

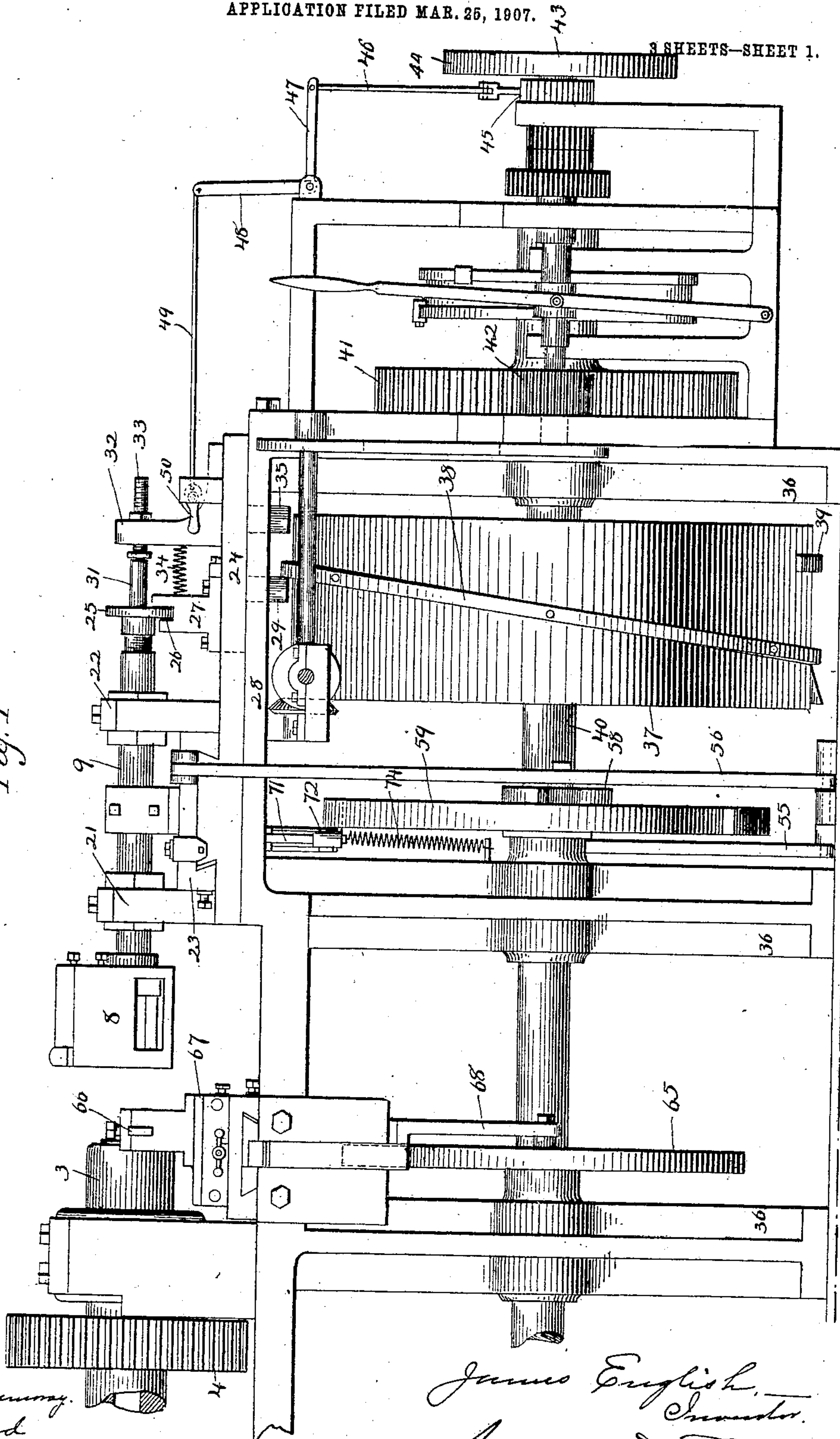
No. 870,499.

PATENTED NOV. 5, 1907.

