2 Sheets—Sheet 1.

S. S. TOWNSEND.

MACHINE FOR MAKING NUTS.

No. 191,200. Patented May 22, 1877.

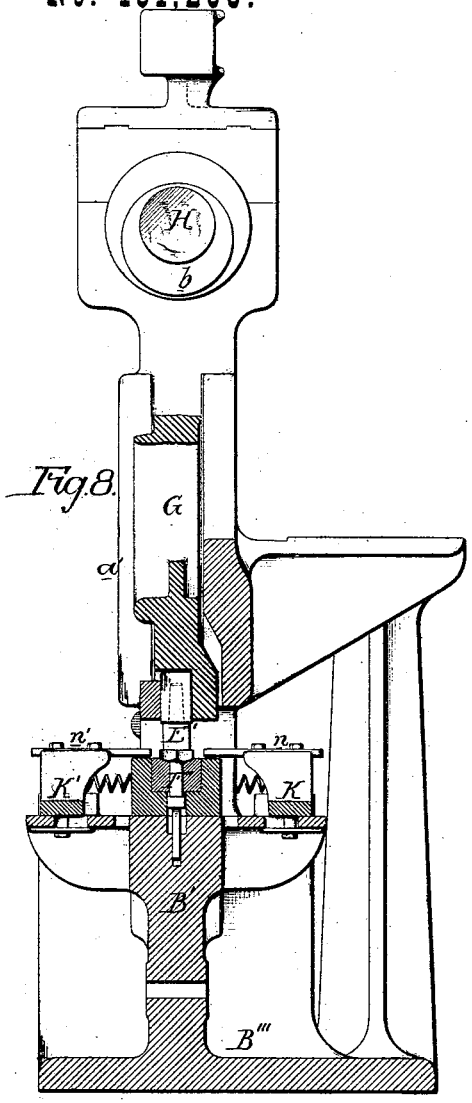


Fig. 8.

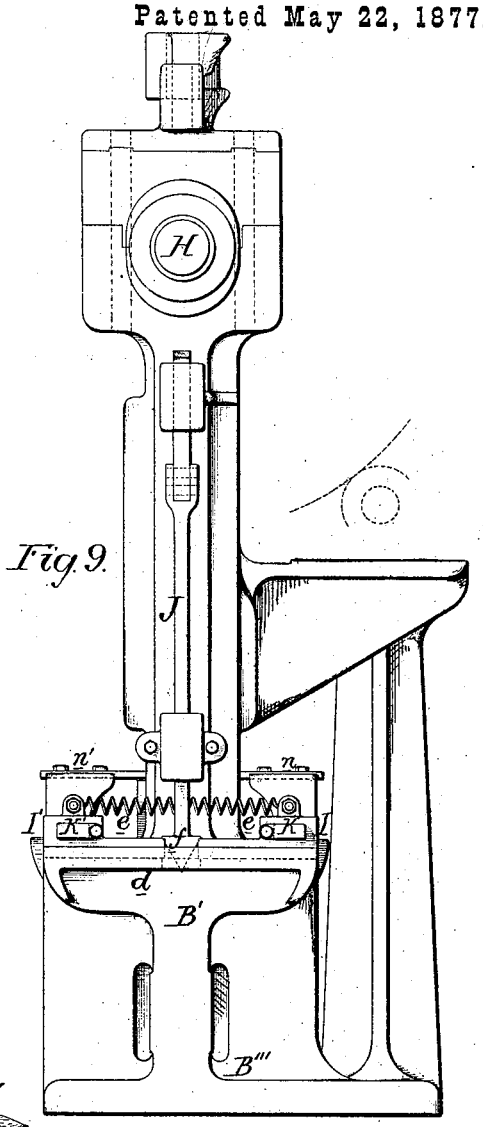


Fig. 9.

