No. 814,655. PATENTED MAR. 6, 1906.

R. KIENZL.

BOLT THREADING AND TAPERING MACHINE.

APPLICATION FILED MAR. 1, 1905.

2 SHEETS—SHEET 1.

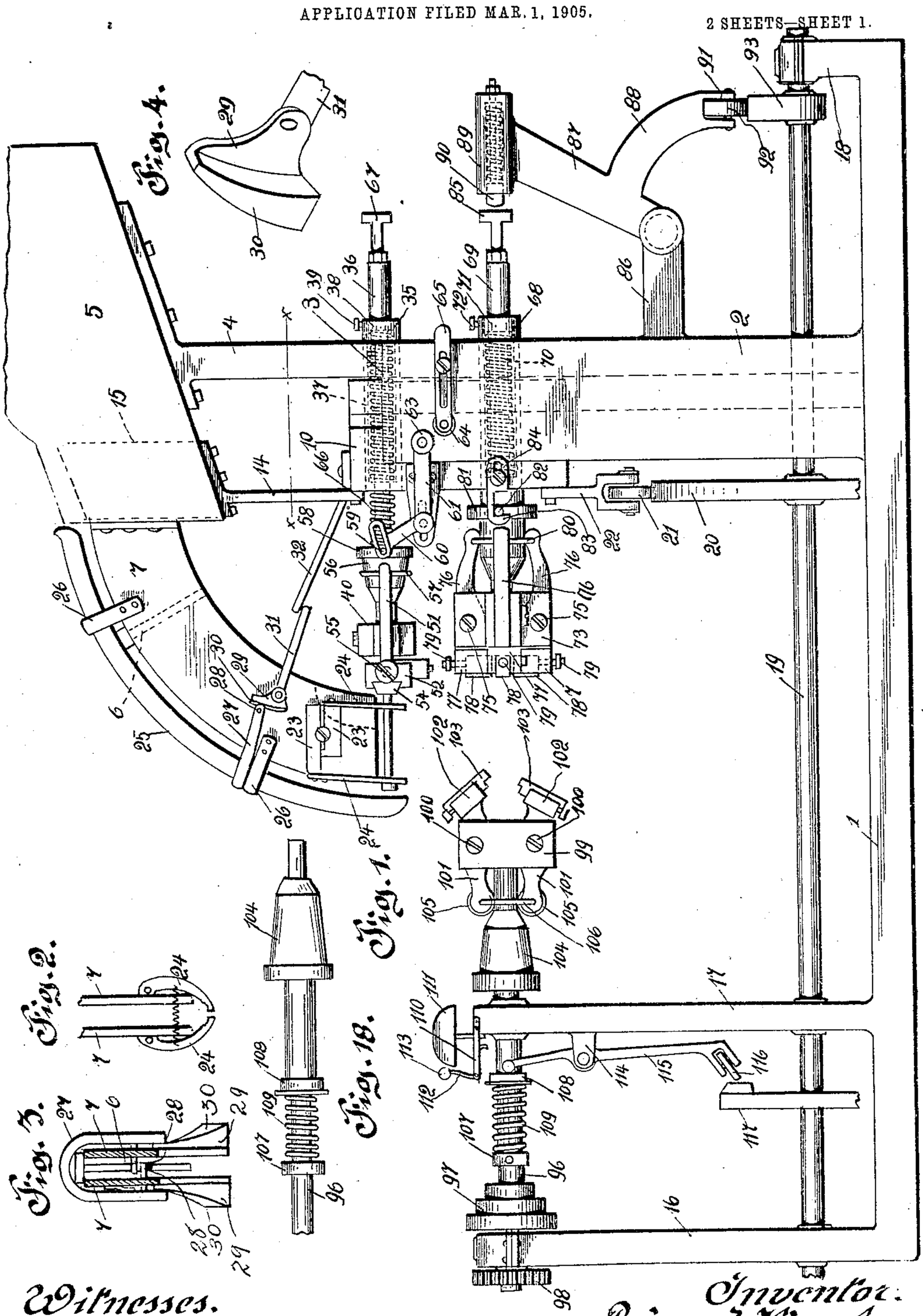

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 1a.