J. ENGLISH.  
SCREW MACHINE.  
APPLICATION FILED MAR. 25, 1907.

3 SHEETS—SHEET 1.

Fig. 1



Witness.  
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C. L. Weed

James English,  
Inventor.  
By Atty Seymour & Carey

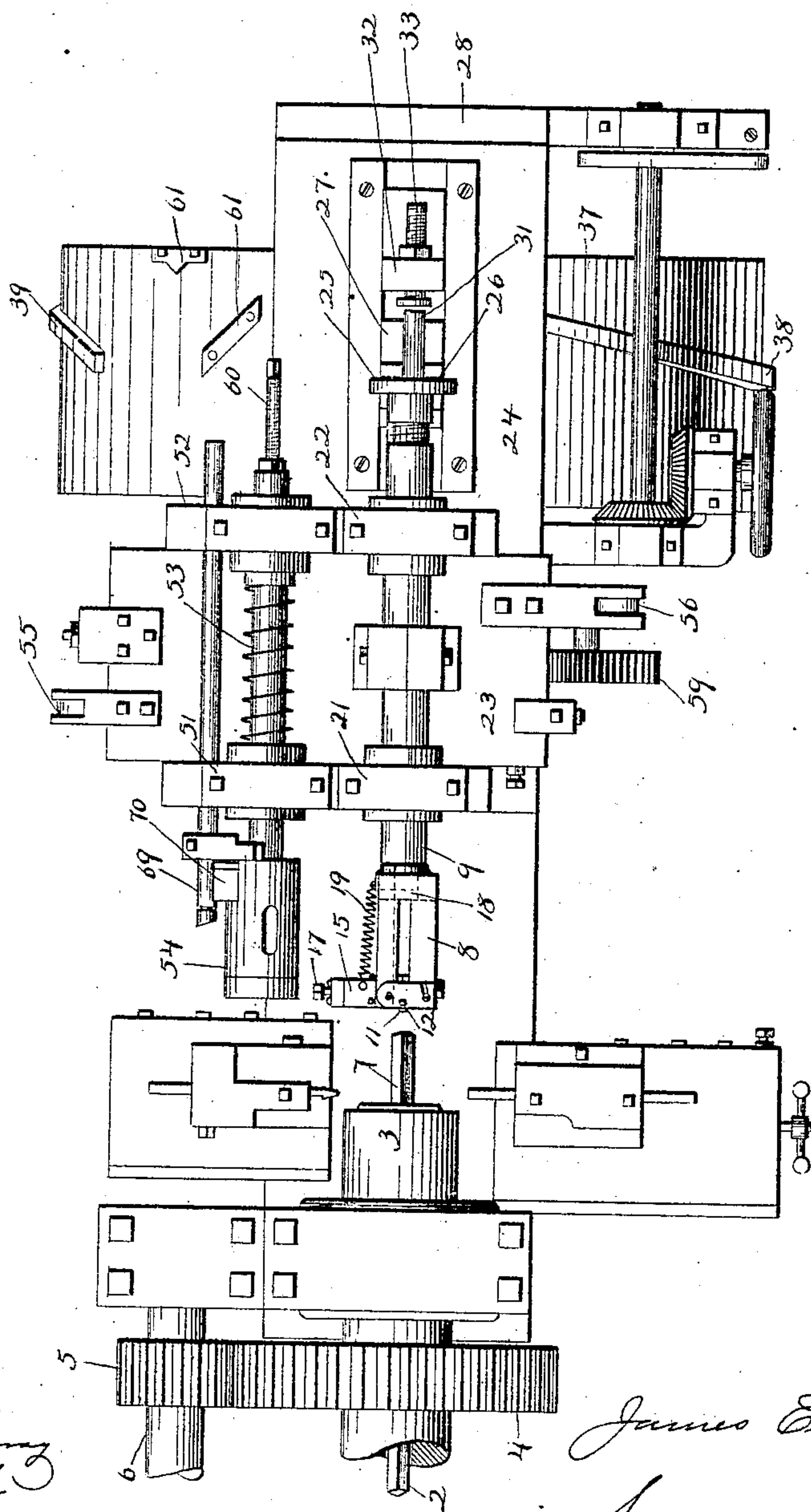
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3 SHEETS—SHEET 2.