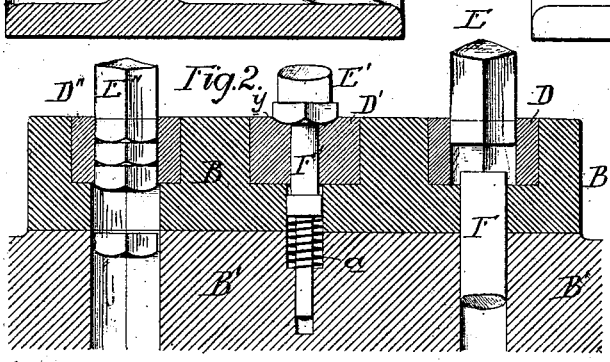


Fig. 2.

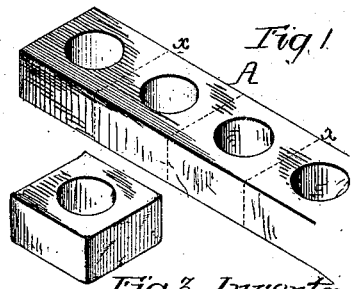


Fig. 1.

Fig. 3.

Witnesses
Hermann Mossner
Harry Smith

Fig. 5.

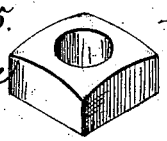
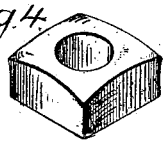


Fig. 4.



Inventor.
Samuel S. Townsend
by his attorneys,
Howson and Sons

2 Sheets—Sheet 2.

S. S. TOWNSEND.

MACHINE FOR MAKING NUTS.

No. 191,200. Patented May 22, 1877.

Fig. 6.

