O. A. SMITH.

MULTIPLE SPINDLE AUTOMATIC LATHE.

APPLICATION FILED MAR. 21, 1910.

992,277.

Patented May 16, 1911.

4 SHEETS—SHEET 1.

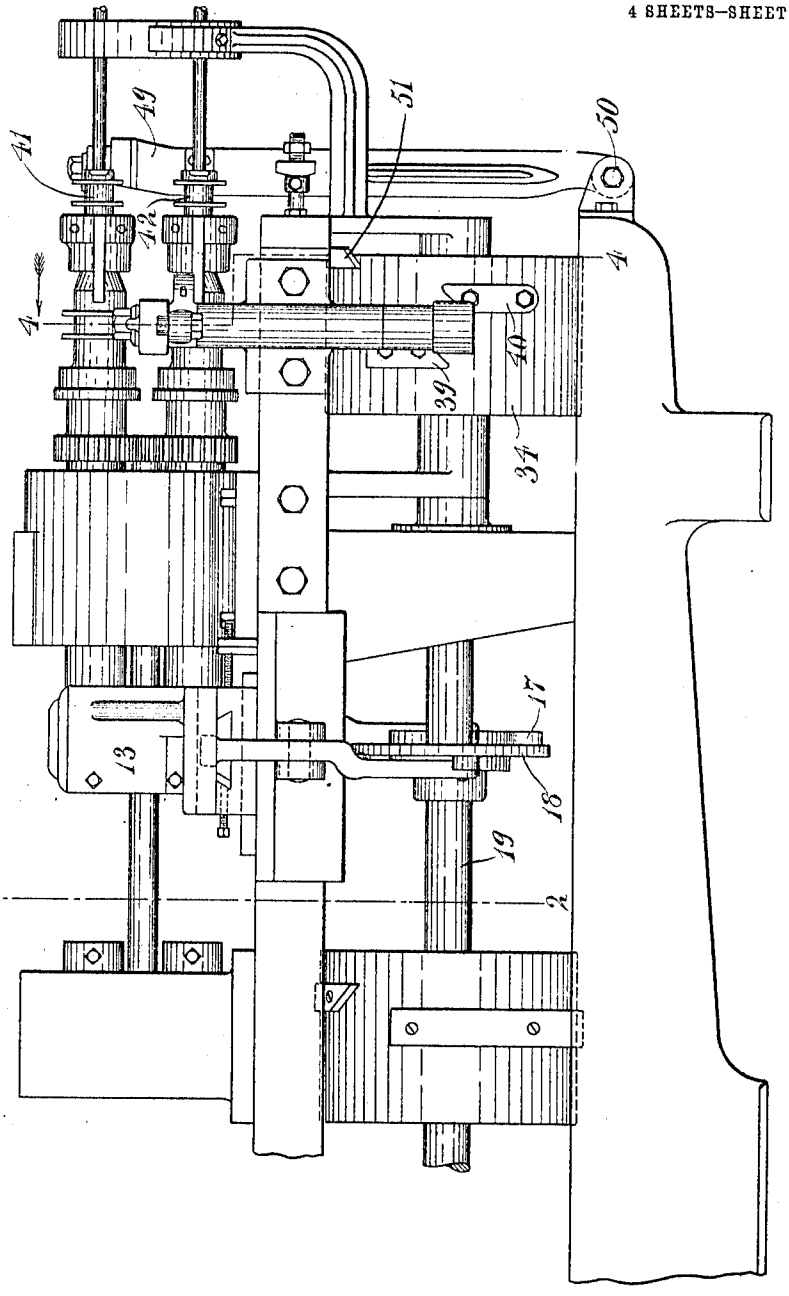

Fig. 1.

Witnesses:

L. C. Badeau.

H. D. Penne.

Inventor:

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By his Attorney, W. A. Richards

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4 SHEETS—SHEET 2.

Fig. 2.

