W. VAN ANDEN.

MAKING WOOD SCREWS.

No. 6,218. Patented Mar. 27, 1849.

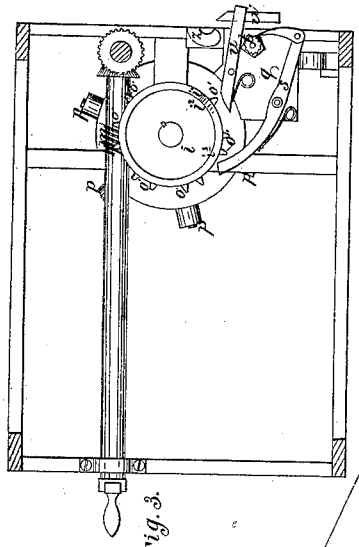

Fig. 3.

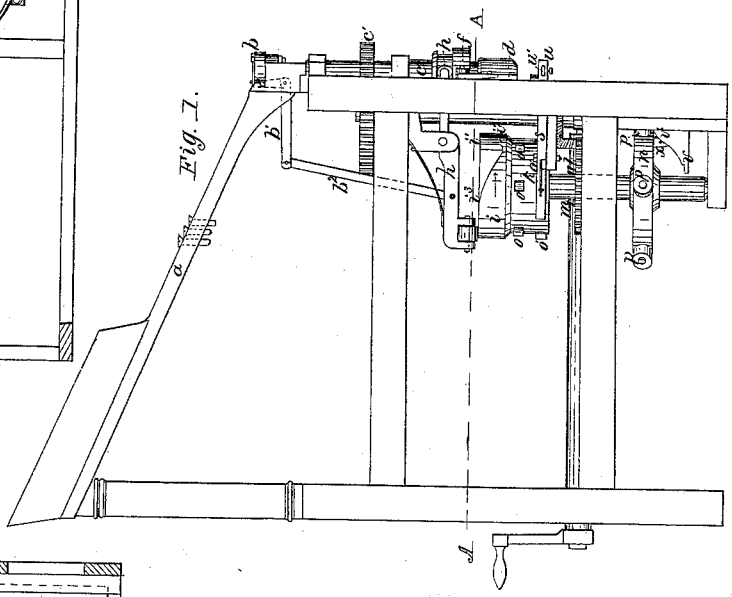

Fig. 1.

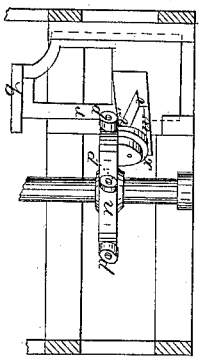

Fig. 6.

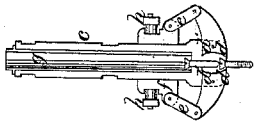

Fig. 4.

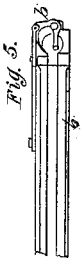

Fig. 5.

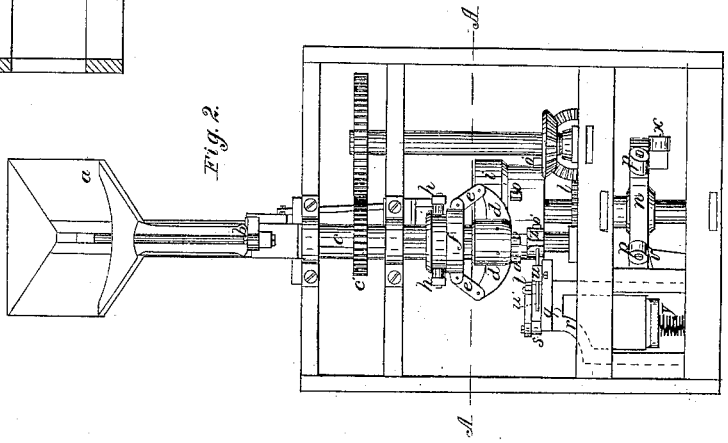

Fig. 2.

UNITED STATES PATENT OFFICE.

