2 Sheets—Sheet 1.

J. D. ALVORD.

MACHINES FOR GROOVING METAL PULLEYS.

No. 180,409. Patented Aug. 1, 1876.

Fig 1

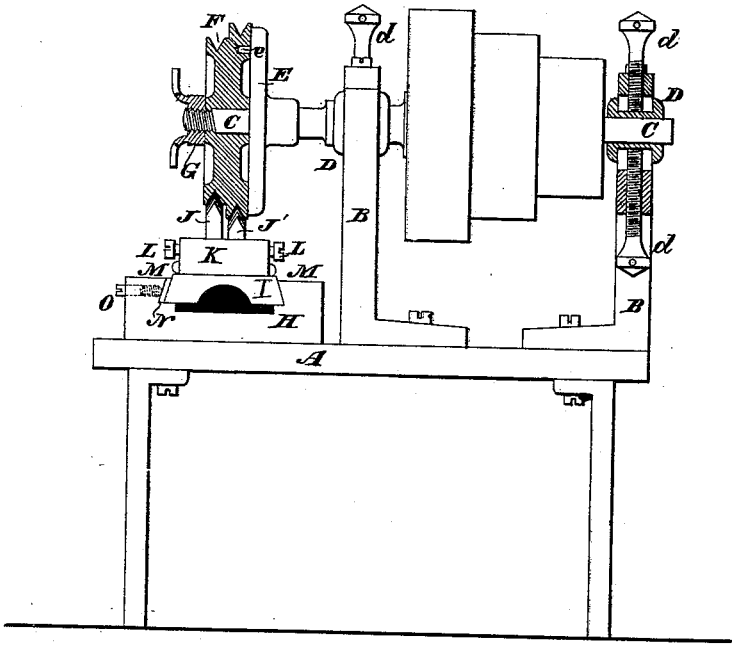
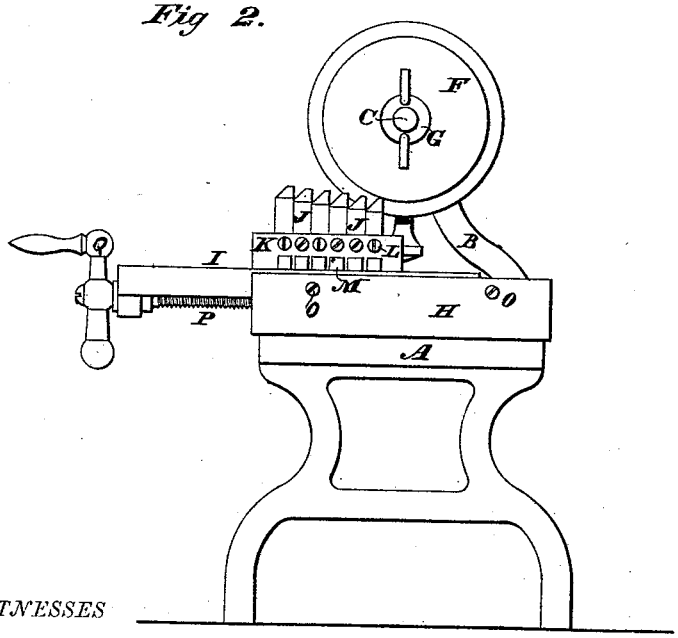


Fig 2.



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2 Sheets—Sheet 2.

J. D. ALVORD.

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Fig 3

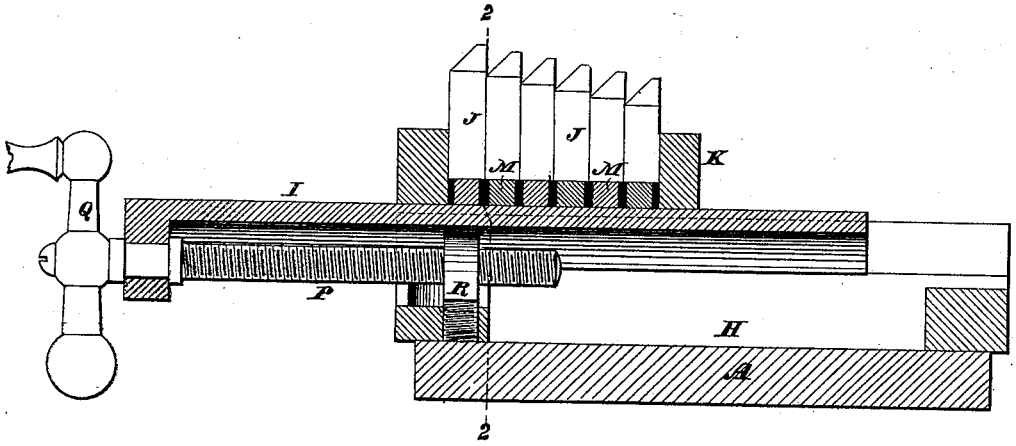
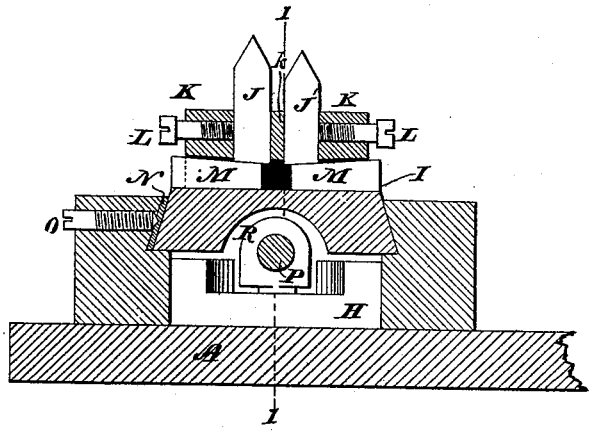


Fig 4



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UNITED STATES PATENT OFFICE.

