(No Model.) 3 Sheets—Sheet 1.

C. H. GRAHAM.

BLANK FEEDER AND GRIPPING DIE FOR BOLT TURNING MACHINES.

No. 394,170. Patented Dec. 11, 1888.

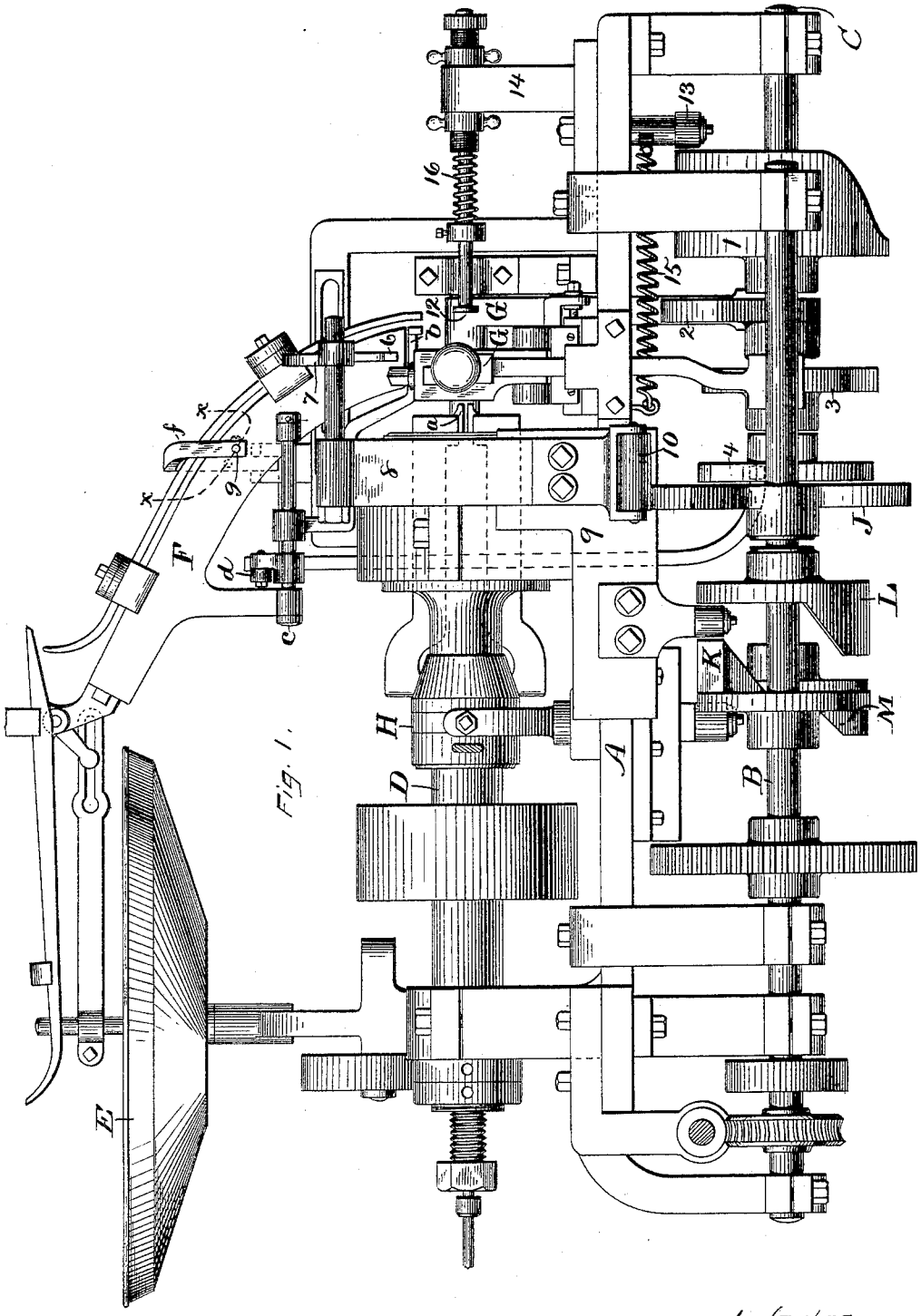


Fig. 1.

Witnesses.
John Edwards Jr.
W. H. Whiting.

Inventor.
Charles H. Graham.
By James Shepard Atty.

(No Model.) 3 Sheets—Sheet 2.

C. H. GRAHAM.

BLANK FEEDER AND GRIPPING DIE FOR BOLT TURNING MACHINES.

