No. 722,938. PATENTED MAR. 17, 1903.

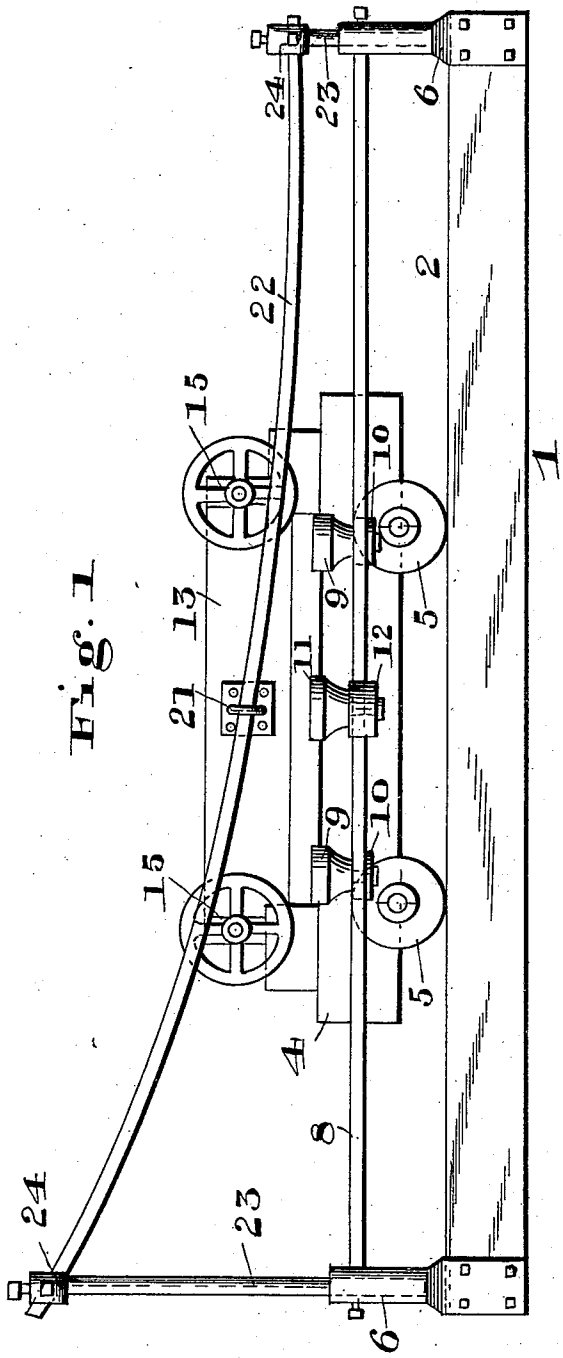
J. BENGE.

GRINDING MACHINE.