Witnesses.
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2 SHEETS—SHEET 2.

Fig. 7

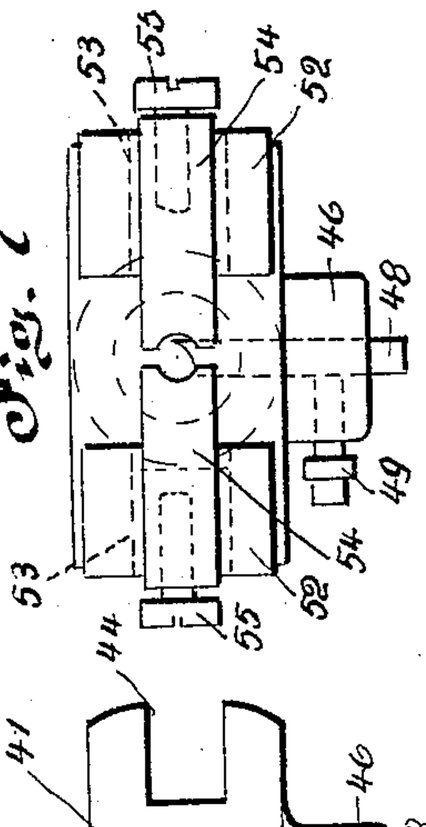


Fig. 12

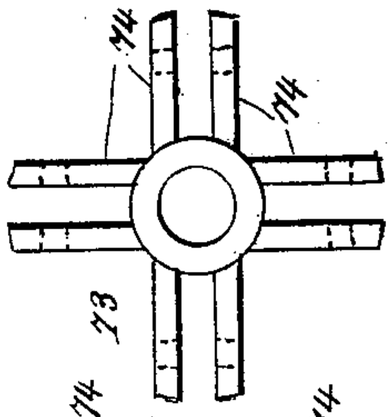


Fig. 11

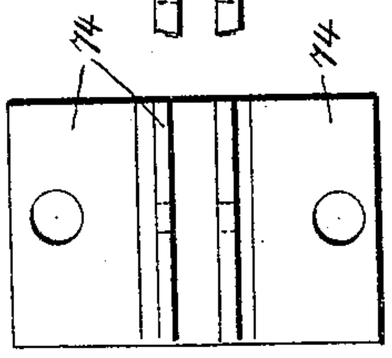


Fig. 13.

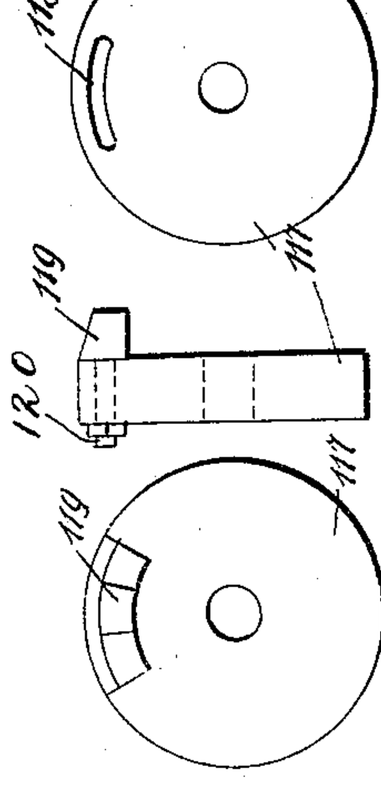


Fig. 14.

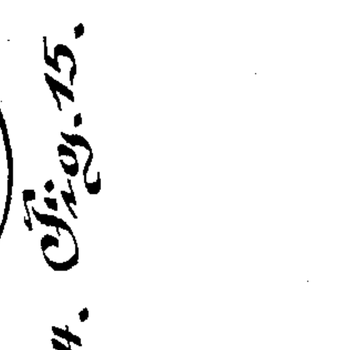


Fig. 15.

