Sheet 1-3, Sheets

T. W. Harvey,

Heading Wood Screws,

No. 149, Patented Mar. 25, 1837.

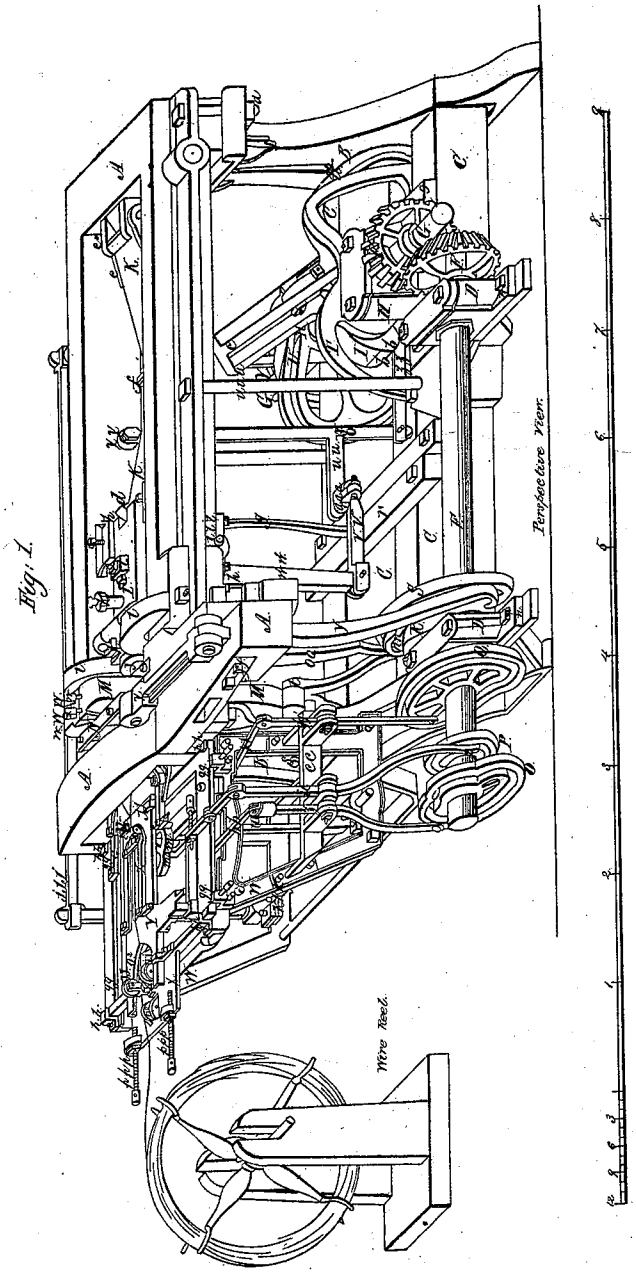
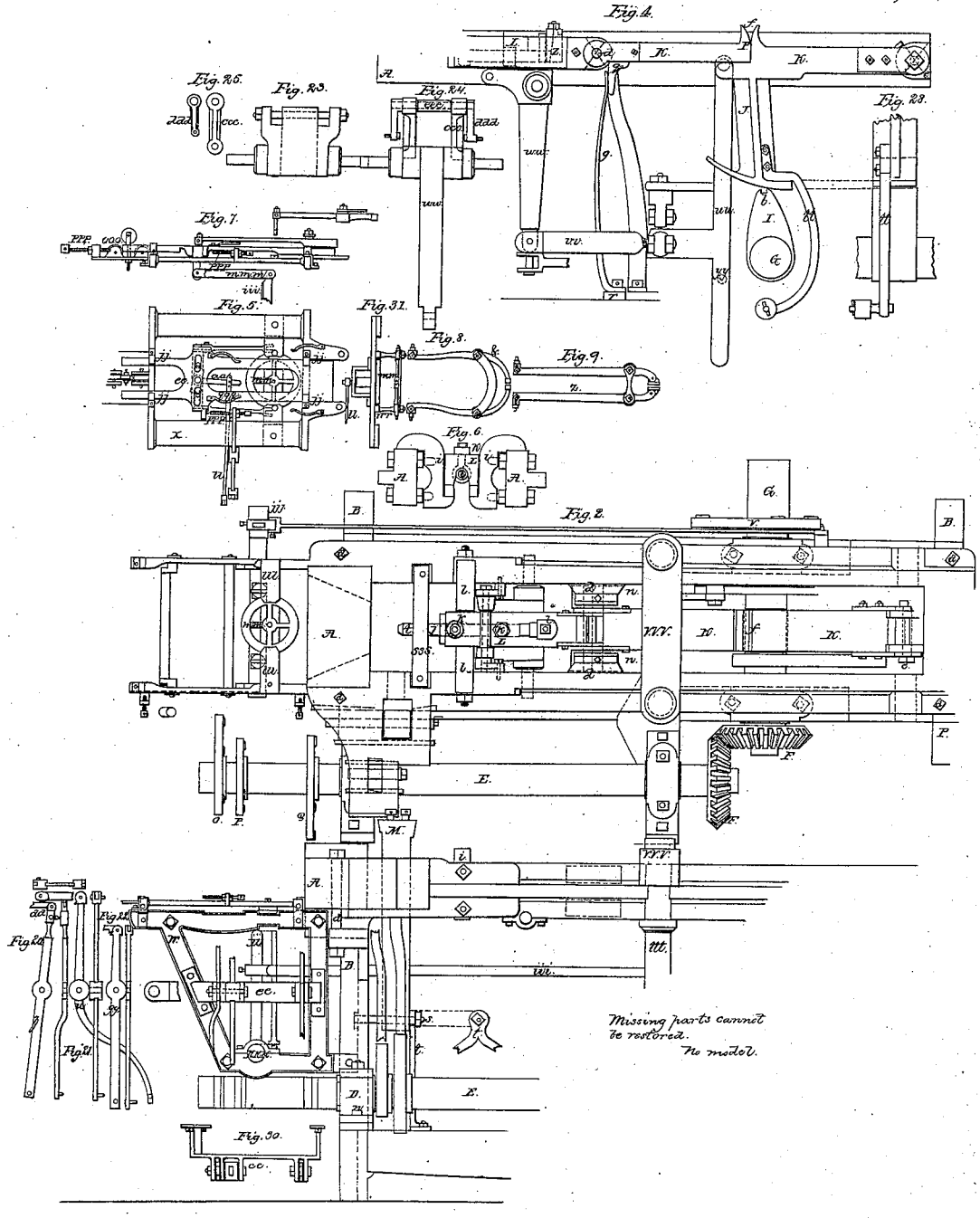


