No. 816,393. PATENTED MAR. 27, 1906.

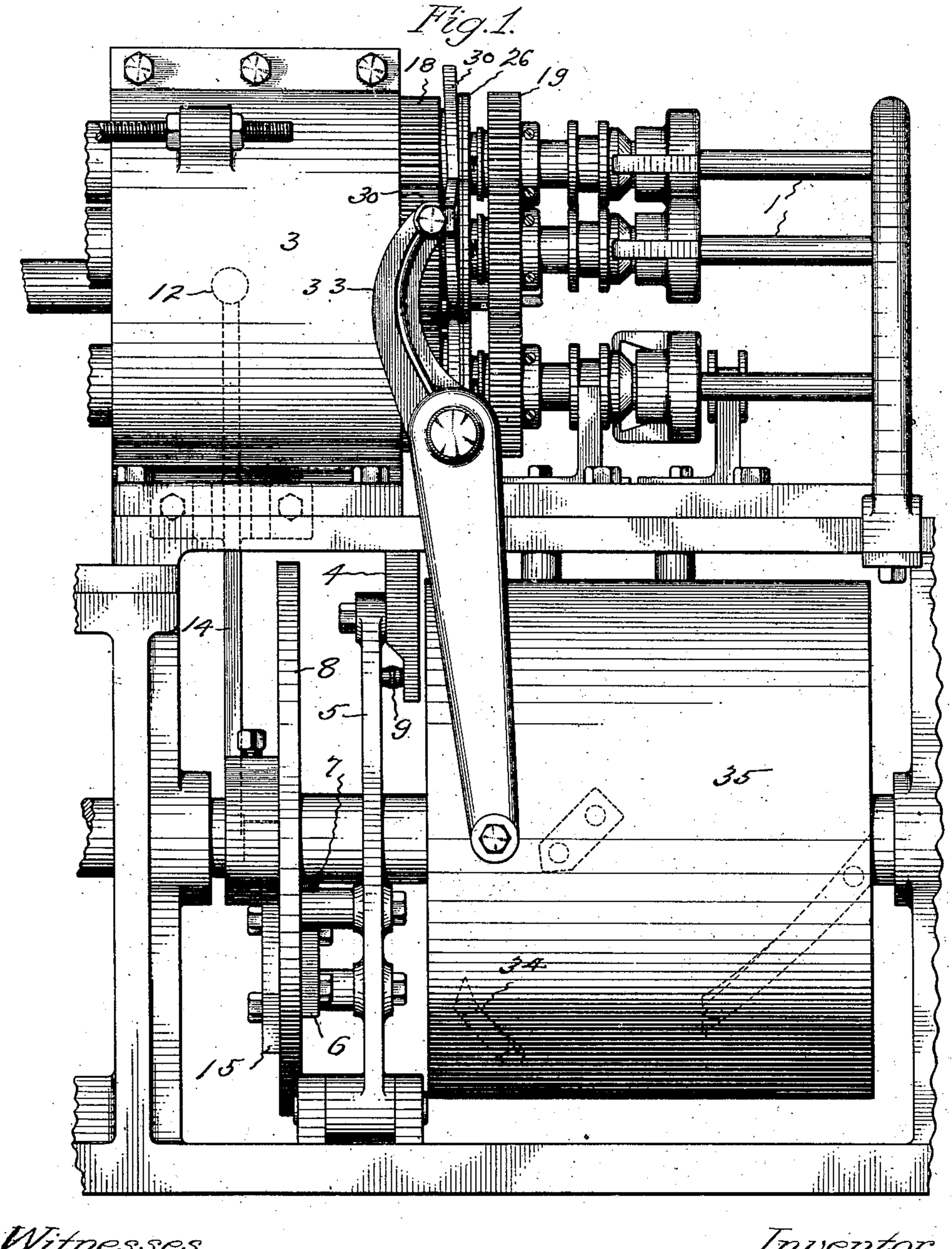
C. M. SPENCER.

THREADING MECHANISM FOR AUTOMATIC SCREW MACHINES.