Fig. 6

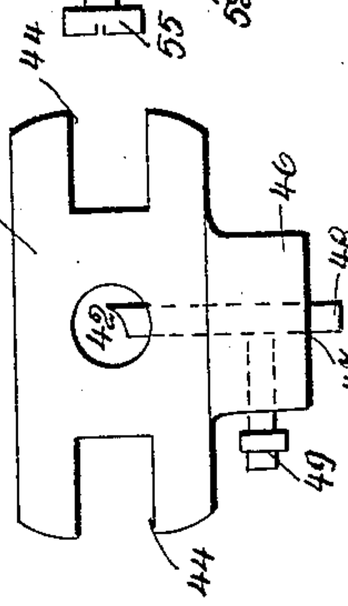


Fig. 10

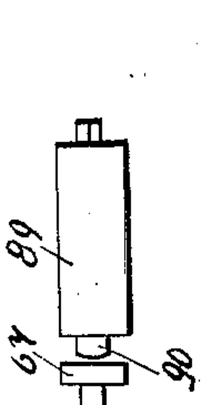


Fig. 16.

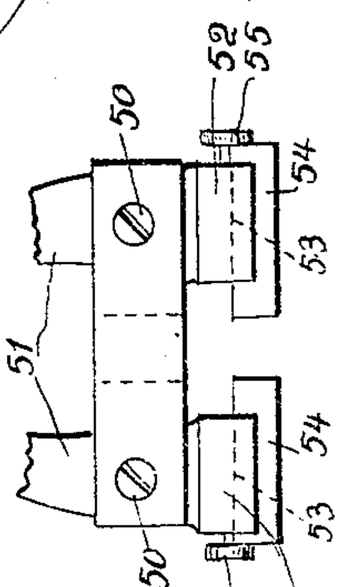


Fig. 17

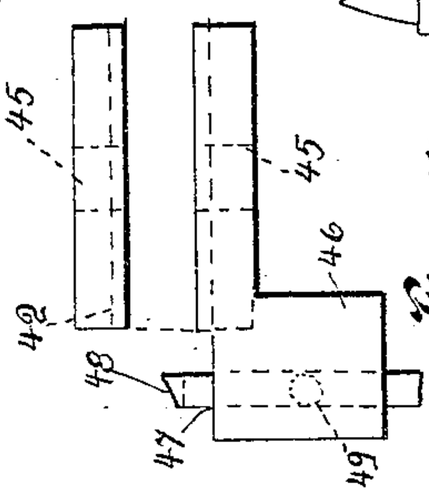


Fig. 8

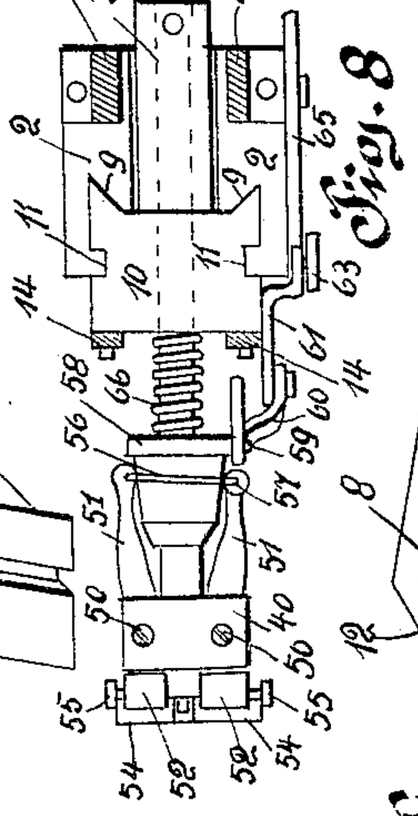


Fig. 5

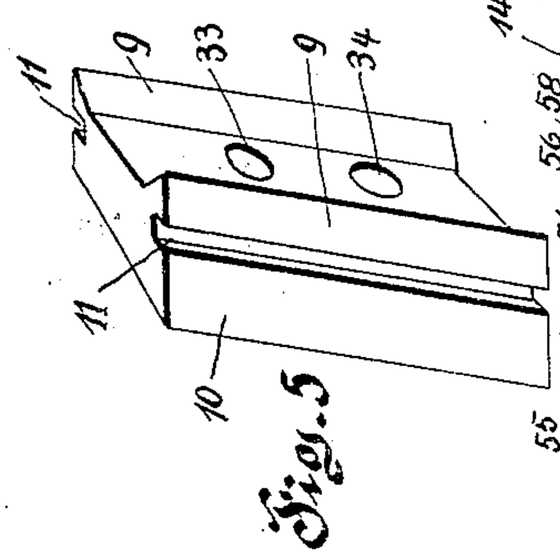
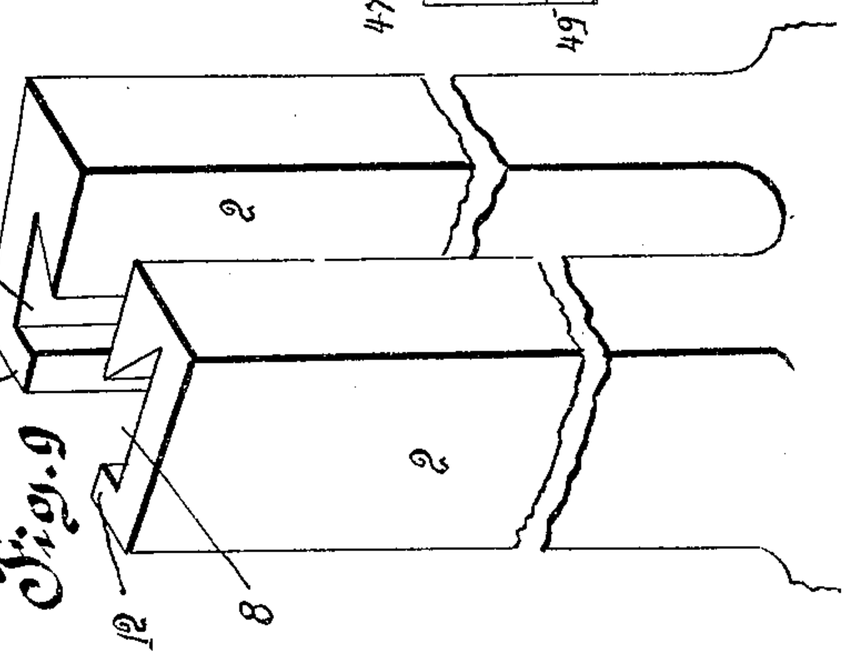


Fig. 9



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by Attorneys.

UNITED STATES PATENT OFFICE.

RAIMUND KIENZL, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO GEORGE SCHMIDT, OF PITTSBURG, PENNSYLVANIA.

BOLT THREADING AND TAPERING MACHINE.

No. 814,655. Specification of Letters Patent. Patented March 6, 1906.

Application filed March 1, 1905. Serial No. 247,919.

To all whom it may concern:

Be it known that I, RAIMUND KIENZL, a subject of the Emperor of Austria-Hungary, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Bolt Threading and Tapering Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in threading-machines, and more particularly to that type of machine employed for threading and tapering the ends of bolts.

The object of the invention is to provide novel and positive means for manipulating a bolt whereby it can be acted upon by thread and taper cutting dies and then discharged from the machine. To this end I employ a novel form of feeding mechanism adapted to automatically feed the bolts to my improved machine, a carrier mechanism adapted to position the bolts within the machine ready for threading, a positive gripping mechanism adapted to engage the bolt and retain it in the position to which it is moved, threading-dies adapted to be moved in engagement with said bolt, and novel means for actuating the above-mentioned mechanisms, all of said parts being compactly arranged to produce an inexpensive and highly-efficient machine when placed in operation.