JOSEPH D. ALVORD, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR GROOVING METAL PULLEYS.

Specification forming part of Letters Patent No. **180,409**, dated August 1, 1876; application filed June 17, 1876.

To all whom it may concern:

Be it known that I, JOSEPH D. ALVORD, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Milling-Machines, of which the following is a specification:

My invention relates to a milling-machine of that class employed in forming peripheral grooves in wheels, pulleys, &c.

My object is to cut a groove, or series of concentric grooves, in a wheel rotated in suitable manner by means of one or more series of cutters of successively increasing heights or lengths traveling in a path across and at right angles to the axis of rotation of the wheel, tangentially thereto, and in the plane in which the wheel is rotated, and acting upon its periphery, so as gradually to form the groove or grooves by the successively-deepening cuts of the series of cutting-tools, and finish the groove or grooves by a single traverse of the cutter-frame past the periphery of the rotating wheel.

The subject-matter claimed will hereinafter specifically be designated.

In the accompanying drawings, which represent my improvements as embodied in a machine adapted for forming two parallel concentric grooves simultaneously in a wheel or pulley, Figure 1 is a longitudinal elevation, partly in section; Fig. 2, an end elevation. Fig. 3 is a longitudinal vertical section through the reciprocating cutter-frame, its support and guideway, and parts connected therewith, on the line 1 1 of Fig. 4, showing one of the series or gangs of cutters in elevation; and Fig. 4, a transverse vertical section on the line 2 2 of Fig. 3.

A supporting base or frame, A, of suitable construction, is provided with supports or standards B B, for a shaft or spindle, C, which is mounted in vertically-adjustable housings or boxes D D. The adjustment of the shaft, so as to admit of varying-sized wheels being grooved, is accomplished by screws *d d*, or in other suitable well-known way. Suitable collars on the spindle prevent its endwise movement in the housings, and band-wheels for rotating the spindle at different speeds are provided. Near one end of the spindle is a chuck or centering-head, E, for securing the wheel F to be grooved upon the spindle. A pin, *e*, upon the chuck enters a cavity in the face of the wheel, and a thumb-nut, G, screws upon the end of the spindle, or the wheel may be secured to the spindle in any other well-known way which admits of its ready attachment and removal, and causes it to revolve therewith when secured in place. A guideway and support, H, for a reciprocating carriage or frame, I, for the cutters, rests upon the frame A. In this instance two gangs or series of cutters, J J′, are mounted in the frame I. The cutters J′, as shown, are of different lengths from those J, each one of the series J′ being shorter than the corresponding cutter of the series J, so as to form concentric grooves in the wheel of different diameters. Any number of grooves desired may be formed in a wheel by increasing the number of series or gangs of cutters, and the grooves may be made of corresponding or of varying diameters. It is also obvious that two or more wheels may be grooved at once by suitably securing them together and to the chuck over their respective cutters. Each of the cutters of either series is of a different length from that contiguous to it, the first one of the series being the shortest, and the final one the longest, the cutters of each series successively increasing in length. The cutters are secured in a holder or socket, K, provided with a separate seat or groove for either series. The two grooves for the cutters are divided by a partition, *k*, against which the cutters are pressed, each by its respective set-screw L, to prevent sidewise movement, and prevent accidental vertical displacement. Sliding wedges M, one for each cutter, serve to adjust the cutters, independently of each other, in the direction of their lengths, to compensate for wear, admit of deep or shallow grooves being formed, allow one or more cutters to be removed and replaced, and enable cutters of different lengths to be used in the same position. The cutters are prevented from moving in the direction of the length of their grooves or seats by contact with each other, or by the use of intervening strips or wedges, when necessary. Different holders K are employed to suit the work being done, the holder being

detachably secured to the frame I by screws. When a single groove is to be cut the cutters may be placed centrally in their holder, and set-screws used at both sides, if preferred.

The frame or carriage I moves, as usual, in dovetail grooves in the guide and support H. A strip, N, and set-screw O provide for wear between the carriage and ways being compensated.

Suitable feeding mechanism, such, for instance, as a screw, P, crank Q, and female screw R, serves to traverse the carriage carrying the cutters up to and away from the work.

In operation it will be seen that as the cutters are moved against the revolving wheel they come in contact successively with its periphery, and gradually cut the groove, little by little, until the final and finishing cutter has completed its groove. The wheel is then removed, the carriage retracted, and the operation repeated on another wheel.

I claim as of my own invention—

1. The combination, substantially as hereinbefore set forth, of a traversing carriage and a series of cutters of gradually-increasing lengths moving tangentially across the axis of rotation of the wheel to be grooved.

2. The combination of the traversing cutter carriage or frame, the holder or socket for the cutters, and a series of independently-adjustable cutters of successively increasing lengths secured in the socket, substantially as and for the purposes specified.

3. The combination, substantially as hereinbefore set forth, of the reciprocating carriage, the holder, and the parallel gangs of independently-adjustable cutters of successively-increasing lengths secured in the holder.

In testimony whereof I have hereunto subscribed my name.

JOSEPH D. ALVORD.

Witnesses:

JAMES ALFORD HOUSE,

A. R. LACY.