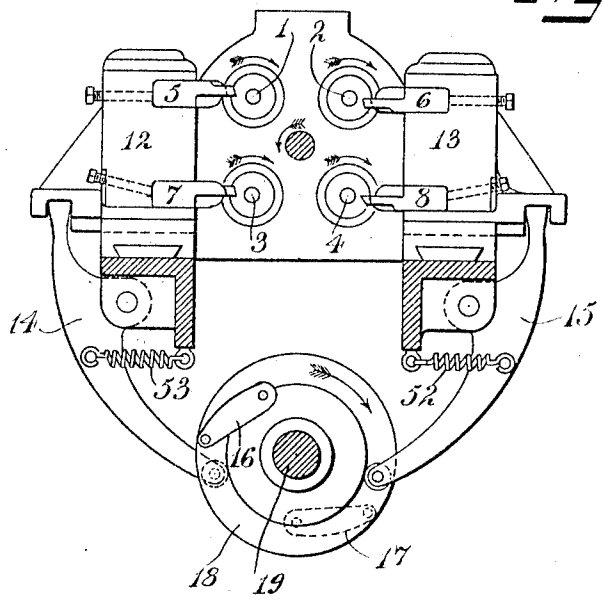
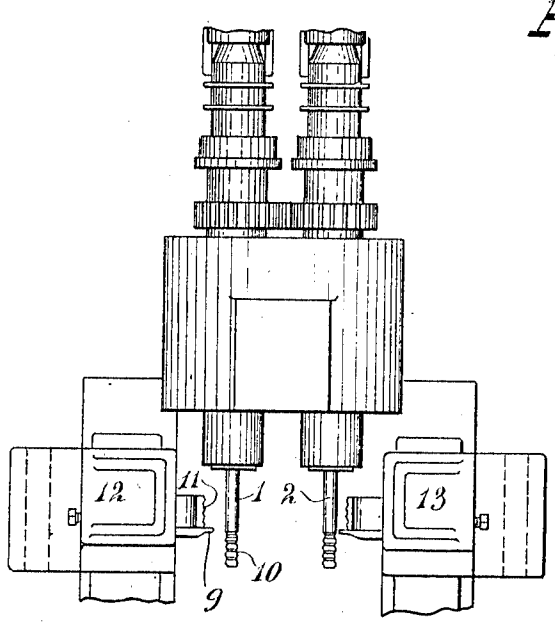


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

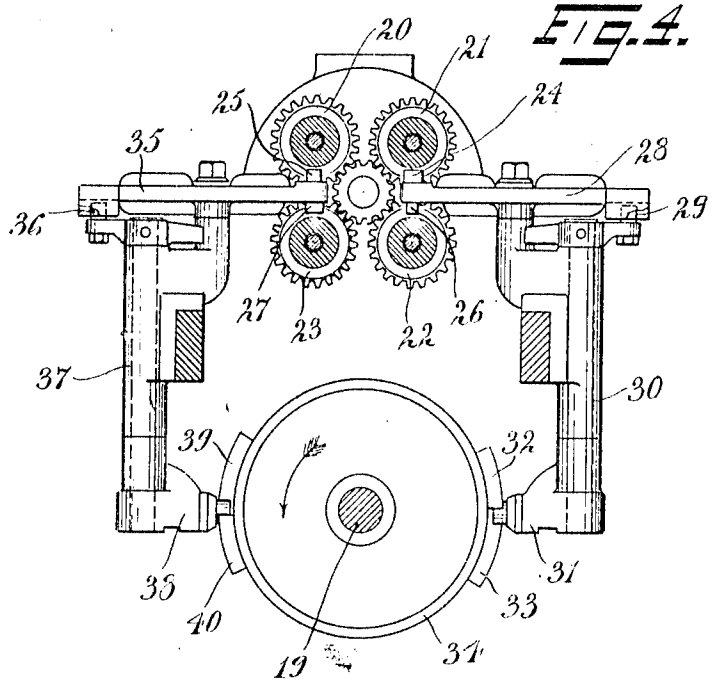
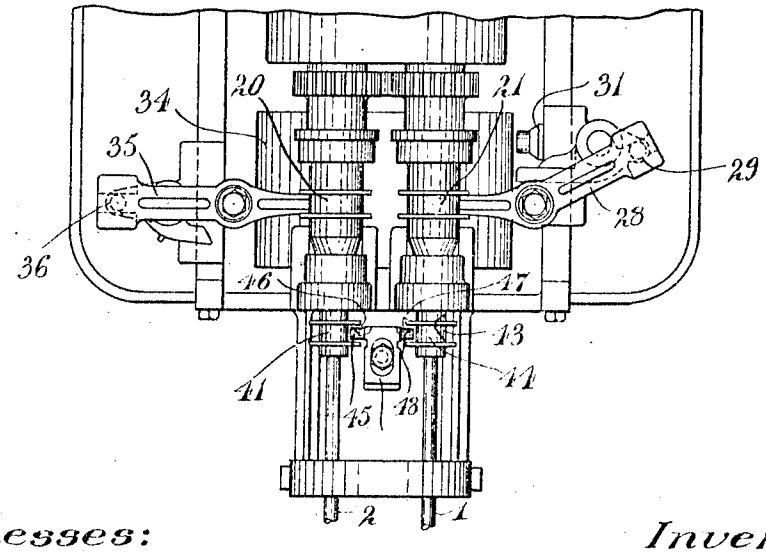


Fig. 5.