The above construction will be hereinafter more fully described and then specifically pointed out in the claims, and, referring to the drawings accompanying this application, like numerals of reference designate corresponding parts throughout the several views, in which—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a detail view of spring retaining-arms employed in connection with the feeding mechanism. Fig. 3 is a sectional view of a feeding-chute, illustrating a part of the mechanism carried thereby. Fig. 4 is a detail perspective view of a shoe employed for actuating the feeding mechanism. Fig. 5 is a perspective view of a movable member employed in connection with my improved machine. Fig. 6 is a front elevation of a head employed in connection with the tapering mechanism. Fig. 7 is a front elevation of the tapering mechanism. Fig. 8 is a horizontal sectional view of my improved machine, taken on the line $x\ x$ of Fig. 1 looking downward. Fig. 9 is a fragmentary perspective view of the standards of my improved machine. Fig. 10 is a side elevation of a cam-wheel. Fig. 11 is a side elevation view of a die-head. Fig. 12 is a front elevation of the same. Fig. 13 is a side elevation of a cam-wheel used in connection with my improved machine. Fig. 14 is an edge view of the same. Fig. 15 is a detail view of a cam-wheel, illustrated in Fig. 13 of the drawings with the cam thereof removed. Fig. 16 is a top plan view of a part of the tapering mechanism, and Fig. 17 is a side elevation of the head illustrated in Fig. 6 of the drawings. Fig. 18 is a detail sectional view of a portion of my improved machine.

A machine constructed in accordance with my invention comprises a suitable foundation or base-plate 1, carrying standards 2 2, and upon the top of said standards I secure, as indicated at 3 3, brackets 4 4, which support a receptacle or reservoir 5, adapted to receive the bolt-blanks 6 to be threaded. The bolts are preferably arranged vertically within the receptacle 5 and are adapted to be automatically fed into a depending curved chute 7, carried by the receptacle 5. The confronting faces of the standards 2 2 are provided with vertically-disposed wedge-shaped grooves 8 8, and in said grooves are adapted to engage the wedge-shaped edges 9 9 of a movable block or member 10. The edges of the movable block 10 are provided with vertically-disposed grooves 11 11, which are adapted to engage the tongues 12, carried by the standards 2 2. To the top of the movable member or block 10 is secured a bracket 14, carrying a feeding member 15, which is adapted to elevate the bolt-blanks to permit them to enter the chute 7.

The foundation or base-plate 1 is provided with standards 16, 17, and 18, and in said standards is journaled a shaft 19. Said shaft is provided with a cam-wheel 20, adapted to engage a roller 21, carried by a bifurcated arm 22, secured to the lower front edge of the movable block or member 10. Any suitable means may be employed, such as a motor, for revolving the shaft 19, and when said shaft rotates the cam-wheel 20 will elevate the movable member or block 10, carrying with it the feeding member 15, which places

the bolt-blanks in position to enter the chute 7. The lower sides of the chute 7 are provided with adjustable plates 23 23, carrying spring retaining-arms 24 24, and these arms are adapted to receive the bolt-blanks 6 when deposited from the chute.

To automatically feed the bolt-blanks to the spring retaining-arms 24 24, I have devised a novel feeding mechanism, which is illustrated in Figs. 1 and 3 of the drawings. I provide the top edge of the chute 7 with a guide 25, that is supported by brackets 26 26, carried by said chute. Loosely mounted upon said guide is a yoke 27, the ends of which are provided with inwardly-extending pins 28 28, that protrude within the chute and support the bolt-blanks 6 as they are fed to the chute by the feeding member 15. The sides of the chute 7 are provided with pivoted cam-shoes 29, having outwardly-extending cam-surfaces 30. The shoes are connected together by a lever 31, which is actuated by a bar 32, carried by the movable member or block 10. The shoes 29 are adapted to engage the ends of the yoke 27, and when the movable block or member 10 descends within the standards 2 2 the bar 32 strikes the lever 31, causing the cam-surfaces 30 30 to move under the ends of the resilient yoke and spread the ends of the said yoke 27 outwardly, withdrawing the pins 28 28 and allowing the bolt-blanks 6 to descend to the spring retaining-arms 24 24.