Fig 2.



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3 SHEETS—SHEET 3.

Fig 3.

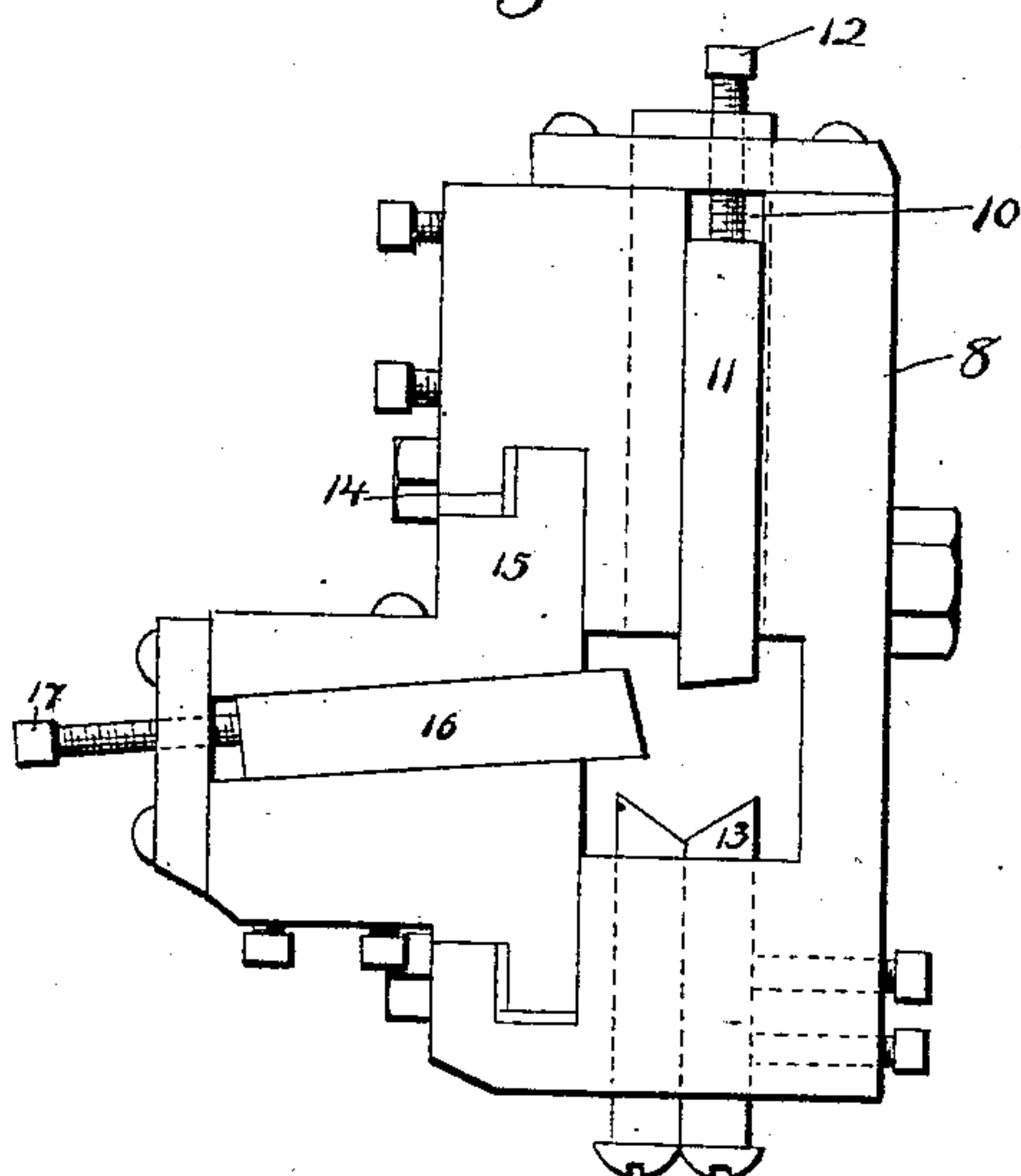


Fig 4.