WILLIAM VAN ANDEN, OF TRENTON, NEW JERSEY.

IMPROVED FEEDER AND NIPPERS FOR SCREW-CUTTING MACHINERY.

Specification forming part of Letters Patent No. **6,218**, dated March 27, 1849.

To all whom it may concern:

Be it known that I, WILLIAM VAN ANDEN, of Trenton, in the county of Mercer and State of New Jersey, have invented a new and Improved Machine for Threading Screws; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal elevation. Fig. 2 is an elevation of the front end. Fig. 3 is a plan taken through the line A A. Fig. 4 is a section of the tube and grippers. Fig. 5 is a plan of the delivery catch or escapement. Fig. 6 is an inside elevation of the sliding table and the cam-wheel *n*.

Similar letters refer to similar parts throughout all the figures.

The nature of my invention consists in the construction of a machine for the purpose of cutting or chasing the threads upon bolts or "blanks," as they are termed, by means of which they are turned into screws of various kinds.

At *a* is seen a conveyer for feeding and conveying the blanks to be threaded from the place where they are deposited on the machine to the tube, to which it is connected at its lower end. This conveyer consists of a hopper, with two arms extending from its under side, sufficiently long to connect the front and rear ends of the frame. A slit is cut in the bottom of the hopper, which runs its whole length, including the arms, thus dividing them into two parts. The width of the slit is such as to admit the body of the blank into it, but not the head, so that when a quantity of blanks are thrown into the hopper those at the bottom fall through the slit as far as the head, and are suspended there in the manner seen at *a*, Fig. 1. The conveyer is next set upon the frame at an angle so much inclined as to cause the blanks to slide from the hopper (which is the most elevated) along the arms toward the end. By this means the blanks arrive at the head of the tube in a vertical position, as is necessary in order to be dropped into it at the proper time. The slot in the conveyer also serves to detect blanks with imperfect heads, as should any such be thrown into the hopper they will fall through onto the floor. At the foot of the conveyer, and immediately over the mouth of the tube, there is a small instrument, *b*, Figs. 1, 2, and 5, or check for preventing the blanks from falling into the tube, except in a certain given time and order. It consists of a semicircular piece of metal having one end pointed. The two ends face the slot in the conveyer, which has a pin through th center, upon which it can vibrate. A top view is seen in Fig. 5. The vibratory motion is given by a connection of levers, *b'* and *b''*, with another part of the machine, to be hereinafter described. Each time this check vibrates it permits a blank to escape from the slot of the conveyer and drops into the tube, and this vibration is so regulated that a blank falls into the tube at the same moment that a finished screw is delivered from the bottom.

At *c* is seen the tube, or, rather, tubes, with their appendages for receiving, holding, and delivering the blanks and screws. In Fig. 2 a front outside view is given, showing the manner in which it is suspended on the frame. It is held in its place by two journals, the caps of which set up by screws to allow of the proper play of the tube. Between the journals there is a pinion-wheel, *c'*, which meshes into a spur-wheel, from which it receives a rotary motion. The outside shape of the tube is that of a straight pipe, with the exception of the grooves for the journals. At its lower end an enlarged head is put upon it, and through the side of this head a slot is cut to receive a pair of grippers, *d d*. The ends of the grippers, which are inserted in the jaws, are hollowed out on the face, so as to leave the upper and lower corner, *d* and *d'*, sharp. Each gripper has a fulcrum in the slot. The grippers taper at their outer ends, and are connected by two plates, *e e*, to a ring, *f*, which is placed upon the tube and which revolves with the tube.