No. 394,170. Patented Dec. 11, 1888.

Fig. 2.

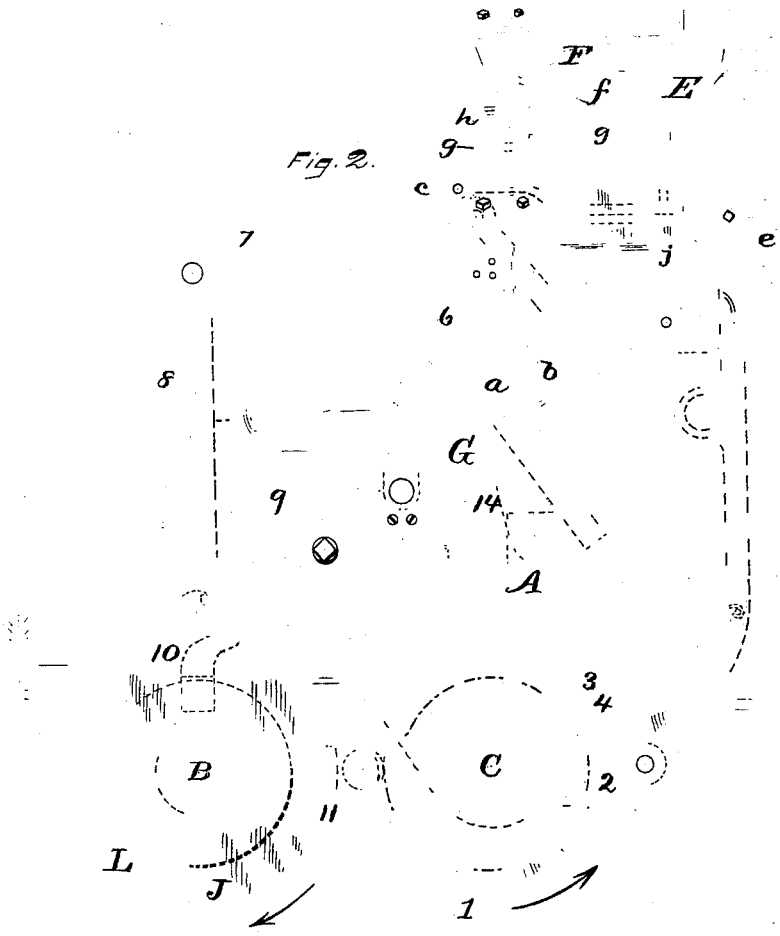
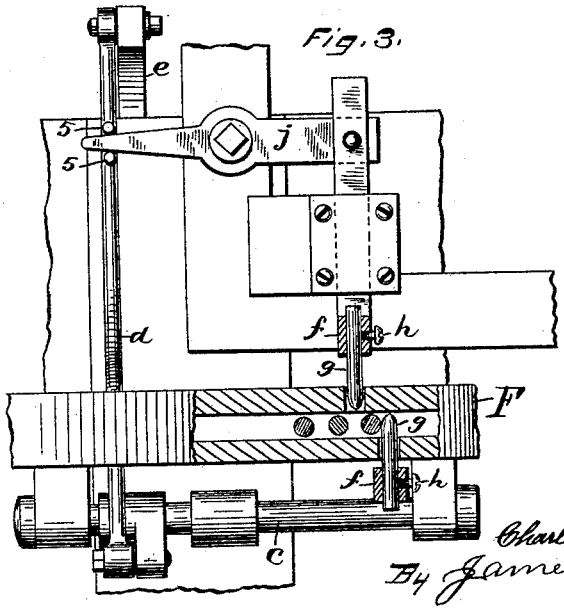


Fig. 3.



Witnesses.
John Edwards Jr.
H. C. Whiting.

Inventor.
Charles H. Graham.
By James Shepard
Atty.

(No Model.) 3 Sheets—Sheet 3.

C. H. GRAHAM.

BLANK FEEDER AND GRIPPING DIE FOR BOLT TURNING MACHINES.

No. 394,170. Patented Dec. 11, 1888.

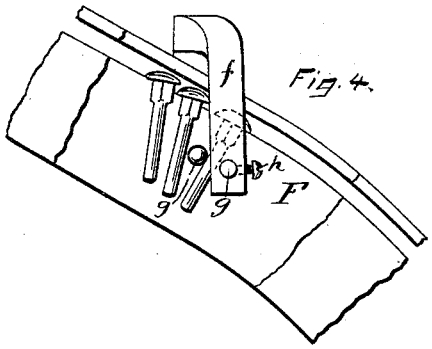


Fig. 4.