The movable block or member 10 is provided with two horizontally-disposed apertures 33 and 34, and in the aperture 33 is mounted a sleeve 35, through which passes a rod 36. Mounted within said sleeve is a spring 37, the one end of which is attached to said rod, while the other end thereof engages the collar 38, retained within said sleeve by a set-screw 39. The rod 36 is provided upon its end with a head 40, which forms part of the tapering mechanism of my improved machine. This head is illustrated in Figs. 6, 7, 16, and 17 of the drawings and consists of a body portion 41, having a central transversely-disposed opening 42 formed therein. The sides of the body portion are slotted, as indicated at 44 44, and the sides of the body portion are provided with vertically-disposed apertures 45 45. The head carries an outwardly-extending boss 46, having a vertically-disposed aperture 47 formed therein, and mounted in said aperture is a bit 48, retained therein by a set-screw 49. In the slots 44 44 are pivoted by screws 50 50 curved arms 51 51, the outer ends of which carry blocks 52, having wedge-shaped grooves 53 formed therein, and in said grooves are mounted horizontally-opposed jaws 54 54. These jaws are retained within the blocks 52 by set-screws 55 55, carried by said blocks. The rod 36 is provided with a tapering peripherally-flanged enlargement 56, and surrounding said enlargement is a split spring annulus or ring 57, which engages the ends of the arms 51 51. The flange 58 of the enlargement 56 is provided with an outwardly-extending pin 59, which engages in a slotted lever 60, pivotally connected to an arm 61, carried by the movable member or block 10. The opposite end of the lever 61 is provided with a roller 63, which is adapted to engage a roller 64, carried by an adjustable plate 65, mounted upon the side of the standard 2, the engagement of said roller taking place when the movable member or block 10 descends between the standards. The reference-numeral 66 designates a spring interposed between the enlargement 56 and the movable block or member 10. The opposite end of the rod 36 is provided with a substantially T-shaped head 67, the object of which will be hereinafter described.

In the aperture 34 of the movable block or member 10 is mounted a sleeve 68, through which passes a rod 69. In the sleeve 68 is mounted a spring 70, that surrounds the rod 69 and has its one end connected thereto, while the other end of said spring engages a collar 71, secured in the sleeve 68 by a set-screw 72. These parts are similar to the sleeve and spring heretofore described in connection with the rod 36. Upon the end of the rod 69, alining vertically with the tapering mechanism of the rod 36, is a die 73, carrying sets of radially-disposed plates 74. Between the plates 74 are pivotally mounted by screws 75 arms 76, carrying blocks 77, similar in construction to the blocks 52, and in said blocks are slidably mounted cutters 78, which are adjusted therein by set-screws 79. The rear ends of the arms 76 are connected together by a spring 80, similar in construction to the spring 57, heretofore described. The rod 69 is provided with an enlargement 81, similar to the enlargement 56 of the rod 36, and the outwardly-extending pin 82 of said enlargement engages the hook-shaped end 83 of an adjustable plate 84, mounted upon the movable member or block 10. The reference-numeral 85 designates a T-shaped head carried by the opposite end of the rod 69.

One of the standards 2 is provided with a bracket 86, to which is pivotally connected an arm 87, having a depending portion 88. The upper end of the arm 87 is provided with a sleeve 89, in which is mounted a spring-actuated head 90. The lower end of the depending portion 88 is bifurcated, as indicated at 91, and in said bifurcated end is journaled a roller 92, which is adapted to engage a cam-wheel 93, mounted upon the shaft 19. The cam-wheel is illustrated in Fig. 10 of the drawings, and by referring to said figure it will be observed that the periphery is provided with two cams or lugs 94 and 95, the object of which will be hereinafter more fully described.

Journaled in the upper ends of the standards 16 and 17 is the shaft 96, positioned in horizontal alinement with the rod 69. The shaft is provided with a stepped pulley 97 and a gear-wheel 98, whereby a rotary movement may be imparted to the shaft 96 from the shaft 19 or from any other suitable source of energy. The opposite end of the shaft is provided with a head 99, in which is pivotally mounted by screws 100 arms 101. These arms are provided with heads 102, carrying adjustable gripping-jaws 103. The shaft 96 is provided with a tapering flanged enlargement 104, and the rear ends of the arms 101 are provided with rollers 105, which are held in engagement with the shaft 96 by an annular spring 106. The shaft is also provided with a fixed collar 107 and a loosely-mounted collar 108. Between said collars is interposed a spring 109.