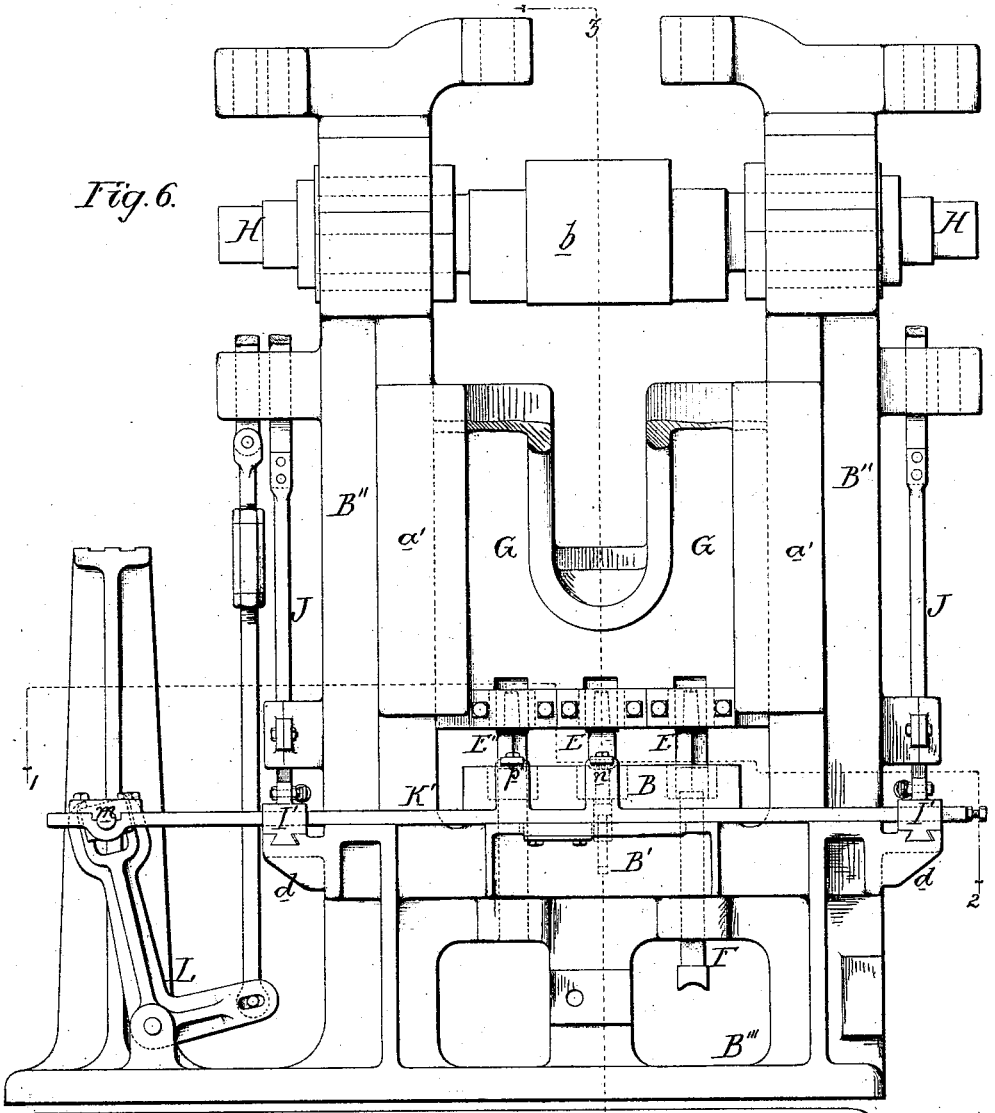
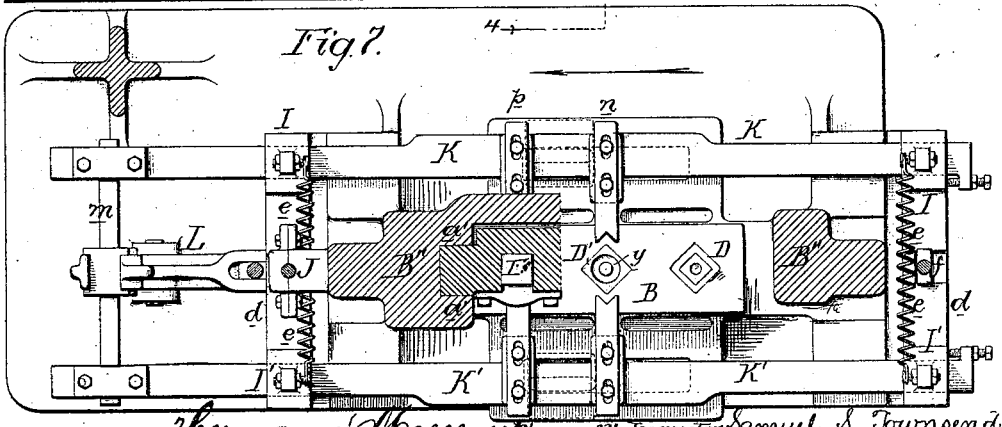


Fig. 7.



Witnesses
Hermann W. Boeckeler
Harry Smith.

Inventor Samuel S. Townsend
By his attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

SAMUEL S. TOWNSEND, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR MAKING NUTS.

Specification forming part of Letters Patent No. **191,200**, dated May 22, 1877; application filed November 24, 1876.

To all whom it may concern:

Be it known that I, SAMUEL S. TOWNSEND, of Philadelphia, Pennsylvania, have invented new and useful Improvements in Machines for Making Nut-Blanks, of which the following is a specification:

The object of this invention is to manufacture nut-blanks with rapidity and precision from punched bars of iron without heating the metal.

Before the machinery employed for carrying the invention into effect is described it will be well to explain the mode of manufacturing square nut-blanks, as illustrated by Figures 1, 2, 3, 4, and 5 of the accompanying drawing—

Fig. 1 being a perspective view of the punched nut-bar; Fig. 2, a vertical section (drawn to a reduced scale) of the dies, &c.; and Figs. 3, 4, and 5 perspective views of the nuts as they appear in different stages.

In Fig. 2, B is a block of wrought-iron properly secured to a bed, B′, and into recesses in this block are fitted and properly secured the three steel dies, D, D′, and D″, the upper surface of the dies being in the same plane with that of the block. A square reciprocating cutting-plunger, E, of the same size as the nut is adapted to the die D, in which also operates a reciprocating ejector, F.

