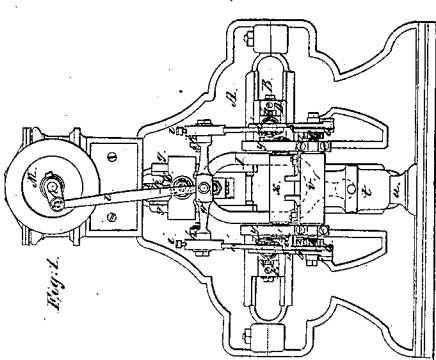
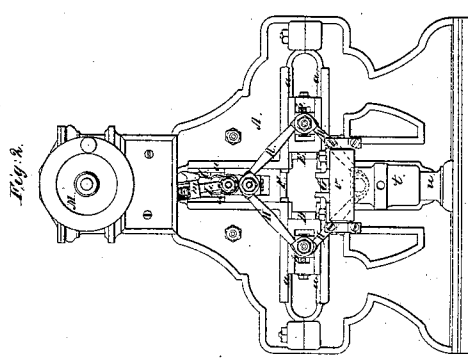
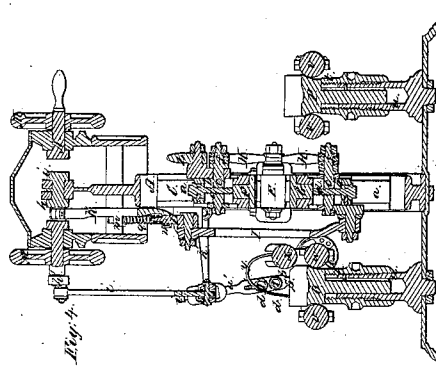
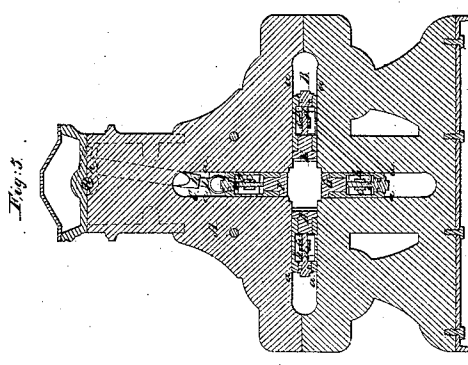
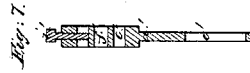
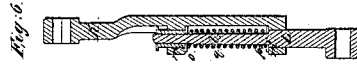
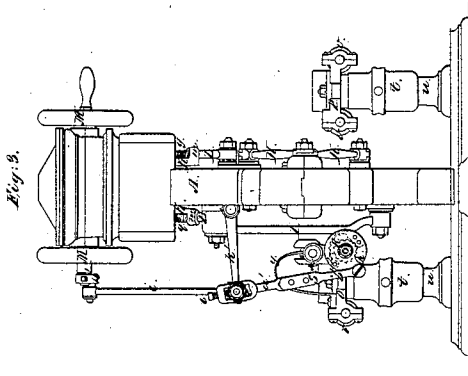


S.S. Putnam,

Making Wrought Nails,

No 12,961,

Patented May 29, 1855.



UNITED STATES PATENT OFFICE.

SILAS S. PUTNAM, OF BOSTON, MASSACHUSETTS.

FORGING-MACHINE.

Specification of Letters Patent No. 12,961, dated May 29, 1855.

To all whom it may concern:

Be it known that I, SILAS S. PUTNAM, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new or
5 Improved Forging-Machine; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, letters, figures, and references thereof.

10 Of these drawings Figure 1, denotes a front elevation of my said machine; Fig. 2, is a rear elevation of the same; Fig. 3, is a side elevation of it; Fig. 4, is a vertical central, and transverse section of it; Fig. 5, is
15 a vertical central and longitudinal section of it.