Witnesses:

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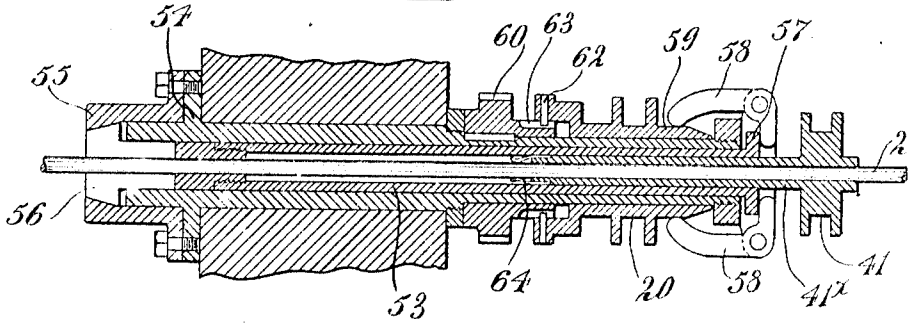
4 SHEETS—SHEET 4.

FIG. 6.



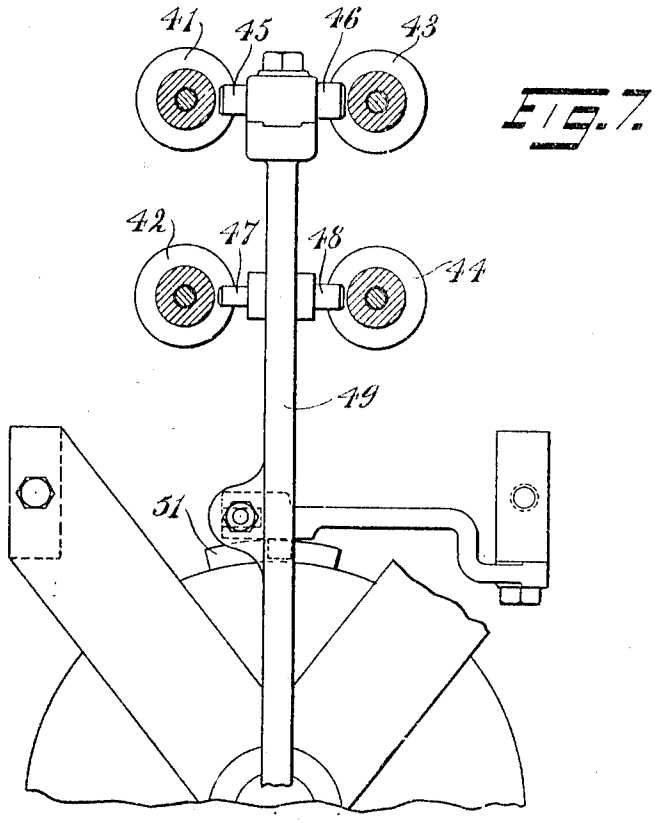


FIG. 7.

Witnesses:

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W. D. Penney

Inventor:

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UNITED STATES PATENT OFFICE.

OSCAR A. SMITH, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL-ACME MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

MULTIPLE-SPINDLE AUTOMATIC LATHE.

992,277. Specification of Letters Patent. **Patented May 16, 1911.**

Application filed March 21, 1910. Serial No. 550,710.

To all whom it may concern:

Be it known that I, OSCAR A. SMITH, a citizen of the United States, residing in Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Multiple-Spindle Automatic Lathes, of which the following is a specification.

This invention relates to multiple spindle automatic lathes wherein a number of pieces of stock are concurrently operated by similar tools.

The object of the invention is to provide a mechanism which will minimize the shock normally attending the simultaneous forward feeding of all the stock rods, the simultaneous advance and retraction of the tools, and the simultaneous engagement of a number of similarly acting tools upon the stock. In the present illustration there are four stock spindles and four similar tools, one for the stock of each spindle. It is desirable that the operations performed upon all of the stock rods be carried forward concurrently, but for relieving or minimizing the shock the various movements and operations should not be effected simultaneously.

In the drawings accompanying and forming a part of this specification Figure 1 is an elevation of a practicable embodiment of a form of my invention; Fig. 2 is a cross section taken on a plane at about the line 2—2 of Fig. 1 looking in the direction of the arrow; Fig. 3 is a top plan view of the left hand end of the machine; Fig. 4 is a cross section taken on a plane at about the line 4—4 of Fig. 1 looking in the direction of the arrow; Fig. 5 is a top plan view of the right hand end of the machine; Fig. 6 is a vertical section enlarged through one of the stock spindles; and Fig. 7 shows enlarged the means for shifting the stock in the spindles.

In the present illustration there are four stock spindles respectively carrying stock rods 1, 2, 3 and 4 which will be operated respectively by tools 5, 6, 7 and 8. Each of the tools for the purpose of illustration comprises a cutting off portion 9, for cutting off the finished work 10, and a shaping portion 11, for engaging the stock and reducing this to the desired configuration.