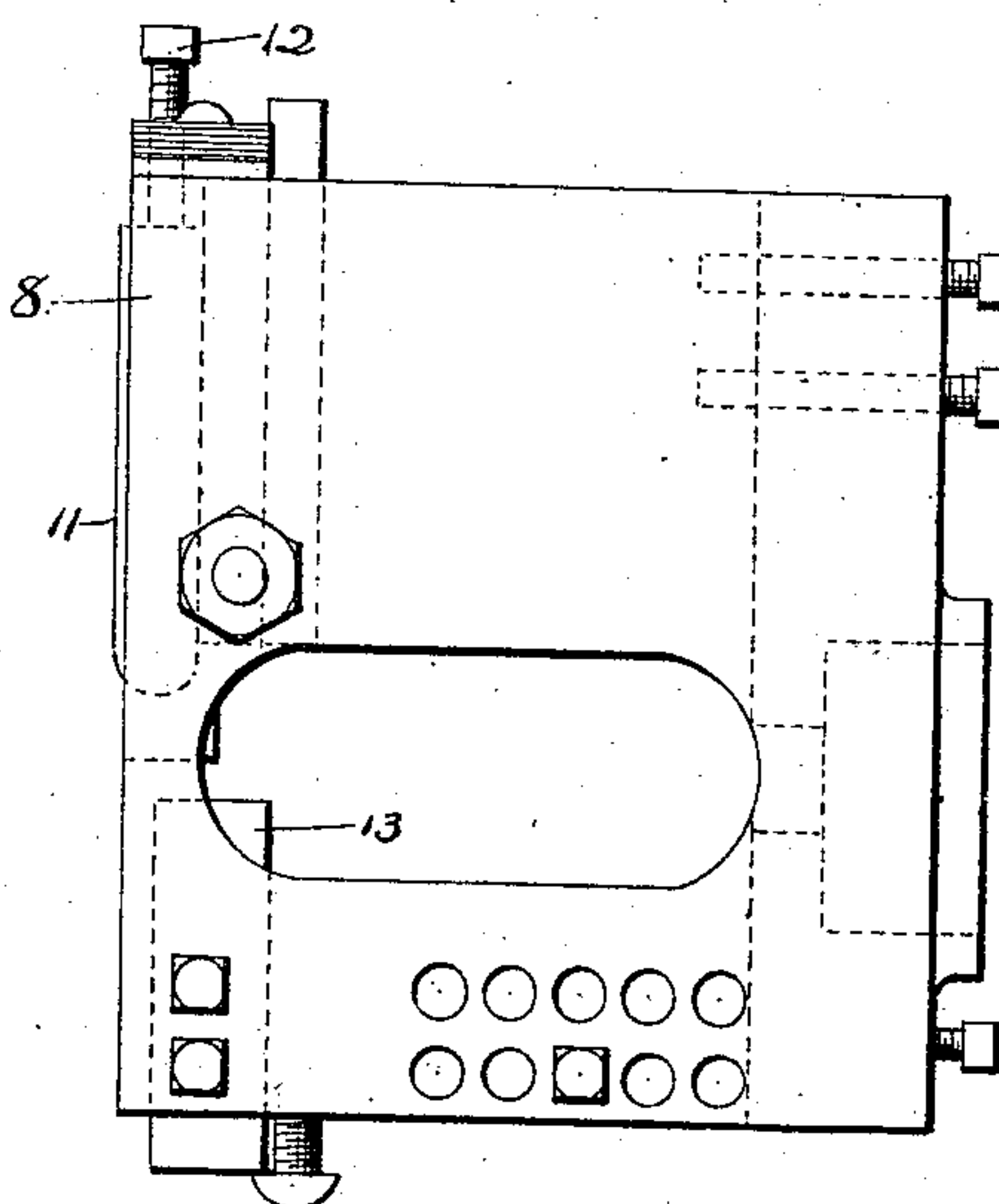


Fig 5.