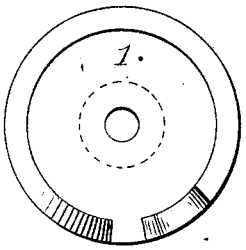


Fig. 5.

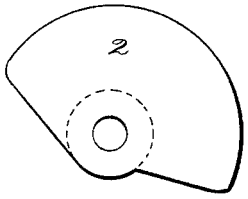


Fig. 6.

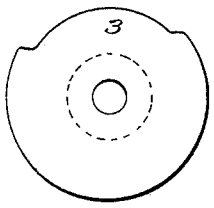


Fig. 7.

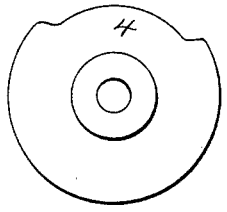


Fig. 8.

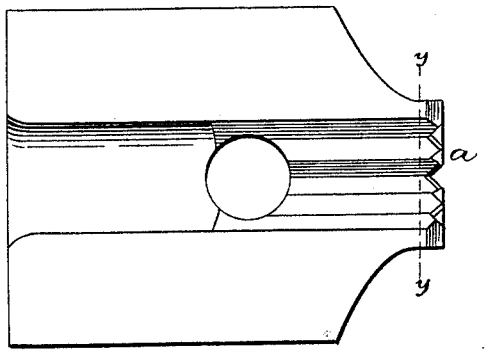


Fig. 9.

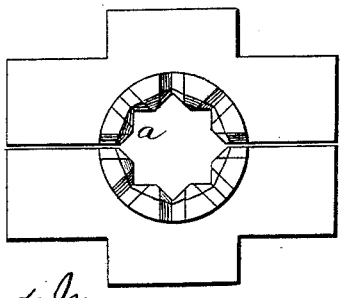


Fig. 11

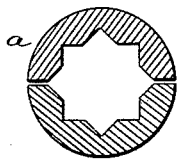


Fig. 10.

Witnesses.
John Edwards Jr.
W. H. Whiting.

Inventor.
Charles H. Graham.
By James Shepard.
Atty.

UNITED STATES PATENT OFFICE.

CHARLES H. GRAHAM, OF UNIONVILLE, ASSIGNOR TO THE UPSON NUT COMPANY, OF FARMINGTON, CONNECTICUT.

BLANK-FEEDER AND GRIPPING-DIE FOR BOLT-TURNING MACHINES.

SPECIFICATION forming part of Letters Patent No. 394,170, dated December 11, 1888.

Application filed December 28, 1887. Serial No. 259,246. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. GRAHAM, a citizen of the United States, residing at Unionville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Turning Carriage Bolt-Heads, of which the following is a specification.

My invention relates to machines for turning the heads of carriage-bolts; and the objects of my improvement are to prevent more than one bolt being fed at one time to the delivery end of the chute, to provide new and efficient means for feeding the bolt into the holding-jaws, and to so construct the holding-jaws or dies as to insure the proper grasping of the bolt.

In the accompanying drawings, Figure 1 is a side elevation of a machine for turning bolts, which embodies my improvements. Fig. 2 is a front elevation of the same. Fig. 3 is an enlarged plan view of detached portions of said machine, together with a partial sectional view of the feeding-chute, the plane of section being indicated by the line *x x*, Fig. 1. Fig. 4 is a side elevation and partial vertical section of said feeding-chute on the same scale as Fig. 3. Figs. 5, 6, 7, and 8 are side views on the same scale as Figs. 3 and 4, of several of the cams employed in said machine. Fig. 9 is a view on a still larger scale, showing the inner face of one of the holding-dies. Fig. 10 is a transverse section of said holding-dies on line *y y*, Fig. 9; and Fig. 11 is a front elevation of the same.

A designates the bed of the machine, underneath which are two cam-shafts, B C, and above which is the lathe-spindle D, Fig. 1, which carries the holding-jaws *a*. At the top of the machine is a revolving pan, E, into which bolts are to be placed promiscuously, and from which they are picked up automatically and delivered into the feeding-chute F. The turning-tools are held in swinging heads or tool-holders G G, which are operated by means of levers and cams 2 and 3 on the shaft C, said cams being shown separately in Figs. 6 and 7. The holding-jaws are operated by means of the cone H and cam M on the shaft C.