A, denotes the frame of the machine, such frame being perforated by two grooves B, C, which are arranged at right angles to one
20 another—one of them being horizontal, and the other vertical. Such grooves serve to sustain four hammers D, E, F, G, which are adapted to them respectively so as to slide freely within them, and so that either two
25 of each set D, E or F G, of such hammers, may be moved either toward or away from one another. In order that each hammer may move rectilinearly, it slides on two parallel guides, *a, a*, see Figs. 1, 4, and 5. Such
30 hammer is provided with a long slot, *b*, for the reception of a square bolt, *c*, which passes transversely through it and receives a screw, *d*, which is tapped into the square bolt, and is so applied to the hammer that when it
35 (viz., the screw) is turned either in one direction or the other, it shall move the hammer on the bolt, *c*.

The purpose of the two screws, *d*, of each set of hammers is to enable the distance between the striking faces of their hammers
40 to be changed, or made greater or less as occasion may require, the same being so as to adapt the hammers to the reduction of the piece of metal to a size in width or thickness as may be desired. The several bolts *c*, have
45 journals *f, f*, extended from them, each passing through two ends of two of four connecting rods, H, H, H, H, arranged with respect to one another as seen in Fig. 2,
50 the axes of such rods being disposed in the perimeter of a parallelogram. By means of such connecting rods, whenever two of the hammers are made to approach one another, the other two will be caused to recede from
55 each other. Under this state of things, it will be perceived that the momentum of the receding hammers will be brought into ac-

tion upon the approaching hammers so as to increase the effect of the blow produced by them when they are brought into contact
60 with a piece of metal extended between them.

I do not employ an anvil in my machine because when a piece of metal to be forged is placed thereon its top surface only receives the blow of the hammer and while such top
65 surface will be greatly compressed under such a blow, the lower surface of the piece of metal will receive little or no compression or reduction comparatively speaking.

My object has been to reduce a piece of
70 metal equally on both of its opposite faces, and consequently, I employ two hammers to accomplish such a result—and in order that the metal may be reduced on its four sides
75 or faces without undue or improper strain of its particles, I make use of four hammers or two sets of them, each set of them being made to operate alternately upon the metal. The lower vertical hammer, G, has a slotted
80 sliding frame I, affixed to it and made to extend upward as seen in Figs. 1, 3 and 4. The upper part of said frame slides on vertical, parallel, guides or ways, *g, g*, (extending from the main frame A) and is jointed
85 to a bell crank, *h*, by means of a connecting rod, K. Another connecting rod of a similar kind also connects another bell crank, *i*, with the upper hammer, F, as seen in Figs. 2 and 4, of the drawings. A driving shaft, N, arranged at the upper part of the frame, A,
90 carries the two bell cranks, *h, i*, and may have one or more fly wheels M, and be put in rotation by any suitable motor. Each of the connecting rods is so made as to enable it to have a double action. It is constructed
95 in two parts K, L, see Fig. 6, which is a longitudinal section of such rod. That part, K, which connects with a bell crank is formed with projections *m, m*, for the reception of the other part, L, which slides freely
100 through them and has arranged upon it two collars, *o, p*, and a helical spring, *q*, the latter being made to envelop the part, L, and to bear upon the collars. The collars respectively rest against the projections, *m, m*,
105 and shoulders, *r, s*, formed on the part, L, as seen in the drawings. The two parts K, L are so connected that when one of them, viz., L, is moved axially either upward or
110 downward it will be supported against the spring, *q*.

By the above mode of constructing the connecting rods, they not only permit the cranks to pass their dead centers when the

hammers are impinging upon a piece of metal which may be between them, but at the same time they impart to the hammers an elasticity of action highly useful in
5 forging.

The machine is provided in front and in rear with two adjusting tables, O, P, each of which is so applied to the base plate of the frame-work, as to be capable of being
10 raised or depressed so as to adjust it, to any height that may be required. In the drawings each table is exhibited as resting on a tubular screw nut, *t*, which is screwed upon a vertical post, *u*. By means of such ad-
15 justment the tables may be set at such a height as may be necessary to bring the axis of any piece of metal to be forged precisely midway between the two hammers of each set as hereinbefore described. Sustaining
20 rollers *v*, *v*, *v* are applied to the tables as seen in Figs. 1, 2, and 4. The table O, is furnished with a feeding roller *w*, and a pressure roller, *x*, arranged as seen in Fig. 4, the pressure roller being forced down-
25 ward toward the feeding roller by springs *y*, *y*, acting against its journal.