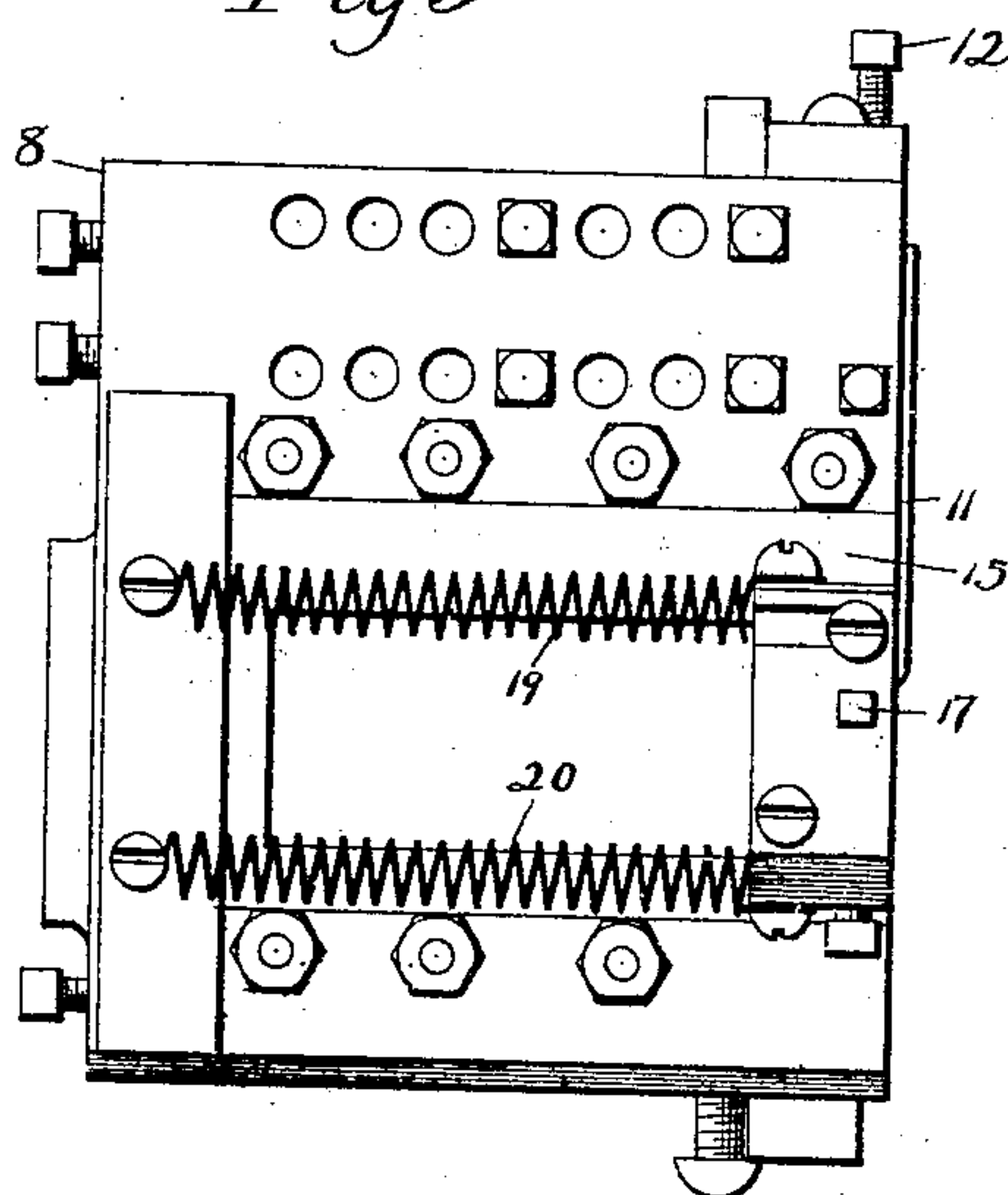


Fig 6.