Fig. 1.

T. W. Harvey,

Heading Wood Screws,

No 149, Patented Mar. 25, 1837.



Sheet 3-3 Sheets.

T. W. Harvey,

Heading Wood Screws,

No. 119, Patented Mar. 25, 1837.

Fig. 14.

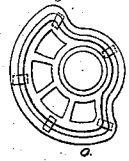


Fig. 13.

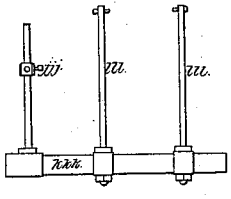


Fig. 15.

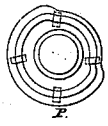


Fig. 16.

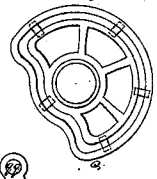


Fig. 17.

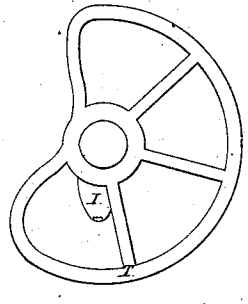


Fig. 18.

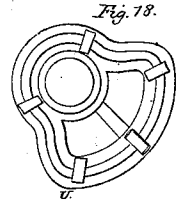


Fig. 12.

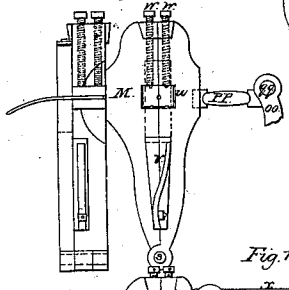


Fig. 10.

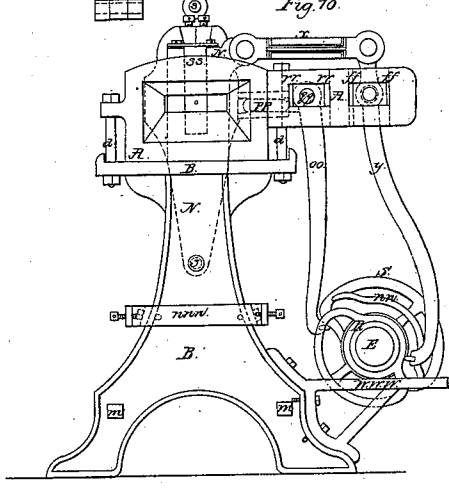


Fig. 11.

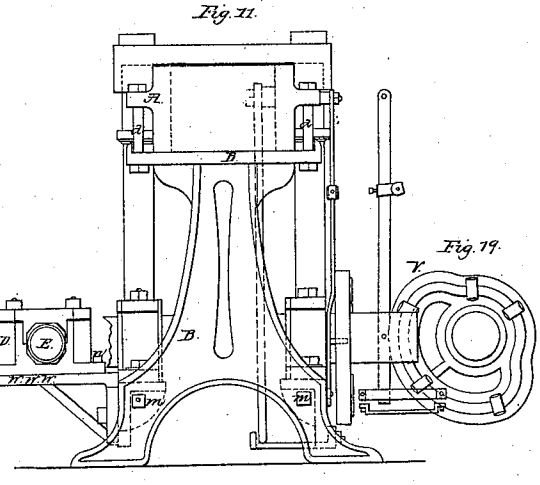


Fig. 19.

UNITED STATES PATENT OFFICE.

THOS. W. HARVEY, OF POUGHKEEPSIE, NEW YORK.

MACHINE FOR CUTTING AND HEADING WIRE FOR THE MANUFACTURE OF WOOD-SCREWS.

Specification of Letters Patent No. 149, dated March 25, 1837.

To all whom it may concern:

Be it known that I, THOMAS W. HARVEY, of Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and useful improvement in machines for cutting and heading wire for the manufacture of screws commonly called "wood-screws," and which may also be applied to the heading of rivets, &c.; and I do hereby declare that the following is a full and exact description of the construction and operation of the said machine as invented by me, reference being had to drawings annexed.

The letters of reference employed in the following description identify the same corresponding parts of the machine in the different figures in the drawing there being one perspective view of the whole machine and thirty-one sectional figures illustrating it. The size of all the parts are given by the scale of inches. The machine here described is of the largest size which I have used. I employ two of less size, but they are in all respects similar in construction.

Explanation of the drawing.