Although the ring *f* revolves with the tube, it is not permanently fastened to it, but may slide up and down upon it. When this ring is made to slide up and down upon the tube, which it does at certain intervals by means of parts to be hereinafter more fully described, it causes the gripper to open and close alternately above and below. Thus when the ring is pressed down it shuts the lower jaw, *d*, of the grippers and opens those of *d'*, as seen in Fig. 4. There is likewise within the large tube a second tube, *g*, which latter tube is stationary, being secured to the conveyer at the top. The upper part of the ring *f* has a groove

cut around it for the purpose of receiving the ends of a forked lever, *h*. This lever has its fulcrum in a brace inside of the frame, and the opposite end plays upon the disk of a revolving cam, *i*, a friction-roller intervening to lessen the friction of the parts. A spring presses the lever always hard down upon the disk. The check *b* is made to operate by this lever by means of its connections through *b'* and b^2. A vertical shaft rises up near the center of the frame, upon the head of which is placed a drum, *k*, the upper circumference terminating in a cam-ring, *i*. Beneath the drum there is a toothed wheel, *l*, by means of which rotary motion is imparted to the shaft through its connection with the spiral wheel *m*, placed upon the main driving-shaft. Beneath this there is a plain wheel, *n*, upon whose circumference five friction-rollers, *p*, are placed, and one other, *x*, beneath the wheel near the edge. Around the side of the drum *k* there are inserted two rows of short beveled pegs, *o o o* and *o' o' o'*, consisting of five pegs in each row. The row of pegs *o o o* is placed directly over the friction-rollers *p p p*, and are of the same number, and the pegs *o' o' o'* are in the intermediate spaces, distant midway from each. The cam *i* consists of a ring with one gap cut in its upper edge. The gap has one side cut vertical from i' to i^2, and one side, from i^2 to i^3, presents an inclined edge, as seen in Fig. 1. This cam operates the grippers *d d* and the escapement or catch *b*. All these several wheels, &c., placed upon the vertical shaft are permanently attached to it and revolve with it. The pegs upon the drum *k* give a vibratory motion to the chaser for threading the screws, and the rollers *p* give the up-and-down motion to the same. The chaser and its appendages are placed upon a table, *q*, secured to the top of a sliding frame, *r*, which plays in grooves in the head of the frame and near to the screw-tube *c*.

On the table *q* there is a lever, *s*. One end has a pawl attached. The other end extends out to the drum *k*. The pawl plays in a small ratchet-wheel, *t*, which has ten teeth cut upon it. Beneath the ratchet-wheel and affixed to it is seen a small pentagon or five-sided piece of metal. Immediately in front of the pentagon is the chaser-rest *u*, with its center on the table *q*, and a spring pressing it constantly against the sides of the pentagon. The chaser *v'* (a tool of hardened steel) is placed in the end of the rest, with its front directly under the lower mouth of the tube.

On the inside of the frame *r*, Fig. 6, there is a cam having two faces, one face of which is inclined as seen at *v v'*, and one is straight, *w*. The inclined face of the cam is for the purpose of giving the up-and-down motion to the chaser by causing the table *q* to rise and fall as the rollers *p* pass over it, and the level part is for the purpose of holding the table for a short space in a stationary position, and this is accomplished by means of a roller, *x*, set under the edge of the wheel *n*. The rollers *p* only cause the table to descend, for as soon as each roller leaves the inclined cam the table is thrown up again by a spring, *y*, Fig. 2. The barrel *k* as it revolves brings the pins *o* against the end of the lever *s*, and as each pin strikes the end of the lever it causes the pawl to play forward one notch of the ratchet *t*, each notch of the ratchet advancing the pentagon one-tenth of its circumference. Now, the chaser-rest *s* is constantly pressing against the face of the pentagon. So it will be seen that one notch will advance the pentagon from its present position, which is at the surface of one of its sides on the chaser-rest, to the next corner. This movement causes the chaser to be thrown forward a little; the next notch, being advanced, will bring another side of the pentagon to the chaser-rest and allow the chaser to spring back, and so on continually. The upper row of pegs, *o*, is to be set so as to cause a corner of the pentagon to act upon the chaser-rest, and the lower row, *o'*, to cause the face sides to come on. The lever *s* is enabled to reach these two rows of pegs by reason of the up-and-down motion of the frame and table *q*.