In the top of the die D′ is made a concave recess, above which is the reciprocating pressure-plunger E′, a spindle, F′, being arranged to slide in the die D′, and a spring, *a*, having a tendency to force the spindle upward.

The third die, D″, has a square opening of the precise size of the nut to be produced, and above this opening is a square reciprocating plunger of the same dimensions.

Having selected a bar, A, of appropriate size, I punch in it holes of the desired diameter at proper intervals. The bar is distorted by this punching, the metal being made slightly concave at that side where the punch enters it, and the bar being distended laterally at the points where the holes occur.

The first operation is to place the nut-bar on the first die, D, while the cutting-plunger E is elevated, care being taken that the end hole of the bar be in proper position in respect to the opening of the die, a position which may be determined by appropriate stops or other appliances.

On the descent of the plunger E the four edges of the latter, acting in conjunction with the four edges of the opening in the die D, will sever the bar on the line *x*, and, at the same time, shave the three sides of the severed portion of the bar, which is thus converted into a crude quadrangular nut-blank, Fig. 3, the blank being forced into the opening of the die prior to being expelled therefrom by the ejector F.

While this crude nut-blank constitutes an article of manufacture which may be finished by different operations, I prefer to convert it into a completed blank by the following operations: Although the blank, Fig. 3, is made truly square by the first operation described above, its opposite faces are slightly irregular, one face being depressed, and the other slightly convex; hence the second operation performed by the combined action of the die D′ and pressure-plunger E′.

The crude blank, Fig. 3, is placed in the cavity *y* of the die D′, and the plunger E′, descending, subjects the blank to such pressure that one side is flattened and the other has the desired rounded edges imparted to it. (See Fig. 4.) As the pressure-plunger E′ rises, the spring-spindle F′ raises the blank above the cavity *y* of the die D′. If desired, both sides of the nut may be thus rounded at the edges by making a proper cavity in the upper as well as in the lower die.

The pressure thus imparted to the blank causes slight fins and protuberances on the sides of the blank; but these are removed by the last operation performed by the die D″ and plunger E″, the latter forcing the blank through the die, the edges of the opening in which shave off the fins, and complete the blank.

Fig. 6 is a front view of the machine by which the above operations are conducted; Fig. 7, a sectional plan on the line 1 2; Fig. 8, a vertical section on the line 3 4, Fig. 6; and Fig. 9 an end view.

G is a vertically-reciprocating cross-head adapted to guides *a′* on the standards or housings B″ B″, which are secured to or form a part of the bed B′ of the machine, this bed

being situated a short distance above the base B‴ of the frame-work.

To the under side of this cross-head are secured the above-mentioned plungers E, E′, and E″, and to recesses in the block B, secured to the bed B′, are fitted the above-mentioned dies D, D′, and D″.

The cross-head G is operated by an eccentric, *b*, on the main shaft H, which is adapted to suitable bearings on the standards B″ B″, and which is driven by any suitable system of gearing, the eccentric rod for connecting the eccentric with the cross-head being omitted in the drawing.

At each end of the machine is a projection, *d*, forming part of the bed B′, and each projection has a dovetailed groove for the two slides I I′, the latter being connected together by a spring, *e*, which tends to pull the slides toward each other, the movement of the slides apart from each other being caused by a wedge, *f*, at the lower end of a guided rod, J, which may be operated from the main shaft H of the machine, in a manner which it has not been deemed necessary to illustrate in the drawing.

A bar, K, is carried by the two slides I I, and a similar bar, K′, is carried by the two slides I′ I′, these two bars being reciprocated in the slides in the present instance from the shaft H through the medium of a cam and rod operating on a bell-crank lever, L, a bearing on the long arm of which embraces a spindle, *m*, the latter being adapted to bearings on continuations of the bars K K′, which can slide from and toward each other on the said spindle.

