A. E. MAYNARD AND W. A. GUNNING.

LAP FORMING MACHINE.

APPLICATION FILED JUNE 5, 1920.

1,408,305.

Patented Feb. 28, 1922.

2 SHEETS—SHEET 1.

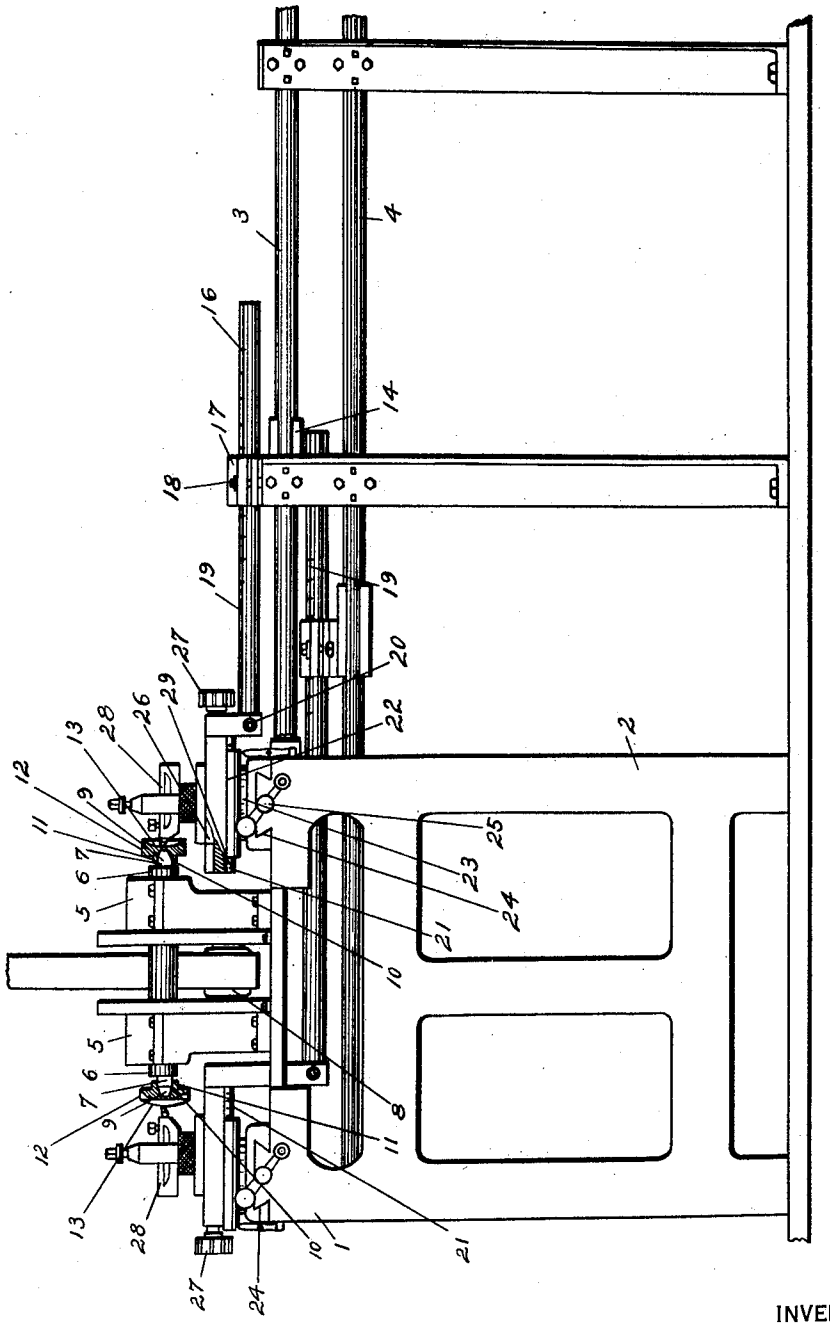


Fig. I

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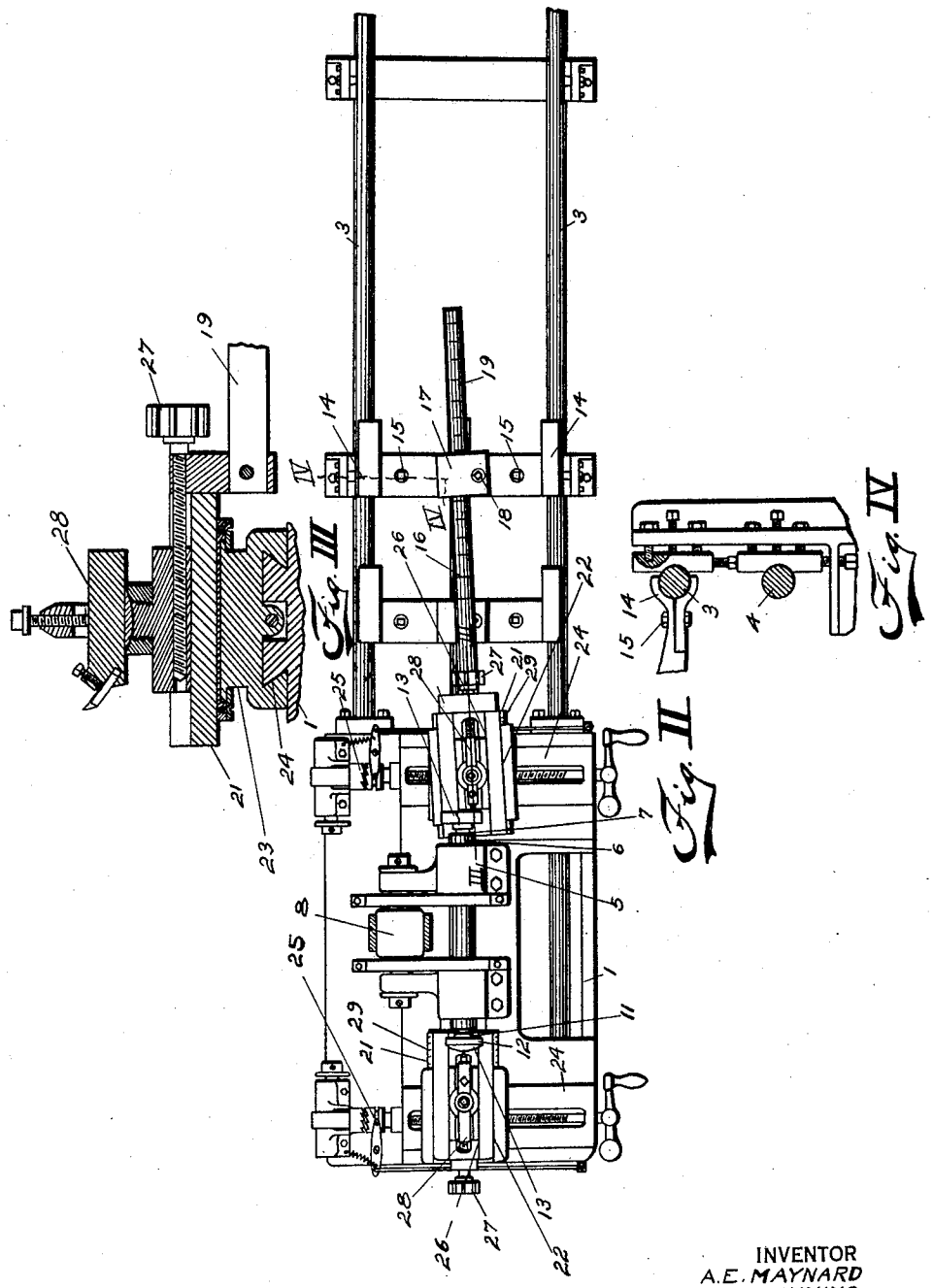


Fig. II

Fig. III

Fig. IV

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UNITED STATES PATENT OFFICE.

ALBERT E. MAYNARD AND WILLIAM A. GUNNING, OF SOUTHBRIDGE, MASSACHUSETTS, ASSIGNORS TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS.

LAP-FORMING MACHINE.

1,408,305. Specification of Letters Patent. Patented Feb. 28, 1922.

Application filed June 5, 1920. Serial No. 386,759.

To all whom it may concern:

Be it known that we, ALBERT E. MAYNARD and WILLIAM A. GUNNING, citizens of the United States, residing at Southbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Lap-Forming Machines, of which the following is a specification.

This invention relates to improvements in lap forming machines or machines for constructing the tools commonly designated as laps employed in the production of ophthalmic lenses or the like.

The principal object of the present invention is the provision of a simple readily constructed automatically operable machine which will serve to satisfactorily generate or produce the desired curve on the face of a metal lap, which machine shall be particularly useful in the formation of the flatter curves having long radii and consequently not satisfactorily producible through ordinary methods.

Other objects and advantages of our improved machine should be readily apparent by reference to the following specification taken in connection with the accompanying drawings, and it will be understood that we may make any modifications in the specific details of construction shown and described within the scope of the appended claims without departing from or exceeding the spirit of our invention.

Figure I represents a side elevation of a complete machine embodying our improvements.

Figure II represents a top plan view thereof.

Figure III represents a sectional view taken as on the line III—III of Figure II.

Figure IV represents a fragmentary sectional view as on the line IV—IV of Figure II.

