vertical motion in consequence of its connection with the lever. When the spindle is raised up for the reception of another screw 15, the gage-rod is also raised and kept to its proper place by means of a spring S. This gage 12 is of a wedge shape, being widest below. It acts in giving taper to the screw by adjusting or varying the distance of the dies *s s* from each other during the process of cutting the thread through the medium of the slide 22, moving in the stationary frame V. This stationary frame V is fastened inside of the trough 30 so as to be partly in the liquid with which the trough is filled and resting on the ways *i i*, before mentioned. The frame is of iron, about eight inches square, and so constructed as to be on the inside about six inches by three inches. The said slide 22 works on ways in the inside of the frame. The dies are round and work on centers, and the centers are screwed through the side of the said frame, at one end of which is placed a stationary die *s*. The other die *s* works on centers screwed through the said slide. The slide is governed by a set-screw *t*, passing through the back side of it, the head of which said screw bears against the wedge-gage 12, so as to give the taper.

The above-described machinery for making screws may be all geared together and operated simultaneously by the same power.

What we claim as our invention or improvement, and desire to secure by Letters Patent, is as follows:

1. In the machine for paring the head of the screw, the combination of the two levers C and K with the spring *r*, by which the blank is removed from the jaws of the spindle after the paring of the head is completed, as above described and set forth.

2. In the machine for nicking or scoring the screw, the lever *e*, to which the face-plate *f* is attached, in combination with the lever O^2 and trip-lever *h*, for the purpose and in the manner described, and these thus combined in combination with the lever H for re-engaging the trip-lever *h*, as described.

3. In the machine for threading the screw, the manner of combining the gage 12, that operates the slide 22, with the spindle 1 by means of the lifting-rod 3, in manner substantially as described.

SIMEON BROOKS.
WILLIAM N. CLARK.

In presence of—
ELY WARNER,
JONATHAN WARNER.