For the purpose of feeding along, with an intermittent motion, the bar or piece of metal to be forged, the respective journals
30 of the feeding rollers, *w* are provided with rocker cranks Q, Q, which turn freely upon them, each crank being made to carry a spring click or pawl, *z*, which acts in the teeth of a ratchet, R, fixed to the shaft of
35 the feed roller as seen in Fig. 1, and more particularly by dotted lines in Fig. 3. The rocker cranks Q, Q, are respectively jointed to connecting rods S, S, see Figs. 1, and 3. Each of these connecting rods is made in
40 two pieces or parts, *a'*, *b'*, the upper of which, viz, *a'*, is provided with a slot, *c'*, and is lapped upon the other piece and secured to it by two screws, *d'*, *d'*, as seen in
45 Figs. 1, and 4. Each of the said upper pieces, *a'*, *a'*, is also provided with another slot, *e'*, which receives a sliding box *f'*, see Fig. 7, which is a vertical section of said
piece, *a'*, and its box, *f'*. The sliding boxes, *f'*, *f'*, receive the journals of a horizontal
50 shaft, *g'*, which is connected with a crank *h'*, (fixed on the driving shaft) by means of a connecting rod, *i'*, the same being arranged as seen in Figs. 1, 3, and 4. The
said shaft, *g'*, is supported by rocker arms
55 *k'*, *k'*, which extend from the main frame work as seen in Figs. 1, 3, and 4. A screw, *t'*, passes down through the head of each of the connecting rods, S, S, and enters its slot
60 *e'*, as seen in Fig. 3 the object of the slot *e'* being to prevent any movement of the feed roller from taking place while either two
of the hammers are in the act of reducing a piece of metal, the screw, *t'*, serving to
65 regulate the extent of stoppage of the feed roller.

My improved forging machine has many advantages over others in use. By the peculiar manner in which its hammers are made to operate they can be run or moved with great velocity without danger of break-
70 age, and when two of them meet upon a piece of metal, they serve to arrest the motion of the other two when receding from one another, the velocity of the latter being
75 checked without any injurious jar or strain to the mechanism, the momentum of the receding hammers being at the same time brought into action upon those which are
approaching one another as herein before de-
80 scribed. The hammers can be readily adjusted so as to forge a piece of metal to any desirable thickness or width. As each set of hammers is balanced to a certain extent
by the other, very little power will be re-
85 quired to operate the machine, the force of the blows given by them being in accordance with their weight and velocity.

I do not claim the combination of an anvil, its hammer, and two lateral hammers made to operate together so as to enable a
90 bar, during its reduction by the hammers, to be compressed or reduced laterally by the side hammers, but

What I do claim is—

1. So combining four hammers together
95 by means substantially as described, that not only may two of them be approaching toward while the other two are receding from one another, but that the momentum of the receding hammers may be brought
100 into action upon the approaching hammers so as to increase the effect of the blow or blows produced by them, as stated.

2. I also claim two hammers arranged to operate on two opposite sides of a bar, in
105 combination with two hammers arranged to operate upon other two opposite sides of such bar, each set operating alternately, and the four hammers acting on the four sides and producing an equality of reduction of
110 the bar which cannot be obtained by an anvil (to support it) and three hammers operating upon the three unsupported sides of such bar.

3. I also claim the above described man-
115 ner of constructing each of the connecting rods K, L, in order that it may not only allow its crank to continue its movement when the hammers strike together or upon a bar of metal, but relieve the cranks and connect-
120 ing rods from the effects of the sudden blows given by the hammers.

In testimony whereof, I have hereunto set my signature this eighteenth day of April A. D. 1855.

SILAS S. PUTNAM.

Witnesses:

R. H. EDDY,
F. P. HALE, Jr.