In the drawings, the numeral 1 designates the main frame of our machine provided with suitable supports, such as the legs 2, and having secured thereto the upper pair of guides 3 and lower pair of guides 4. Said frame also has mounted thereon the head 5 provided with bearings 6 for the shaft 7 driven as by suitable power applied to the pulley 8 and having at each end the cone taper portion 9. This cone 9 is of such size as to fit the usual socket 10 formed in the shank 11 of the lap 12, which in ordinary practice is formed from cast iron or similar material and which for the proper production of lenses must have on its surface 13 an absolutely accurate and correct curve of the dioptric value, the counterpart of which is to be produced upon the glass. These curves it is to be understood vary greatly, running from a .12 diopter to 20. diopters or stronger in general practice. A large number, however, run in the weaker curves due to the fact that the average eye does not require a very strong correcting lens. In the past considerable difficulty has been experienced in attempting to accurately produce these weaker curves due to the long radius of curve and the variation produced by slight changes. Difficulties were also experienced in getting an absolutely true spherical curve and eliminating the possibility of a slight toroidal effect. In this connection it might be mentioned that the radius of a one-eighth diopter curve above referred to, is almost fourteen feet.

It is the purpose of our present invention to facilitate the production of these laps in a rapid and simple manner, requiring minimum attention of an operator and making it possible to at the one time readily produce a pair of contrageneric curves, that is, one tool having a positive and the other having a negative curve, to complete the pairs or sets in which such tools are to a large extent sold. In carrying out this result, therefore, we mount on each pair of guides 3 the slides 14 provided with locking members 15 for securing them in desired longitudinally adjusted position upon the guides. Each of these slides has pivotally mounted thereon the fulcrum member or sleeve 17, while adjustably mounted within the sleeve and retained in position by the screw 18 is the radius rod 19 provided with indications 16 denoting the points at which same is to be set with respect to the member 17 for the production of various desired curves. Each radius rod 19 has secured to its forward end the head 20 having rigid therewith the slide 21 working in the guides 22 of the swivelled turret 23 laterally slidable on the guide member 24, an automatic screw feed mechanism 25 being preferably employed to impart the desired cross feed to the member 23.

Mounted upon the slide 21 is a supplemental tool bearing slide 26 adjustable through the screw 27 to vary the in and out position of the tool 28, a suitable designation 29 being preferably provided on the slide 21 to aid in determining the position which the point of the tool should occupy when in properly adjusted relation.

It is to be noted that a similar mechanism is provided adjacent each of the cones 9 on the shaft 7, one of these mechanisms being attached to the upper and the other to the lower radius member 19, the tool in the one case extending outwardly from the radius member and in the other inwardly thereover, as will be understood by reference to Figure II. It will thus be seen that with the two radius rods properly set, the one in its swing will form a concave and the other in its swing will form a convex surface on the lap engaged by its tool, so that in this manner a pair of tools of either the same or different contrageneric curves may be produced by our machine at the one time. The two articles being worked on are immediately adjacent each other where they may be readily inspected by the operator in charge of the machine and the lock guides and radius rods substantially coincide one with the other so that minimum amount of space is occupied for the work to be produced.

In the operation of the machine the lap on which the curve is to be formed is placed on one of the cones 9 and the sleeve 17 is shifted to correct position for the curve to be generated along the radius rod 19, after which the slide 14 is adjusted along its guides to bring the cutting point of the tool in proper engagement with the lap. This having been done power is applied to the machine rotating the shaft 7 and lap 12, and at the same time operating the cross feed to transversely shift the member 23. This cross feed is at a very slow rate of speed so that the cutting tool may have plenty of time to operate on the rotating lap 12 but as the part feeds across on the slide 24 the tool bearing slide 21 on the end of the radius rod 19 will move inwardly or in the direction of the work through the slides 22, at the same time angling with rotation of the turret member 23, and in this way as the tool feeds across the exact desired curve will be generated upon the surface of the lap 12 as at 13, with the additional advantage that with the opposed tools and double lap arrangement the thrust is substantially equalized on opposite sides of the shaft 7, eliminating to a large degree any possible vibration or variation in position of the parts, and facilitating obtaining of best results and most perfect surfaces.

We claim:

1. A machine of the character described comprising a head having a double end rotary spindle, a pair of tool holders disposed one on each side of the head for cooperation with the ends of the spindles, and independent radius rods substantially coextensive operatively associated with the respective tool holders for controlling the position thereof.

2. A machine of the character described including a work head and a series of guides extending to one side thereof, a pair of slides mounted on the guides each having a pivot portion, a radius bar adjustably secured to the pivot portion of each of the slides, said bars extending to opposite sides of the head, and a tool holder carried by each of the bars for cooperation with the work head.

3. A machine for simultaneously producing concave and convex spherical tools, comprising a work head bearing a rotary spindle, said spindle having its opposite ends projecting from the head and each shaped to receive a tool socket, a tool cutter holder mounted for transverse and longitudinal movement adjacent each end of the spindle, coextensive guide tracks projecting to one side of the work head and spindle, and independent radius members adjustably mounted on said guides and operatively engaging the cutter tool holders for controlling the action thereof.

In testimony whereof we have affixed our signatures, in presence of two witnesses.

ALBERT E. MAYNARD.
WILLIAM A. GUNNING.

Witnesses:
ESTHER M. LAFLER,
ALICE G. HASKELL.