At the lower end of the feed-chute F there is a swinging carrier, *b*, the same being in the form of a rocking arm mounted on the shaft *c*. Said shaft is rocked to move the carrier from the position shown in Fig. 2 into a position directly over the axis of the spindle D by means of the connecting-rod *d*, lever *e*, and cam 4 on shaft C, said cam being shown separately in Fig. 8.

The parts thus far specifically described are all old and are hereby disclaimed. Any other mechanism which is adapted for use in combination with my improvements may be substituted for either or all of the old mechanisms herein disclaimed.

When two or more bolts are allowed to descend at one time to the delivery end of the feeding-chute, it interferes with the proper operation of the carrier *b* and is liable to prevent it from properly carrying forward a single bolt. I provide a device in the body of the chute for preventing more than one bolt at a time being fed to the carrier at the end of the feed-chute. This device consists of a sliding frame, *f*, which extends to opposite sides of the chute and carries two separating-fingers, *g*, the same being rigidly affixed to the frame *f*, but adjustable therein by means of set-screws *h*, most clearly shown in Fig. 3. These fingers have their inner ends resting in holes in the side walls of the chute, the frame being offset or otherwise formed, so that one finger occupies a position in the chute in advance of the other finger a distance about equal to the space occupied by one bolt in the chute. This sliding frame *f* is made to reciprocate by means of the lever *j*, pivoted to a fixed part of the frame, and having one end connected loosely with the operating-rod *d* in any proper manner—as, for instance, by the two pins 5 5 in Fig. 3—so that said sliding frame *f* and its separating-fingers will have one reciprocating movement for every reciprocating movement of the carrier *b*.

When the carrier has its recess or pocket immediately under the lower end of the feeding-chute, as shown in Fig. 2, the sliding frame and its separating-fingers are in the position represented in Fig. 3. When the carrier moves forward under the influence of the operating-rod *d*, the sliding frame *f* is moved in the

same direction, thereby withdrawing the lowermost of its fingers *g* from the passage-way in the chute and forcing the upper finger between the two bolts adjoining said lower finger, and so soon as said frame and fingers have made their full stroke in this direction the bolt which lies between the upper and lower fingers will be released and permitted to fall, while all of the other bolts are detained therein by the upper finger. The bolts thus released will lie upon the body of the carrier at the lower end of the chute. Upon the return movement of the carrier the fingers *g g* are carried back into the position shown in Fig. 3, and as the upper finger withdraws all of the bolts within the chute slide forward a distance equal to the space occupied by one bolt and are caught upon the lower finger, as shown.

My next improvement relates to the mechanism for conveying the bolt from the conveyer *b* into the holding-jaws. The bolt is taken from the conveyer by means of the spring-pressed fingers 6, which of themselves are well known in analogous structures, and in shop parlance are called the "turkey-bill." These are mounted upon the arm 7, which is secured to the vertical slide 8, said slide having its ways formed on or secured to the horizontal slide 9, said horizontal slide being mounted upon ways affixed to the bed or frame A of the machine.

When the carrier *b* is forward with a bolt in its pocket or recess, the vertical slide 8 is held in its most elevated position by means of the cam J on the shaft B. At the same time the horizontal slide 9 is forced toward the front of the machine by means of the cam K. A friction-roller, 10, bears against the cam J. When the depression 11, Fig. 2, passes this roller, the vertical slide 8 and the spring-pressed fingers 6 descend upon the bolt within the carrier and grasp the body of said bolt, immediately after which the fingers 6 rise as the depression 11 leaves the roller 10, which roller then rests against the concentric periphery of the cam J, thereby holding the slide 8 and fingers 6 in an elevated position for a time. Before the fingers 6 thus grasp the bolt the sliding push-rod 12 is forced out of the way by means of the cam 1 on shaft C, (shown separately in Fig. 5,) which cam acts against a projection, 13, on the under side of the slide 14, to which the push-rod 12 is attached. A spring, 15, on the under side of the bed A has a tendency to draw the slide 14 and push-rod 12 toward the holding-jaws.