Figure 1, shows a perspective view of the machine. Fig. 2, shows a top view of most of its parts. Fig. 3, shows a side view giving the location of certain parts. Fig. 4, shows a side view of toggle joint, piston, lifting arm, counter cam arm, heading punch, &c. Fig. 5, shows a top view of the moving part of feeding table giving the situation of tightening cams and straightening rollers, check screws, &c. Fig. 6, shows a cross sectional view of piston, heading punch, yoke screw, guides for piston and their adjusting screws. Fig. 7, shows a side view of the moving part of feeding table with the feeding tongs attached and showing the connection with the rock shaft that moves them. Fig. 8, shows a top view of the hold fast tongs. Fig. 9, shows a top view of the feeding tongs. Fig. 10, is an end view, showing the arrangement of the cutting lever and grip lever with their bearings, connection with the cams and with the cutter and die clamps. Fig. 11, shows a reversed end view, showing the situation of the feeding cams, the fastenings of the top part of frame piece with the stand, &c. Fig. 12, shows a side and edge view of the die clamps showing the spring which opens them and the connection between the grip lever. Fig. 13, shows the arms of the rock shaft for feeding. Fig. 14, shows a side view of the cam operating on the tightening cam of feeding tongs. Fig. 15, shows a side view of the cam which gives the transverse movement to the feeding table. Fig. 16, shows a side view of the cam operating on the tightening cam of hold fast tongs. Fig. 17, shows a side view of the counter cam to main cam and its position to said cam. Fig. 18, shows a side view of the cam which lifts the piston. Fig. 19, shows a side view of cutting cam. Fig. 20, shows a side and edge view of lever for tightening the feeding tongs. Fig. 21, shows a side and edge view of lever giving the transverse movement to feed table. Fig. 22, shows a side and edge view of lever for tightening the hold fast tongs. Fig. 23, shows a top view of lifting arm to raise the piston. Fig. 24, shows an end view of lifting arm showing the connecting bars and rollers on top of piston. Fig. 25, shows a shackle bar connecting the lifting arm with the frame piece. Fig. 26, shows a shackle bar connecting the lifting arm with the top roller on piston. Fig. 27, shows a cross section of the piston. Fig. 28, shows an end view of the arm of counter cam of toggle joint. Fig. 29, shows the box and guides for the part of the piston where it connects with the toggle joint. Fig. 30, shows the piece of casting forming the seat for the tightening lever, &c. Fig. 31, shows an end view of the tightening cam of hold fast tongs showing its bearings and fixtures and arm for moving it.

Fig. 1, A, A, A, A; Fig. 2, A, A; Fig. 3, A, A; Fig. 4, A; Fig. 6, A, A; Fig. 10, A, A; Fig. 11, A: Part of the frame work or superstructure of the machine fastened at the corners to stands B, B, by screw bolts at *a*, Fig. 1, *a*, *a*, Figs. 10 and 11, *a*, *a*, *a*, *a*, Fig. 2, and *a*, *a*, Fig. 3.

Fig. 1, B, B; Fig. 2, B, B, B; Fig. 3, B, B, B; Fig. 10, B, B; Fig. 11, B, B; Main stands or end pieces for the frame.

Fig. 1, C, C, C, C; Fig. 3, C: Side rails bolted to stands B, B, shown at *m*, *m*, Fig. 10, and *m*, *m*, Fig. 11, which rails constitute

the base for the plumbing boxes, H H, and D, D, Fig. 1.

The above parts constitute the superstructure of the machine.

Fig. 1, D, D; Fig. 3, D, D; Fig. 11, D: Plumber boxes for side shaft E bolted to side rail C C, by the screw bolts at *n*, *n*, Figs. 1, 3, and 11.

Fig. 1, E; Fig. 2, E; Fig. 3, E; Fig. 10, E; Fig. 11, E: Side shaft resting on plumber boxes D D and connected with main shaft G, by bevel gears F, F, Figs. 1 and 2.

Fig. 1, F, F; Fig. 2, F, F: Bevel gears equal size.

Fig. 1, G, G; Fig. 2, G; Fig. 3, G; Fig. 4, G: Main shaft resting on plumbing boxes H H, Fig. 1, and H, Fig. 3.

Fig. 1, H, H; Fig. 3, H: Plumber boxes for main shaft resting on side rails C, C, C, C, Fig. 1, and fastened by screw bolts at *o*, Fig. 1, and *o o*, Fig. 3.

Fig. 1, I; Fig. 4, I; Fig. 17, I: Main cam on shaft G working against the stop J. Said cam is cast solid on the shaft having a rub steel at *b*, Figs. 1 and 4.