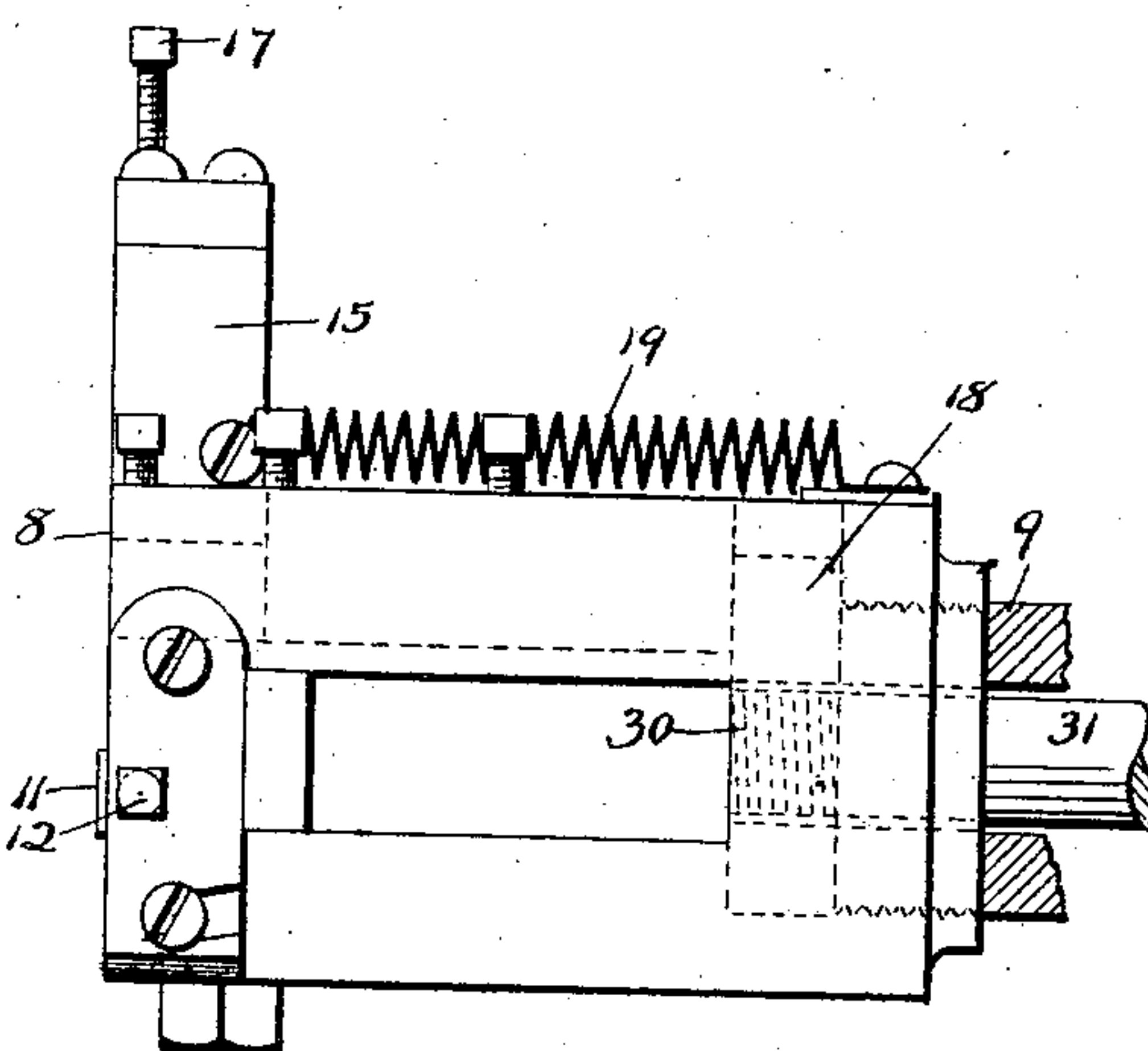


Fig 7.



Fig 8.



Fig 9.



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# UNITED STATES PATENT OFFICE.

JAMES ENGLISH, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO REYNOLDS & CO., OF NEW HAVEN, CONNECTICUT, A CORPORATION.

## SCREW-MACHINE.

No. 870,499.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed March 25, 1907. Serial No. 364,488.