APPLICATION FILED NOV. 17, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

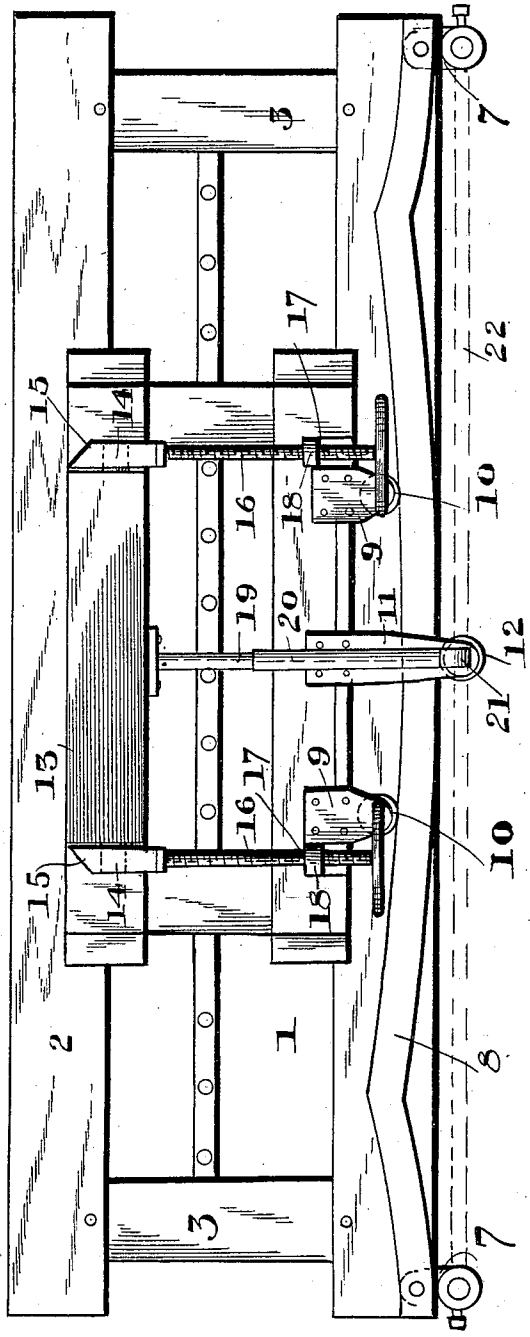


Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.

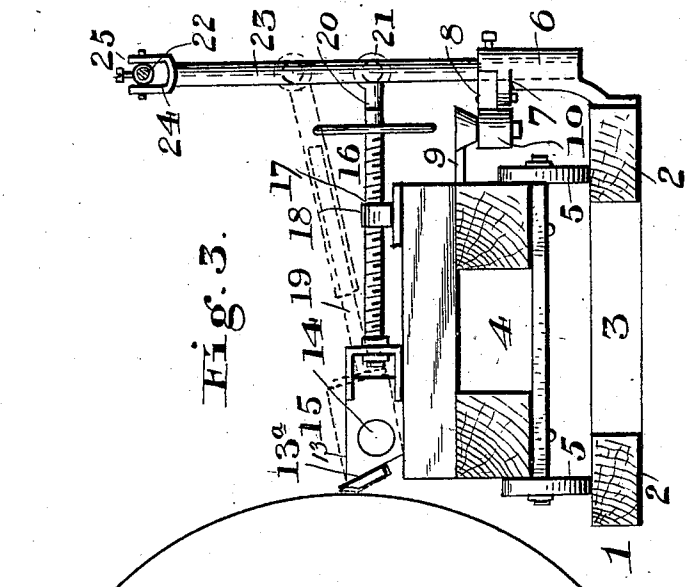
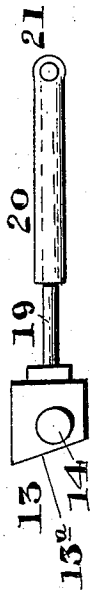


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN BENGE, OF YORKLYN, DELAWARE, ASSIGNOR TO THOMAS WILLIAMSON, OF HOCKESSIN, DELAWARE.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 722,938, dated March 17, 1903.

Application filed November 17, 1902. Serial No. 131,664. (No model.)

To all whom it may concern:

Be it known that I, JOHN BENGE, a citizen of the United States, residing at Yorklyn, in the county of Newcastle and State of Delaware, have invented new and useful Improvements in Grinding-Machines, of which the following is a specification.

My invention relates to grinding-machines, and has for its object to construct a machine for grinding spiral, straight, or curved knives.

The simple and novel construction employed by me in carrying out my invention is fully described and claimed in this specification and illustrated in the accompanying drawings, forming a part thereof, in which—

Figure 1 is a side elevation of my device. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a detail of the knife-holder, the rocking arm, and its sleeve.

Like numerals of reference designate like parts in the different views of the drawings.

The numeral 1 designates a bed comprising sills 2, connected by sills 3. A carriage 4 is mounted on the bed 1 and is provided with four wheels 5, having broad smooth faces to adapt them to run on the sills 2 and move transversely thereon. Standards 6 are bolted to the corners of the bed 1 and bear arms 7, which support a curved pattern 8. The curve of the pattern 8 is a plane curve, which extends parallel to the plane of the bed. Arms 9 are secured to the carriage 4 and bear guide-rollers 10, which engage the inner side of the pattern 8, while an arm 11, located intermediate the arms 9, carries a roller 12, which bears on the outer side of the pattern 8. By this arrangement every point of the carriage is constrained to describe a path which is a counterpart of the pattern 8. A knife block or carrier 13 is mounted on the carriage and is provided with trunnions 14, which are supported by boxes 15, carried by adjusting-screws 16, passing through threaded apertures 17, formed in lugs 18 on the carriage 4. The outer face 13^a of the knife-carrier is inclined and carries a suitable knife-holding device. (Not shown.) An arm 19 is connected to the knife-carrier 13 and extends at right angles to the axis thereof. A sleeve 20 is slidingly mounted on the arm 19 and is provided with an apertured head 21, which engages a guide-rod 22. The rod 22 is inclined to the plane of the bed 1 and is supported by two stems 23, which are adjustably mounted in the standards 6 and are provided with forked heads 24, which support pivoted collars 25, adjustably mounted on the guide-rod 22. The arrangement just described permits the ready adjustment of the angle of inclination of the guide-rod.