Fig. 1, J; Fig. 4, J: The stop or lower part of toggle joint which we some times cast separate and fasten as at *c*, Fig. 1, but more commonly solid as shown in Fig. 4.

Fig. 1, K, K; Fig. 2, K, K, Fig. 4, K, K: Toggle joint connected to piston L by joint pins as at *d*, Fig. 1, *d*, *d*, Fig. 2, and *d*, Fig. 4, and to the frame by joint pin *e*, Fig. 1, *e e*, Fig. 2, and *e*, Fig. 4. These joints are all made with rub steel, the pins also are steel hardened. The toggle joint works with open faces at *f*, Figs. 1, 2, and 4, guided by tooth *p*, Fig. 4, and kept together by spring *g*, Figs. 1 and 4, pressing against the projecting piece *q*, Fig. 4, and bolted to cross bar *r*, Figs. 1 and 4.

Fig. 1, L; Fig. 2, L; Fig. 4, L; Fig. 6, L; Fig. 27, L: Piston working in slides at *h*, Fig. 1, *h*, *h*, Fig. 2, and H, Fig. 29, at one end and between guides *i i*, Figs. 1, 2, and 6, and *i*, Fig. 3, which guides are regulated by temper screws as shown in Fig. 6. The piston contains the heading punch *j*, Figs. 1, 2, 4, 6, and 27, and is fastened by yoke screws *k k*, Figs. 1 and 2, and *k* Figs. 6 and 27, and regulated by screw key at *l*, Figs. 1, 2, and 4.

Fig. 1, M, M; Fig. 3, M; Fig. 12, M: Die clamps forming a joint on pin *s*, Figs. 1, 3, 10, and 12, which pin rests on stand B, Fig. 10, and stands *t* Figs. 1, and 3. Said stand *t* rests on side rail C, C, C, C, Fig. 1. Said clamps contain the dies *u* Fig. 12, and are held open by spring *v*, Fig. 12. Said dies are made four square and are drilled on all sides so as to form 4 sets of dies and are held to their place by screw pins *w w w w*, Fig. 1, and *w w*, Fig. 12, and correspond to the length of screw to be made. The figure at the left and opposite to Fig. 12 shows an inside edge view of one half of the clamps with the die placed in and shows the cavities for spring *v*, Fig. 12, also the cavities made to admit the heading punch to rise and fall in making short screw blanks.

Fig. 1, N; Fig. 10, N, N: Cutter resting on pin *s*, Figs. 1, 3, 10, and 12, and connected by shackle bar *x*, Fig. 10, to the cutting lever *y*, Figs. 1, and 10. Said cutting lever is regulated and secured in box by key *f f*, *f f*, Fig. 10, and *f f*, Fig. 1.

Fig. 1, O; Fig. 14, O; Fig. 2, O: Main tightening cam for feed tongs being an eccentric groove cam works the lever *z*, Figs. 1, and 20. The shackle bar *b b*, Figs. 1, and 5, has a swivel joint at *a a*, shown at Fig. 20. Said lever is attached to side stand *c c*, Figs. 1, 3, and 30. The shackle bar *b b* connects with the arm *d d*, Fig. 5, which moves the 2d tightening cam *e e*, Fig. 5.

Fig. 1, P; Fig. 2, P; Fig. 14, P: Eccentric groove cam giving the transverse movement to the part of feeding table *g g*, *g g*, *g g*, and *g g*, Fig. 1. Said part slides in guides *h h*, *h h*, *h h*, and *h*, *h*, Fig. 1, and moves precisely with the motion of the cutter N, Fig. 1, and N, N, Fig. 10, and gives a cross motion to the wire agreeing with said cutter. Said cam works lever *i i*, Figs. 1, and 21.