*To all whom it may concern:*

Be it known that I, JAMES ENGLISH, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented  
5 a new and useful Improvement in Screw-Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear,  
10 and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a side view of a screw machine constructed in accordance with my invention. Fig. 2 a top or plan view of the same, the driving mechanism which is of  
15 substantially usual construction being omitted. Fig. 3 a face view of the cutter-head. Fig. 4 a side view looking to the right of Fig. 3. Fig. 5 a side view looking to the left of Fig. 3. Fig. 6 a plan view of the cutter. Fig. 7 a side view of the end of the stock after the break-  
20 ing-down cutter has completed its operation. Fig. 8 a side view of the same after the finishing cutter has completed its operation. Fig. 9 a side view of a screw as completed.

This invention relates to an improvement in machines for making screws, and while capable of making screws of various styles is particularly intended for machine screws such as are formed from stock corresponding in cross-section to the form of the head. In the  
25 usual manufacture of screws the stock is first broken down or trimmed by a cutter mounted in one head making a rounding cut so that when it completes its operation a certain amount of stock is left beneath the head. The blank is then finished by a finishing cutter mounted in a second head, which finishing cutter  
30 makes a square cut and removes the stock beneath the head so as to form a shoulder between the head and shank, the blank being then threaded by a threading die carried by another head. Thus three separate and independent operations are required.

40 The object of this invention is to construct a head which shall carry a breaking down or reducing cutter and a finishing cutter which, after the breaking down or reducing cutter has completed its operation, will advance to finish the shank portion of the screw and  
45 the under face of the head, performing these two operations substantially simultaneously; that is, the two cutters will advance with the finishing cutter slightly in rear of the breaking-down cutter, and when the breaking-down cutter has reached the limit of its  
50 movement, the finishing cutter may advance to a point slightly in advance of the breaking-down cutter so as to complete the formation of the shank of the screw and finish the under face of the head so that the blank is ready to be threaded by a die carried in the same machine; and the invention consists in the construction

hereinafter described and particularly recited in the claims.

The construction of the machine will be best understood by a description of the various steps in the operation of forming a completed screw. 60

The stock 2 is fed into the machine through a chuck 3 in which it is gripped, the stock being fed at predetermined intervals and in predetermined lengths, the chuck being revolved through a pinion 4 driven by a similar pinion 5 mounted on a driving shaft 6, all substantially as in the usual form of screw machines. The  
65 projecting portion 7 of the stock is in line with a cutter head 8 which is mounted upon a hollow shaft 9. Located in an undercut groove 10 in the face of the head 8 is a breaking-down or reducing cutter 11 adjustable by means of a set screw 12. Beneath the reducing cutter 11 is a backing block 13 on which the blank 7 may rest and be supported. In one side of the head is an undercut groove 14 in which a longitudinally movable  
70 slide 15 is mounted, and in this slide is a transversely arranged finishing cutter 16 held and adjusted by a set screw 17, the cutting portion of the finishing cutter 16 being slightly in rear of the cutting portion of the reducing cutter 11. This slide 15 while moved forward  
75 by the head 8, may be moved independent of it, and is formed at its rear end with an inwardly extending lug 18, and the slide is connected with the head by springs 19 and 20. 80

The hollow shaft 9 on which the head is mounted extends rearward through bearings 21 and 22 which are  
85 fixed to a transversely movable bed 23 mounted upon a longitudinally sliding bed 24 which slides on a main bed 28; and on the rear end of the tubular shaft is a flanged collar 25 which flange enters a notch 26 in a block 27 secured to the sliding bed 24 having a depending  
90 stud 29. The slide 15 in the head 8 is attached to the threaded end 30 of a shaft 31 which extends through the hollow shaft 9 and projects beyond it at the rear. Mounted upon the sliding bed 24 is a block 32 in which  
95 a headed screw 33 is mounted in position to engage with the rear end of the shaft 31, but normally out of engagement therewith. This block 32 is connected with the block 27 by a spring 34 and has a depending  
100 stud 35 which extends down through the sliding bed 24 and bed 28 so that it can be moved independently of both. Below the bed 28 which is supported by legs  
36 is a large cam wheel 37 having a cam rib 38 adapted to engage with the stud 29 so as to move the sliding bed 24 and with a cam rib 39 adapted to engage with the  
105 stud 35 so as to move the block 32. This cam wheel 37 is mounted on a shaft 40 on which is fixed a large gear wheel 41 which meshes with a pinion 42 on a shaft 43 driven by a belt pulley 44, the pulley 44 being free to turn upon the shaft 43 but thrown into engagement  
110 therewith by a clutch 45 on the shaft 43, the clutch