APPLICATION FILED MAR. 2, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
C. F. V. Storey.
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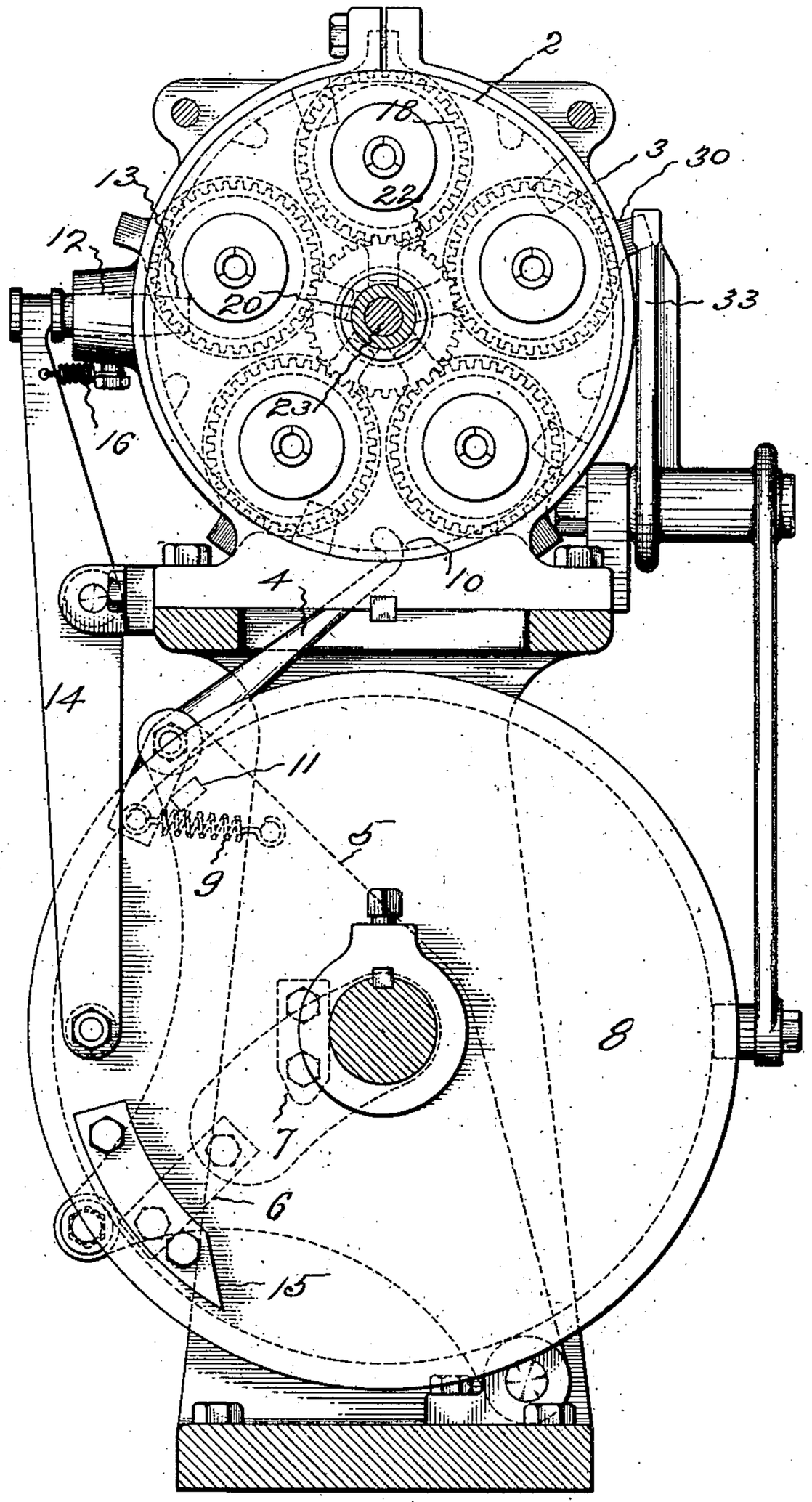
3 SHEETS—SHEET 2.

Fig. 2.