Fig. 1, Q, Q; Fig. 2, Q: Main tightening cam for hold fast being an eccentric groove cam and works lever *g' g'*, Figs. 1, and 22, which lever is attached by shackle bar *k k*, Fig. 1, to arm *l l*, Fig. 31, which arm is attached to and drives the 2d tightening cam *m*, *m*, Figs. 1, 31, 2, and 5.

Fig. 1, R; Fig. 10, R: Cutting cam being an open cam on the face except at *n*, *n*, Figs. 1, and 10, which is a shield or defender to bring back the lever working against a steel pin projecting on the back side of said lever at the bottom *s s*, Fig. 10, shows the cutting steel.

Fig. 1, S; Fig. 10, S: Open eccentric cam, working against the grip lever *o*, *o*, Figs. 1, 10, and 12, which lever swings on journal *q q*, Figs. 10, and 12, in a box regulated by key *r r*, *r r*, Fig. 10, and carries up the piece *p p*, Figs. 10, and 12, against the die clamp M, Fig. 10, which piece is hardened steel with its bearings.

Fig. 1, T; Fig. 17, T: Counter cam to main cam I, Fig. 1, an open eccentric working against the arm *t t*, Figs. 1, 4, and 28, and serves to bring down the toggle joint in rapid speed.

Fig. 1, U; Fig. 18, U: Lifting cam to raise the heading end of piston L; it is an eccentric groove cam, working the arm *u*, *u*, Figs. 1, and 4, which arm is swung on pivot at *x*, *x*, Fig. 1, attached to the frame piece A, and connected with cam by steel pin *y y*, Figs. 1 and 4, and held up to cam by the guide

z z, Fig. 1, which is fastened to side rail C. Said arm is connected by regulating screws to swivel joint arm *a*, *a*, *a*, Fig. 1, by the shackle bar *v*, *v*, Figs. 1 and 4, which shackle bar is attached to lifting arm *w w*, Figs. 1, 4, and 24, which lifting arm is attached to frame at *b′ b′ b′*, Fig. 1, and to shackle bar *c c c*, Figs. 24 and 26, which shackle bar is attached to roller *e e e*, Fig. 24, shackle bar *d d d*, Figs. 24 and 25. The other end is fastened by screw pin pivot to inside of frame on which the bar turns when the piston rises and falls.

Fig. 1, V; Fig. 2, V; Fig. 19, V: Feeding cam, an eccentric groove cam. The shackle bar *f f f*, Fig. 3, is worked by this cam, by pin g^2 g^2 g^2, Fig. 3, and swings on pivot at *h′ h′ h′*, Fig. 3, the shackle bar connected with arm of rock shaft at *j j j*, Figs. 13, 1, 2 and 3. This shackle bar slides up and down on arm *f f f*, and *j j j* to regulate the length of feed. The rock shaft *k k k*, Figs. 1, 3, and 13, has arms *l l l*, Figs. 1, 7, 13, and 2, connected by shackle bars *m m m*, Fig. 7, to the slide Y, Fig. 1.

Fig. 1, W; Fig. 2, W: Frame piece for feeding table and is attached to stand B at *n n n*, Fig. 10, and forms a base for the cross slide X Fig. 1, by the guides *h h*, *h h*, *h h*, *h h*, Fig. 1.

Fig. 1, X; Fig. 5, X: Cross slide of feeding table to which is affixed the hold fast tongs and Figs. 1, and 8, and the 2d tightening cam *m*, *m*, by the piece at Fig. 31; also the straightening rollers o^2 o^2 o^2, Figs. 7 and 5, and the check screws *p*, *p*, *p*, Figs. 5 and 7, which overcome the momentum of metal under quick speed.

Fig. 1, Y: Feeding slide working in guides *j j*, *j j*, *j j*, *j j*, Figs. 1, and 5, and to which the feeding tongs *z*, Figs. 1 and 9, are affixed, also the tightening cam is attached.