My device is located adjacent to a grindstone 26, with the carrier opposite the periphery thereof. In operation the carriage 4 is driven from some source of power. To insert a knife 27 for grinding, the knife-carrier is moved away from the stone 26 by use of the screws 16, which are provided with hand-wheels, and the knife inserted in the holder, after which the screws 16 are again operated to bring the knife in contact with the stone. The guide-rod 22 is then set at the proper angle and the machine started.

A different pattern may be substituted for the pattern 8, and even a straight one may be employed.

I do not wish to be limited as to details of construction, as these may be modified in many particulars without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grinding-machine, the combination, of a carriage mounted to move in a plane, a curved pattern, guides carried by said carriage and engaging said pattern, a knife-carrier mounted on said carriage and bearing trunnions fitted in bearings, a guide-rod extending at an angle to the axis of said knife-carrier, an arm connected to said knife-carrier and bearing an eye engaging said guide-rod, whereby said knife-carrier is given a rocking motion, substantially as described.

2. In a grinding-machine, the combination of a bed, a carriage mounted on said bed and constrained to move in a plane, a pattern, guides carried by said carriage and engaging said pattern, a knife-carrier mounted on said carriage and bearing trunnions fitted in bearings, a guide-rod inclined to the plane of movement of said carriage, and an arm car-

ried by said knife-carrier and engaging said guide-bar, whereby said knife-carrier is rocked on its axis, substantially as described.

3. In a grinding-machine, the combination of a bed, a carriage mounted on said bed, a pattern, guides carried by said carriage and engaging said pattern, a knife-carrier mounted to rotate about an axis, a guide-rod inclined to the axis of said carrier, and an arm connected to said knife-carrier and having an aperture therein engaging said guide-rod, substantially as described.

4. In a grinding-machine, the combination of a plane bed, a carriage mounted on said bed and bearing wheels, a pattern set parallel to said plane, a guide-rod extending at an angle to said plane, a knife-carrier rotatably mounted, and an arm connected to said knife-carrier and bearing a sliding sleeve having an aperture therein which engages said guide-rod, substantially as described.

5. In a grinding-machine, the combination of a carriage, a knife-carrier mounted on said carriage, a guide-rod extending at an angle to the axis of said carrier, an arm connected to said knife-carrier, and a sleeve sliding on said arm and having an aperture therein which engages said guide to rock said knife-carrier, substantially as described.

6. In a grinding-machine, a carriage mounted to move in a plane, a pattern parallel to said plane, guides carried by said carriage and engaging said pattern, a knife-carrier mounted on said carriage and constrained to rotate about an axis, and means for rocking said knife-carrier, substantially as described.

7. In a grinding-machine, the combination of two standards, stems adjustably mounted in said standards, means for clamping said stems, apertured heads mounted on said standards, and a guide-rod fitted in said heads, substantially as described.

8. In a grinding-machine, the combination of a carriage, a knife-carrier mounted on said carriage and bearing trunnions, boxes supporting said trunnions, adjusting-screws carrying said boxes, and means for rocking said knife-carrier, substantially as described.

9. In a grinding-machine, the combination of a carriage, a knife-carrier mounted on said carriage and provided with trunnions, boxes supporting said trunnions, adjusting-screws carrying said boxes, an arm carried by said knife-carrier, a sleeve slidingly mounted on said arm and bearing an apertured head, and a guide-rod engaging said head to rock said knife-carrier, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN BENGE.

Witnesses:
T. WESLEY VANDEVER,
ISRAEL W. MARSHALL.