being thrown through a link 46 connected with one arm 47 of a bell-crank lever, the other arm 48 of which is connected by a connecting rod 49 with a small hand cam lever 50 mounted upon the bed of the machine.

- 5 Thus the head 8 with its slide 15 may be moved forward and after the head has reached a predetermined point the cam 39 will engage with the stud 35 of the block 32, moving that block forward upon the sliding bed 24 and against the shaft 31 forcing the slide 15 forward and the finishing cutter 16 slightly beyond the cutter 11, so that the finishing cutter 16 advances to finish the shank of the screw and the under face of the head, the breaking down or reducing cutter 11 making a round cut, while the finishing cutter makes a square cut. After these two cutting operations have been performed, the sliding bed 24 is retired, drawing the head 8 with it, the slide returning to its normal position under the action of the springs 19 and 20 which have been extended by the forward movement of the slide.

- Mounted in bearings 51, 52, arranged side by side with the bearings 21 and 22, is a shaft 53 carrying a screw threading die 54. At one side the transversely movable bed 23 is connected with a lever 55 and at the opposite side with a lever 56, these levers being engaged respectively by cams 58 mounted on a cam wheel 59 also mounted on the shaft 40 and so as to move the transversely movable bed from side to side so that after the blank has been reduced and finished, the threading die 54 will be brought into line with it. When this sliding bed has thus been moved to bring the threading die in line with the blank, the rearwardly extending end 60 of the shaft 53 comes into line with the screw 33 in the block 32, and by means of suitable cams 61 on the cam wheel 37 the block will again be moved forward so as to force the cutting die 54 onto the blank, and the extent of movement depends upon the extent to which the blank is to be threaded, the operating movement of the threading-die being regulated by a stem 69 which is longitudinally adjust-

able and with which a lug 70 on the threading die engages. When the lug passes beyond the stem 69 the die will be free to revolve with the screw being cut.

In order to hold the transversely movable bed 23 in proper position so as to present the head 8 or the threading die 54 to the blank, a vertically movable pin 71 is arranged below the bed of the machine and adapted to lock the transversely movable slide therewith, this pin being mounted in one end of a lever 72 which lever is turned by a cam and the pin normally forced upward by a spring 74. After the blank has thus been broken down, finished and threaded, it is severed from the strip of stock 2 by means of cutters arranged in the usual way of screw machines. It will thus be seen that stock is broken down or reduced, finished and threaded at practically two operations, thereby reducing the number of parts in a screw machine and simplifying the operation.

I claim:—

1. A screw machine comprising a head, a breaking-down cutter mounted therein, a slide arranged in one side of said head, a finishing cutter mounted in said slide, and means for advancing said head and slide, and means for advancing said slide beyond said head, substantially as described.
2. In a screw machine, a head carrying a breaking-down cutter, a slide mounted in said head and carrying a finishing cutter, springs connecting said slide and head and tending to keep the finishing cutter in rear of the reducing cutter, means for advancing said head and slide, and means for advancing the slide beyond said head, substantially as described.
3. In a screw machine, a head mounted upon a hollow shaft, a breaking-down cutter mounted in said head, a slide arranged in one side of said head, a finishing cutter mounted in said slide, said slide connected with a shaft extending through the said hollow shaft, means for moving said shafts to advance said head and slide together, and for advancing said slide independent of the head, substantially as described.

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

JAMES ENGLISH.

Witnesses:

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CLARA L. WEED.