The tools 5 and 7 are mounted upon a tool post 12 movable toward and from the stock. The tools 6 and 8 are mounted on a tool post 13 also movable toward and from the stock. A lever 14 is provided for moving the tool post 12 and a lever 15 for moving the tool post 13. These levers are provided with rolls for the engagement of cams 16 and 17 respectively on the cam wheel 18. The cam wheel is fast upon the general cam shaft 19 of the machine. The tool posts are retracted by extension springs 52 and 53. The timing of the cams is such that the tool post 13 will be moved toward the work in advance of the movement of the tool post 12. The tool posts will also be retracted one after the other. By this means the engagement of the tools with the stock is not simultaneous throughout the machine. The forward and backward movement of the tool posts is also not simultaneous. By this means the overloading of the driving power of the machine is avoided.

There are four stock spindles illustrated which are identical in construction and are shown in detail in Fig. 6 comprising a sleeve 53 on which rotates an outer sleeve 54 carrying a clutch member 55 at one end that is engaged by a cone clutch 56 fast on one end of the stock spindle 53; whereby when the stock spindle 53 is shifted endwise this clutch member will serve to clamp the stock 2. The stock spindle is shifted endwise by having its flanged end 57 engaged by levers 58 that are swung by means of a cone 59. The latter carries a spool 20 by which it is shifted endwise to swing the levers and thereby engage and disengage the stock from the stock spindle. A gear 60 is splined on the sleeve 54 and serves to rotate the latter. The slidable sleeve 59 carries a pin 62 sliding in a slot 63 in the hub of the gear member whereby the gear will rotate the sleeve. By this means the stock spindle will be constantly rotated, and when the clutch is shifted to engage the stock it will be at once rotated. The four stock spindles, as just described carry sleeves having spools 20, 21, 22 and 23, as shown.

The shoes 24 and 26 are carried by one end of a lever 28. The other end of which lever is engaged by a wrist pin 29 carried by a rock shaft 30 which has fast upon it an arm 31 for the engagement of the cams 32 and 33 on the cam drum 34. The cam drum is mounted upon the main shaft 19 of the machine. Shoes 25 and 27 are carried by

one end of a lever 35. The other end of which lever is engaged by a wrist pin 36 carried by a rock shaft 37, an arm 38 of which engages the cams 39 and 40 on the cam drum 34. The relative timing of the cams 32 and 39, and 33 and 40 is such that the levers 28 and 35 will be operated one slightly in advance of the other. The shoes 24, 25, 26 and 27 are of dissimilar sizes so that some of these will have a certain free movement between the flanges of the spools. The different dimensions of the shoes and the dissimilar movement of the levers will result in the chucks of the spindles being operated one in advance of the other, for opening and also for closing the chucks. This will relieve shock upon the machine and also prevent overloading the driving power.

The spools for operating the forwarding feed of the stock rods are represented at 41, 42, 43 and 44 respectively and are engaged by pins 45, 46, 47 and 48 respectively which are carried by a lever 49 pivoted at 50 to the machine frame and actuated by means of a cam 51 controlled by the cam shaft. These pins are also of diverse dimensions so that the spool flanges will be engaged one at a time in the forward movement and also one at a time in the backward movement of the spools. This also is for the purpose of preventing shock and overload.

The sleeve 41^x is an extension of the spool 41, and carries a spring clutch 64 that will serve to engage and shift the stock 2 when the spool is advanced. At the period when the spool is advanced in one direction, the stock is released from the stock spindle permitting the stock to be fed. Thereupon the stock is gripped by the clutch as decribed and this clutch member upon being retracted to normal position will not shift the stock.

Having thus described my invention, I claim:

1. The combination of a circular series of stock spindles, means for simultaneously rotating the stock spindles, means in the stock spindles for gripping the stock, means for causing all of said latter means to grip the stock in the several spindles in a sequential order, means for effecting the simultaneous advance of the stock for the several spindles and for causing the starting of the advance movement in a sequential order.

2. The combination of a circular series of stock spindles, means for simultaneously rotating the stock spindles, means in the stock spindles for gripping the stock, means for causing all of said latter means to grip the stock in the several spindles in a sequential order, means for effecting the simultaneous advance of the stock for the several spindles and for causing the starting of the advance movement in a sequential order, and which means will start the withdrawal of the stock feeding means in a sequential order.

3. The combination of a circular series of stock spindles, means for simultaneously rotating the stock spindles, means in the stock spindles for gripping the stock, a plurality of tool holders one for each of the stock pieces, means for causing the simultaneous advance of the tool holders which means are organized to cause the tools to be brought into engagement with the stock in sequence whereby the simultaneous operation of the several members will be started in sequence.

4. The combination of a circular series of stock spindles, means in the stock spindles for gripping the stock, means for constantly rotating the stock spindles and gripping means, and means for causing said latter means to grip the stock in the several spindles in a sequential order in the act of causing the simultaneous rotation thereof.

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Witnesses:
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E. J. MASTERSON.