After the bolt has been grasped by the jaws 6, as before described, the most depressed portion of the cam comes under the vertical slide 8 and roller 10 and permits said slide to fall, thereby bringing the bolt that is held by the fingers 6 into substantial alignment with the axis of the holding-jaws. The cam L on the shaft B then acts to carry the slides 8 and 9 horizontally to the rear, and simultaneously therewith the cam 1 releases the slide 14 and push-rod 12, so that the latter acts upon the head of the bolt to push it into the holding-jaws. When the bolt has well entered the jaws, the cam J again acts to raise the slide 8 and pulls the spring-fingers from the bolt, the bolt being forced fully home by the push-rod 12. When the vertical slide 8 is thus held in its highest position, the cam K again acts to carry the slides 8 and 9 with the spring-fingers forward into position ready to grasp another bolt in the manner before described, the cam 1 also acting to take the push-rod out of the way. The carrier *b* is timed in concert with the motion of the spring-fingers 6, so as to present a bolt to said fingers at the proper time and to withdraw therefrom immediately after the bolt is securely grasped by said fingers. The turning-tools act to turn the bolt-head immediately after the bolt is properly seated in the holding-jaws, and when turned it is ejected from said jaws, as in analogous machines, before another bolt is presented thereto.

It will be seen that the spring-fingers describe what may be termed a "four-motion" feed—that is to say, they move vertically downward, then horizontally rearward, then vertically upward, then horizontally to the front, where they make a slight and quick up-and-down movement to grasp the bolt, preparatory to making the succeeding four motions specified, and so on repeatedly. It should also be noticed that the slide which carries the push-rod 12 is not only carried rearward by a spring, but is held in position at the upper end of the slide 14 by means of a supplementary and weaker spring, so that said push-rod may yield a little under any undue strain.

Another of my improvements relates to the shape of the operating faces or dies of the holding-jaws *a*. Carriage-bolts, as is well known, are formed with a neck underneath the head, which is square in cross-section. With dies as ordinarily constructed of a shape corresponding to the square of the bolt the corners of the bolt are liable to strike against the flat side faces of the holding-dies, so that the bolt changes its position when the turning-tool comes in contact with it, thereby causing the turning-tool to make a deep cut, with a liability of breaking the tools or the bolt or stopping the machine.

Instead of forming the face of the holding-dies square in cross-section, I form them in a combination of two squares, or, in other words, with eight longitudinal angular recesses instead of four, as shown most clearly in the sectional view, Fig. 10, the square of the bolt entering four of the angular recesses at one time, while the four intervening recesses remain unfilled. By this arrangement the bolt will match the recesses in the die when presented in eight different positions, instead of four; or, in other words, the corners of the

bolt will always register with the corners of the die at every one-eighth of a revolution of the bolt, and therefore the variation from said registering position can never exceed one-sixteenth of a revolution. The front end or mouth of the die I also bevel off gradually, as shown. By this construction of the dies when the bolt is forced therein, if it is not in proper position to register with the recesses in the die, will, as it strikes the beveled mouth of the die, turn axially sufficiently to properly enter those corners with which it most nearly registers. By this construction I insure the proper feeding of the bolt within the dies and the proper holding of the same therein.

While I have described my improvement in the feeding-chute as for use upon a machine for turning bolts, it is evident that this improvement may be applied to a chute for feeding bolts to any other mechanism for a subsequent operation whenever it may be desirable to have but one bolt at a time fed to the lower end of the chute.

I claim as my invention—

1. The combination of the feeding-chute, the swinging carrier *b*, its operating rock-shaft *c*, connecting-rod *d*, lever *e*, cam 4, for driving said lever, the sliding frame *f*, having fingers *g g*, and the lever *j*, for operatively connecting said sliding frame with the connecting-rod *d* and its operating mechanism, substantially as described, and for the purpose specified.

2. In a machine for turning bolts, the combination of the spring-pressed fingers, the vertical slide for carrying said fingers, a horizontal slide carrying said vertical slide, and the cams for controlling the vertical and horizontal movements of said slide and imparting the four motions to the fingers, substantially as described, and for the purpose specified.

3. In a machine for turning bolts, the holding jaws or dies having their holding-faces provided with eight longitudinal angular recesses beveled at the mouth, substantially as described, and for the purpose specified.

4. The combination of the feeding-chute, the sliding frame *f*, which extends to opposite sides of said chute, the fingers *g g*, affixed in sockets at opposite ends of said frame, the set-screws *h*, for adjustably holding said fingers, and mechanism for reciprocating said slide, substantially as described, and for the purpose specified.

CHARLES H. GRAHAM.

Witnesses:

S. FRISBIE,

W. A. HITCHCOCK.