At the letter *z* there is a short post having a semicircular groove cut in it vertically. The post is so placed as to have this groove under the tube sufficiently near to allow the point of the blank to fall into it, and the groove is also opposite to the front of the chaser. The object of this groove is to afford a support to the blank while it is being operated on by the point of the chaser, and this keeps it steady and also vertical. All the movements are effected through the crank-shaft with suitable and well-known gearing, as seen in the drawings.

The operation is as follows: A number of blanks are thrown into the hopper of the conveyer *a*. The bottom ones fall through the slot and slide down the same, suspended by their heads, as seen at *a*, Fig. 1. Thus a row extends the whole length of the arms from the escapement *b* up to the hopper. The first one is kept back by *b* from falling into the tube. The whole is now set in motion by the crank seen in the figure. As soon as the cam *i* and incline i^2 come round to the pulley on *h*, the latter is forced into it by the spring, which movement causes the connection b^2 and *b'* to open the check *b* and allow one blank to fall into the tube. This movement of the lever *h* is also extended to the grippers *d*, as the descent of the wheel into the mouth of the cam causes the opposite end to rise and carry up with it the ring *f*, which opens the lower jaw of the grippers *d d*, Fig. 4, and closes the upper, *d' d'*. By this means the finished screw is permitted to fall out, while the blank just dropped in is prevented from falling out by the contraction of the upper jaw, *d'*. The cam, continuing its rotary motion, causes the wheel on *h* to ride up on the surface of the ring by the incline i^2 i^3. This gradually shifts the ring *f*, by lower-

ing it down again, thus opening the upper jaw, d', sufficiently to permit the blank to drop through, while the lower one is so far contracted as to catch it at the head. When the friction-wheel on the lever h is finally on the top of the cam-ring, the grippers $d\,d$ have been brought firmly down upon the blank. As these operations are going on, the tube c has a continuously-rapid rotary motion, while the cam-ring i has a slow one, gaged to a certain comparative speed with the tube. The instant that the blank is gripped in the lower jaw, d, a peg, o, strikes the lever s and operates the ratchet t, throwing a corner of the pentagon on the chaser-rest, and that advances the point of the chaser up against the side of the blank. The chaser is now drawn down by the operation of the roller p running upon the inclined plane $v\,v$. This makes a spiral cut upon the blank. As the frame r is brought down, a peg, o', strikes the lever s and throws the side of the pentagon on the chaser-rest, thus drawing the points of the chaser away from the blank, while it is sent up to the top to take another cut, as before described. Thus while one revolution takes place in the vertical shaft the chaser is made to traverse the blank five times, and the screw is finished at the instant that the lever h is about to drop into the gap $i'\,i^2$, and discharge the screw and take another blank into it. The wheel x now comes upon the horizontal part of the cam w and arrests the upward ascent of the frame, thus keeping the chaser stationary while the finished screw is discharging and a blank is being replaced. The space this wheel x traverses is equal to the distance $i^2\,i^3$ of the cam i, so that the moment the grip has been taken upon the blank by the lower jaw, $d\,d$, the wheel x has cleared the cam, and the wheels p commence their operation as before. Thus the chaser is made to traverse the side of the blank five times for the purpose of forming the thread upon the blank, which is performed by one revolution of the cam i and those other parts attached to that shaft. Each revolution of the cam i therefore produces a finished screw, discharges it from the machine, and takes another in its place, to be finished in like manner, and thus performing all the operation within itself.

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

1. The permanent vertical feeding-tube or shaft extending from the top of the frame down to a point near the grippers, in combination with the revolving tube c and grippers d, whereby I am enabled to feed the blanks directly through the said tube on the grippers without imparting rotary motion to them until they reach the jaws of the grippers, thereby insuring perfect regularity in the feed, as described.

2. The peculiar construction of the grippers in respect to the double action of the jaws, whereby but one screw-blank can enter, be held, and discharged at a time, although a series of the said blanks may fill the entire length of the stationary feeding-tube, the whole operating substantially as set forth herein.

WILLIAM VAN ANDEN.

Witnesses:
J. L. KINGSLEY,
W. BECK.