The reference-numeral 110 designates a bracket carried by the upper end of the standard 17, and said bracket is provided with a bell 111 and a bell-crank lever 112, carrying a clapper 113. The standard 17 is also provided with a bracket 114, in which is pivotally mounted a lever 115, the upper end of which is adapted to engage the loosely-mounted collar 108 of the shaft 96, while in the lower end of the lever 115 is journaled a roller 116, which is adapted to engage a cam-wheel 117, mounted upon the shaft 19. The cam-wheel 117 is illustrated in Figs. 13 to 15, inclusive, of the drawings and comprises a body portion having a segment-shaped slot 118 formed near its outer edge, and to the body portion cam-bodies 119 are secured by bolts 120, that pass through the slot 118 of the wheel. By this construction the position of the cam-body 119 upon the wheel can be readily adjusted, and when the cams have become worn they can be readily removed and new ones placed therein.

Operation: The shaft 19 of my improved machine is adapted to be driven from a suitable source of power and is adapted to actuate the various parts of my improved machine. Through the medium of the cam or eccentric wheel 20 the movable member of block 10 is vertically reciprocated within the standards 2 2, and as said block travels upwardly the feeding member 15 places the bolt-blanks 6 in position to travel downwardly within the chute 7. The heads of the bolts travel between the guide 25 and the body portion of the chute, and their downward movement is retarded by the pins 28 28 of the feeding mechanism. We will, however, assume that a bolt has been deposited upon the spring retaining-arms 24 24 and that the tapering mechanism—namely, the head 40 and rod 36—are in horizontal alinement with the bolt-blank illustrated in Fig. 1 of the drawings. The spring 66 is adapted to retain the jaws 54 54 in a closed position through the medium of the arms 51 51 and the tapering enlargement 56. However, when the movable member or block 10 has moved upwardly the lever 60, engaging the pin 59, has moved the enlargement 56 rearwardly, and the spring-ring 57 has contracted the rear end of the arms 51 51 and opened the jaws 54 54. This has been accomplished by the roller 63 striking the roller 64, carried by the adjustable plate 65, mounted upon the side of the standard 2. When the roller 63 has passed out of engagement with the roller 64, as indicated in Fig. 1 of the drawings, the jaws 54 are closed upon the end of the bolt-blank 6 by the spring 66, and the further operation of the cam-wheel 20 causes the movable member 10 to descend, carrying with it the mechanism just described and the rod 69 and its appurtenant parts. The lowest position assumed by the rod 36 is in horizontal alinement with the shaft 96, and when it has reached this position the rotation of the shaft 19 through the medium of the cam 93, arm 87, and head 90 causes the rod 36 to move inwardly, compressing spring 37 and at the same time forcing the head of the bolt-blank 6 in position to be gripped by the jaws 103 of the shaft 96. The cam-wheel 117, which has retained the lever 115 in the position illustrated in Fig. 1 of the drawings, now releases the lever and permits the spring 109 to force the tapering enlargement 104 forward, separating the rollers 105 and closing the jaws 103 upon the bolt-blank 6. A rotary motion is now imparted to the shaft 96, and through the medium of the head 41 and the bit 48 a tapering end is placed upon the revolving bolt-blank carried by the jaws 103. The jaws 54 54 had previously released the bolt-blank by the arm 87 receding and the spring 37 returning the rod 36 to its normal position, the spring 37 having a greater tension than the spring 66 naturally overcoming the tendency of the spring 66 to retain the jaws in a closed position. In this operation the cam 94 has been employed, which only moves the shaft 36 and the bolt a sufficient distance to place the head of the bolt-blank 6 between the jaws 103. The bolt having been gripped by the jaws 103, as previously described, and the tapering end turned upon the bolt and the rod 36 returned to its normal position, the cam 20 elevates the movable member or block 10, placing the rod 36 in position to receive another bolt from the feeding mechanism and also placing the rod 69 in position to thread the end of the bolt-blank 6. The bolt-blank is now being revolved by the shaft 96, and when the rod 69, carrying the die-head 73, is in position the cam 95 of the wheel 93 is adapted to actuate the arm 87 and cause the head 90 to move into engagement with the T-shaped end 85 of the rod 69 gradually forcing the rod 69 inwardly to the position shown in Fig. 1 of