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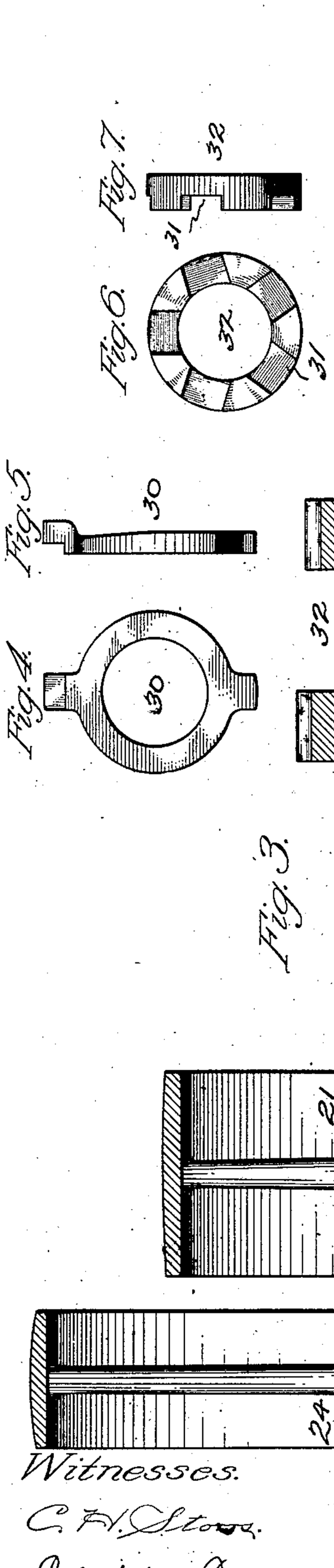
3 SHEETS—SHEET 3.