Fig. 1, Z; Fig. 9, Z: Feeding tongs thrown open by springs *q q q* Fig. 5, and fastened by the cam *e e*, Fig. 5, to the wire and having temper screws and rollers working against the cam as at *r r r*, Fig. 31.

Fig. 1 &: Hold fast tongs thrown open by springs and closed in the same way as above. *s s s*, Fig. 2, guide to hold the clamp up to cutter *t t t*, Fig. 3, a hollow pillar to sustan the frame and side rails by the bolt *u u u*, Fig. 1; *v v v*, Figs. 2 and 3, a piece to sustain the frame and keep it from spreading. *w w w*, Figs. 10, and 11, shows the manner of attaching the stands of the side shaft E.

Use and operation:

The wire is placed on the reel one end of which is passed along through the straightening rollers *o o o*, and then on between the feed tongs Z and hold fast tongs and through the steel of the cutter N, into the dies. The machine put in motion, the cam S works die clamp and grips the wire when the cam R works the cutter N and cuts the wire against the back die and closes up the die by the steel of the cutter passing by the hole of the die about ½ an inch at the same instant and agreeing with the motion of cutting, the cam P gives the transverse or cross movement to the feed table X which prevents crooking the wire between the hold fast tongs and cutter; next the heading punch and piston moves up by the action of main cam I, and strikes on the head; when the heading punch has retired a fourth of an inch the cam U raises the piston at the heading punch end of piston at the same time the cutter returns back and brings the wire opposite to the hole of the die and at the same time the spring V throws open the die clamp and relieves the screw blank in the die (the cam S having moved round in a manner to cease gripping the die) in the meantime and during the heading operation the cam Q having closed the hold fast tongs on the wire, and cam O having opened the feed tongs, the cam V thrown back, the feed tongs and brought the sliding piece Y against the temper screws *p p p*, the feed tongs again closed upon the wire, and the hold fast tongs open. When by the cam V acting on the rock shaft, brings forward the slide piece Y to the counter screw *p p p* with the feed tongs and of course brings forward the wire again into the die at the same time shoving and discharging the finished blank next before headed out of the die, when the piston falls ready to move up, and the hold fast tongs again grips the rim and the operation is continued as above described making a screw blank every revolution of the main shaft G. The shackle bar at J J J, is dropped down on the arm of the rock shaft and also at the other end on the arm *f f f* to lessen the length of the feed, and raised up to increase it; always turning the temper screws *p p p*, to correspond therewith, and to agree with the length of screw desired to be made; the length of the die is always the length of the screw when countersunk heads are made; when button heads or piano screws are made the die is the length of the body of the screw exclusive of the head; a cavity of the form of the head is sunk in the end of the heading punch. The screw key *l* in piston L always adjusts the heading punch—the same punch answering for a number of lengths of screws by substituting keys of different thickness immediately before the schew key; these keys are made of steel as is also the heading punch. It will be perceived either the feed tongs or hold fast tongs have constantly hold of the wire and consequently a uniformity in feeding is secured.

What I claim as new in this machine and desire to secure in Letters Patent is:

1. The construction of the die clamp and the manner of gripping the dies and of affecting the rise and fall of the piston.

2. The particular arrangement and construction of the moving parts of the feed table.

3. That part of the main toggle joint which differs from one described in a patent, granted to me for a machine for heading rivets and screws on the 29th of June 1833; in that machine, as therein described there was a joint to the step part at *c*, with an arm and spring back of the step. In this case the joint, back arm and spring are dispensed with, the back part of the toggle joint and the vertical piece and step J are one entire piece, this latter mode of constructing which I claim as new.

4. The particular construction and arrangement of the cutter.

5. And I also claim the general combination of the parts of the machine taken as a whole: for although many of the parts taken individually are not new yet the machine as herein described is sufficiently characterized by the arrangement of its respective parts, whether old or new, to distinguish it from others previously constructed for the same purpose.

THOS. W. HARVEY.

Witnesses:
GEO. N. MINER,
JAMES FROST.