the drawings—that is, to the limit of the inward movement permitted by the slot in the arm 83, this movement causing the thread-cutters 78 to produce a thread upon the end of a bolt. When the thread has been cut a sufficient distance, which distance will be governed by the cam 95, the spring 70 returns the die-head to its normal position. The cam-wheel 117, carrying the cam-body 119, now engages the lever 115 and causes the tapering enlargement 104 to release the arms 101 and open the jaws, at which time the blank bolt as a finished article drops into a suitable receptacle. (Not shown.) If during any part of the operation the jaws 103 103 fail to grip a bolt-blank, the contacting of the jaws will cause the rollers 105 of the arms 101 to engage the flange of the tapering enlargement 104, and this forward movement of the tapering enlargement 104 will cause the collar 108 to engage the bell-crank lever 112 and through the medium of the clapper 113 sound the bell 111, notifying the attendant of the machine that a bolt-blank is being carried by the jaws 54, which cannot be gripped by the jaws 103 until the jaws 54 are opened. By the construction of the tapering enlargement 104 illustrated in Fig. 18 of the drawings it will be observed that this enlargement is permitted to slide upon the shaft 96, while said shaft is revolving and carrying with it the head 99.

While I have herein illustrated the preferred manner of constructing my improved machine, it is obvious that various changes may be made in the arrangement of the different operating mechanisms, together with structural changes, without departing from the spirit and scope of the invention.

What I claim, and desire to secure by Letters Patent, is—

1. In a machine for threading and tapering bolts, the combination with a suitable supporting-frame, and blank-feeding mechanism mounted on the frame, blank-holding devices carried by the blank-feeding mechanism, a reciprocable block mounted on said frame, mechanism mounted on the frame for reciprocating said block at regular intervals, a reciprocable rod carried by said reciprocable block, blank-gripping devices carried by said rod, blank-tapering devices carried by said rod, a rotary shaft journaled in said frame, blank-gripping devices carried by said rotary shaft, a second rod carried by said reciprocable block, threading devices carried by said second rod and means mounted on the frame for reciprocating said rods alternately while each is in alinement with said rotary shaft.

2. In a machine of the type described, the combination of a suitable frame, blank-feeding mechanism mounted on the frame, a reciprocable block mounted on the frame, mechanism for reciprocating said block, a rod carried by said block, a cutter carried by said rod, gripping devices carried by said rod, means mounted on the frame for automatically operating said gripping devices, a rotary shaft journaled on the frame, gripping devices carried by said rotary shaft, means for automatically operating the gripping devices on said rotary shaft.

3. In a machine of the type described, the combination with a suitable frame, a reciprocable block mounted on said frame, mechanism for reciprocating said block, a reciprocable rod carried by said reciprocable block, blank-gripping devices carried by said rod, blank-tapering devices carried by said rod, a rotary shaft mounted on the frame, automatically-operating blank-gripping devices carried by said rotary shaft, a second rod carried by said reciprocable block, a threading-die carried by said second rod, means for reciprocating said rods when each is in alinement with said shaft.

4. In a machine of the type described, the combination with a vertical reciprocable member, of gripping mechanism and a tapering mechanism carried by said member, a feeding mechanism arranged to deliver a bolt in position to be grasped by said gripping mechanism, means for operating said gripping mechanism, thread-cutters carried by said member, a revolving head adapted to grip a bolt while being acted upon by said tapering mechanism and said thread-cutters, means to operate said member, means to revolve said head and means to release said bolt from said head when the operation has been finished, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

RAIMUND KIENZL.

Witnesses:
K. H. BUTLER,
WM. C. HEITZ.