The bars K K′ are provided with adjustable jaws *n n′* and *p p′* adapted to the nut-blanks, the under sides of these jaws being very nearly in contact with the upper surface of the block B, which is in the same plane as the upper surfaces of the three dies previously referred to.

Two movements are imparted to the bars K and K′, one being a simultaneous intermittent reciprocating movement in the slides I I and I′ I′, the other being the simultaneous and intermittent reciprocating movement of the bars toward and from each other, this being caused by a like movement of the slides.

As it is immaterial what mechanism may be employed to actuate these bars, and as I do not desire to confine myself to any specific devices for that purpose, it will suffice to explain the manner in which the bars, with their jaws, automatically transfer the nut-blanks from one die to another.

As shown in the plan view, Fig. 7, the bars K and K′ have just completed their movement in the direction of the arrow, during which movement the jaws *n n′* have transferred a nut-blank from the die D to the die D′, and the jaws *p p′* have transferred another nut-blank from the die D′ to the die D″. The moment this transfer has been effected the three plungers E, E′, and E″ are brought into action, the plunger E severing a blank from the nut-bar and forcing the blank into the die D, the pressure-plunger E′ compressing another partly-finished blank against the die D′, and the plunger E″ operating on a third blank, and completing the same by forcing it through the die D″. The jaws had continued to gripe the blanks until the plungers had commenced to act on the same, but, when a proper action on the blanks had been assured, they had been released by the wedges *f f*, which forced the bars apart from each other.

After the nuts have been thus released, the bars K K′ move back in a direction contrary to that pointed out by the arrow, while they remain at the limit of their movement apart from each other.

When the bars K K′ have reached such a position that their jaws *n n′* coincide with the opening in the die D and the jaws *p p′* with the opening in the die D′, the said bars remain stationary until the ejector F of the die D has raised the crude nut-blank from the latter, and the spindle F′ has elevated the blank, which had been compressed against the die D′ by the pressure-plunger E′.

The under sides of the blank being now on a level with, or slightly above, the upper surface of the block D, and the cross-head with its plungers being elevated, the wedges *f f* are raised, and the springs *e* draw the slides I I′, and, consequently, the bars K K′, toward each other, so that the blank above the die D will be griped by the jaws *n n′*, and the blank above the die D′ by the jaws *p p′*, after which the bars K K′ are again moved in the direction of the arrow, Fig. 7, the blank above the die D being transferred to a position above the die D′, and that above the latter die to the die D″. When this transfer has been effected and the plungers have commenced to act on the blanks, and the plunger D to sever another blank from the nut-bar, the bars K K′ will release the blank and again move in the rearward direction, prior to a repetition of the above-described movements.

The bar may be severed into crude nut-blanks prior to the forcing of the same through the die; but the operation is much facilitated by severing a section from the bar simultaneously with the shaving of the sides of that section.

It will be evident that the above-described machine may be used for the manufacture of hexagonal nut-blanks, the griping-jaws and dies being made to accord with the desired blanks.

It has not been deemed necessary to illustrate or describe the mechanism for operating the ejector F, as different devices may be used for that purpose.

I claim as my invention

1. The combination, in a nut-machine, of the following elements, namely, first, a reciprocating plunger and stationary die

ing a crude nut-blank from a punched bar simultaneously with the shaving of the said blank; second, a chamfering plunger and die; third, a reciprocating plunger and stationary die for final shaving; and, fourth, transferring mechanism, substantially as described, whereby the above elements are made to co-operate, all substantially as set forth.

2. The combination of the bars K K′, having jaws *n n′* and *p p′*, with mechanism for imparting to them the two movements herein described, so as to operate in conjunction with the three plungers and three dies in the manner described.

3. The combination of the intermittently-reciprocating slides I I and I′ I′ with the intermittently-reciprocating bars K K′ adapted to the slides and having adjustable jaws *n n′* and *p p′*.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL S. TOWNSEND.

Witnesses:
HERMANN MOESSNER,
HARRY SMITH.