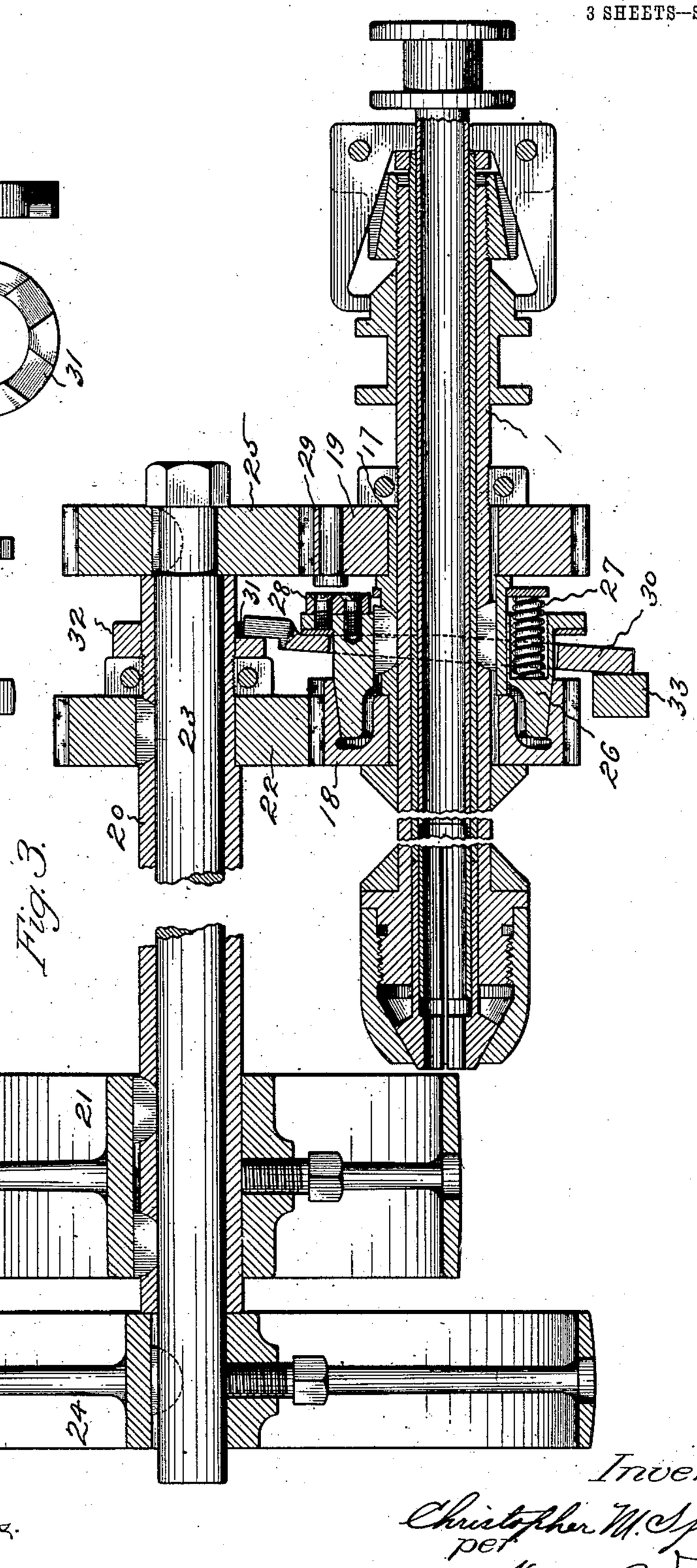


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER M. SPENCER, OF WINDSOR, CONNECTICUT, ASSIGNOR TO THE UNIVERSAL MACHINE SCREW COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

THREADING MECHANISM FOR AUTOMATIC SCREW-MACHINES.

No. 816,393. Specification of Letters Patent. Patented March 27, 1906.

Application filed March 2, 1905. Serial No. 248,040.

To all whom it may concern:

Be it known that I, CHRISTOPHER M. SPENCER, a citizen of the United States, residing at Windsor, in the county of Hartford and State of Connecticut, have invented a new and useful Threading Mechanism for Automatic Screw-Machines, of which the following is a specification.

This invention relates to an automatic multiple-spindle screw-machine which is constructed to feed a continuous length of rod through each spindle and to turn down, form, thread, and cut off a piece of each rod as it is carried by a spindle from tool to tool of the type illustrated and described in my application for patent filed May 4, 1904, Serial No. 206,277. The threading mechanism in machines of this character must act positively, accurately, and at the correct time; otherwise the tools will become broken or the stock be imperfectly threaded. To insure efficient operation, the threading mechanism should work easily and quickly, with but little friction, and to insure uniform results must be firm and durable.

The object of this invention is to provide a simple and sensitive threading mechanism which will work accurately, with but little friction, and will be very durable.

Figure 1 of the accompanying drawings shows a side elevation of so much of one of these automatic screw-machines as is necessary to illustrate the invention herein claimed. Fig. 2 shows a transverse section of the same looking toward the left-hand side of Fig. 1. Fig. 3 shows, on much larger scale, a longitudinal section of the mechanism which causes the stock to be rotated in one direction for turning it into the threading-die and rotated in the opposite direction for turning it out of the threading-die. Fig. 4 shows a face view of a clutch-shifting yoke. Fig. 5 shows an edge view of this yoke. Fig. 6 shows a face view of the collar which supports the inner ends of the yokes, and Fig. 7 shows an edge view of the collar.

The tubular spindles 1 are supported by a cylindrical spindle-head 2, mounted so that it may be rotated in an annular frame 3. The head, with the spindles, is rotated at intervals from position to position by means of the finger 4, pivotally mounted on the lever 5, which is swung in one direction by a cam 6 and in the opposite direction by a cam 7 on the face of the cam-disk 8. A spring 9 tends to hold the end of the finger in one of the notches 10 in the periphery of the spindle-head, and a cam 11 on the face of the cam-disk is arranged to at the proper time cause the end of the finger to withdraw from the notch it occupies.

The head is locked in position while the tools are operating by a bolt 12, supported by the frame. The inner end of the bolt is adapted to project into the mortises 13 in the periphery of the head. The outer end of the bolt is engaged by the lever 14, that is oscillated for withdrawing the bolt from a mortise by a cam 15 on the face of the cam-disk and oscillated for thrusting the bolt into a mortise by a spring 16.

Loose on a sleeve 17 on each spindle are a gear 18 and a gear 19. On the central tubular shaft 20, that is provided with a driving-pulley 21, is a gear 22, that meshes with all of the loose spindle-gears 18. On a solid shaft 23, that extends through the central tubular shaft and is provided with a driving-pulley 24, is a gear 25, that meshes with all of the loose spindle-gears 19. The pulleys are belted so that one will run in one direction and the other in the opposite direction.

Between the gears 18 and 19, that are loose on the sleeve 17, which is keyed to the spindle, is a clutch-collar 26. One end of the clutch-collar, which is movable along but rotates with the sleeve, is tapered and is forced into the tapering recess of the gear 18 by springs 27. On the other end of the clutch-collar is a block 28, that is adapted to engage with the end of a pin 29, projecting from the gear 19. When the clutch is in its normal position, the spindle is rotated at high speed forwardly by the pulley 21 through the gear 18. When the clutch is moved against the springs, so that the block 28 engages the pin 29, the gear 18 is released, and the gear 19 is connected with the spindle, and then the spindle is rotated in the opposite direction at a slower speed by means of the pulley 24.

Encircling each clutch-collar is a yoke 30. The inner end of each yoke extends into a recess 31 in a collar 32, that is loosely mounted on the central tubular shaft 20 between the

gears 22 and 25. The outer end of each yoke projects to such an extent that as the spindle-head rotates it extends into the plane of the path of the upper end of a lever 33. This lever is adapted to be oscillated at the proper time by means of the cam 34 on the cam-cylinder 35. When this lever is oscillated by the cam, it engages the outer end of a yoke and forces a clutch-collar back, so as to release a gear 18 and connect a gear 19 for the purpose of reversing the rotation of the spindle. This reverse movement takes place just before the die is moved up for the purpose of threading the stock, so that the stock will be threaded by the reverse rotation of the spindle. After the thread has been cut the cam releases the lever 33 and the yoke 30, so that the springs may throw the clutch out of engagement with the gear 19 into engagement with the gear 18 in order that the spindle may be again rotated forwardly and the stock unscrewed from the die which has cut the thread.

By means of this construction the spindle which carries the stock is rotated forwardly at a rapid speed all of the time during its revolution with the head, except when the cam on the cam-cylinder oscillates the lever 33 and causes the yoke 30 to disengage the clutch from the gear 18 and engage the gear 19. Then the spindle is rotated backwardly at a slower speed. The gears are always in mesh and are positively connected with the spindle at the proper time. The yokes which cause the shifting of the clutches have an extended bearing-surface in contact with the clutch-collar, so that the wear is reduced to a minimum, and there is such a leverage that the clutch-collars are moved easily and do not bind and cramp on the sleeve on which they move.

The invention claimed is—

1. In a screw-machine a plural number of revoluble tubular spindles, two gears loosely mounted upon each spindle, a central driving-shaft, a gear mounted on the central shaft and meshing with one gear on each spindle, a tubular driving-shaft on the central shaft, a gear mounted on the tubular shaft and meshing with the other gear on each spindle, a clutch on each spindle for connecting either of the gears with its spindle, a yoke encircling each clutch, a lever for moving the yokes, and a cam for oscillating the lever, substantially as specified.

2. In a screw-machine a plural number of revoluble tubular spindles, two gears loosely mounted upon each spindle, a central driving-shaft, a gear mounted on the central shaft and meshing with one gear on each spindle, a tubular driving-shaft on the central shaft, a gear mounted on the tubular shaft and meshing with the other gear on each spindle, a clutch on each spindle for connecting either of the gears with its spindles, a yoke encircling each clutch and a collar on the central shaft holding the inner ends of the yokes, substantially as specified.

3. In a screw-machine a plural number of revoluble tubular spindles, two gears loosely mounted upon each spindle, a central driving-shaft, a gear mounted on the central shaft and meshing with one gear on each spindle, a tubular driving-shaft on the central shaft, a gear mounted on the tubular shaft and meshing with the other gear on each spindle, a clutch on each spindle for connecting either of the gears with its spindle, a yoke encircling each clutch, a collar on the central shaft holding the inner ends of the yokes, a lever adapted to engage the outer ends of the yokes, and a cam for oscillating the lever, substantially as specified.

4. In a screw-machine a plural number of revoluble tubular spindles, two gears loosely mounted upon each spindle, a clutch keyed to each spindle between the gears, springs adapted to thrust the clutches in one direction, a central driving-shaft, a gear mounted on the central shaft and meshing with one gear on each spindle, a tubular driving-shaft on the central shaft, a gear mounted on the tubular shaft and meshing with the other gear on each spindle, a yoke encircling each clutch, a collar mounted on the driving-shaft and having mortises receiving the inner ends of the yokes, a lever adapted to engage the outer end of each yoke and force it and the clutch against the thrust of the springs, and a cam for oscillating the lever, substantially as specified.

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Witnesses:
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ETHEL M. LOWE.