2 Sheets--Sheet 1.

N. JENKINS.

Molding-Machines.

No. 145,804. Patented Dec. 23, 1873.

Fig:1.

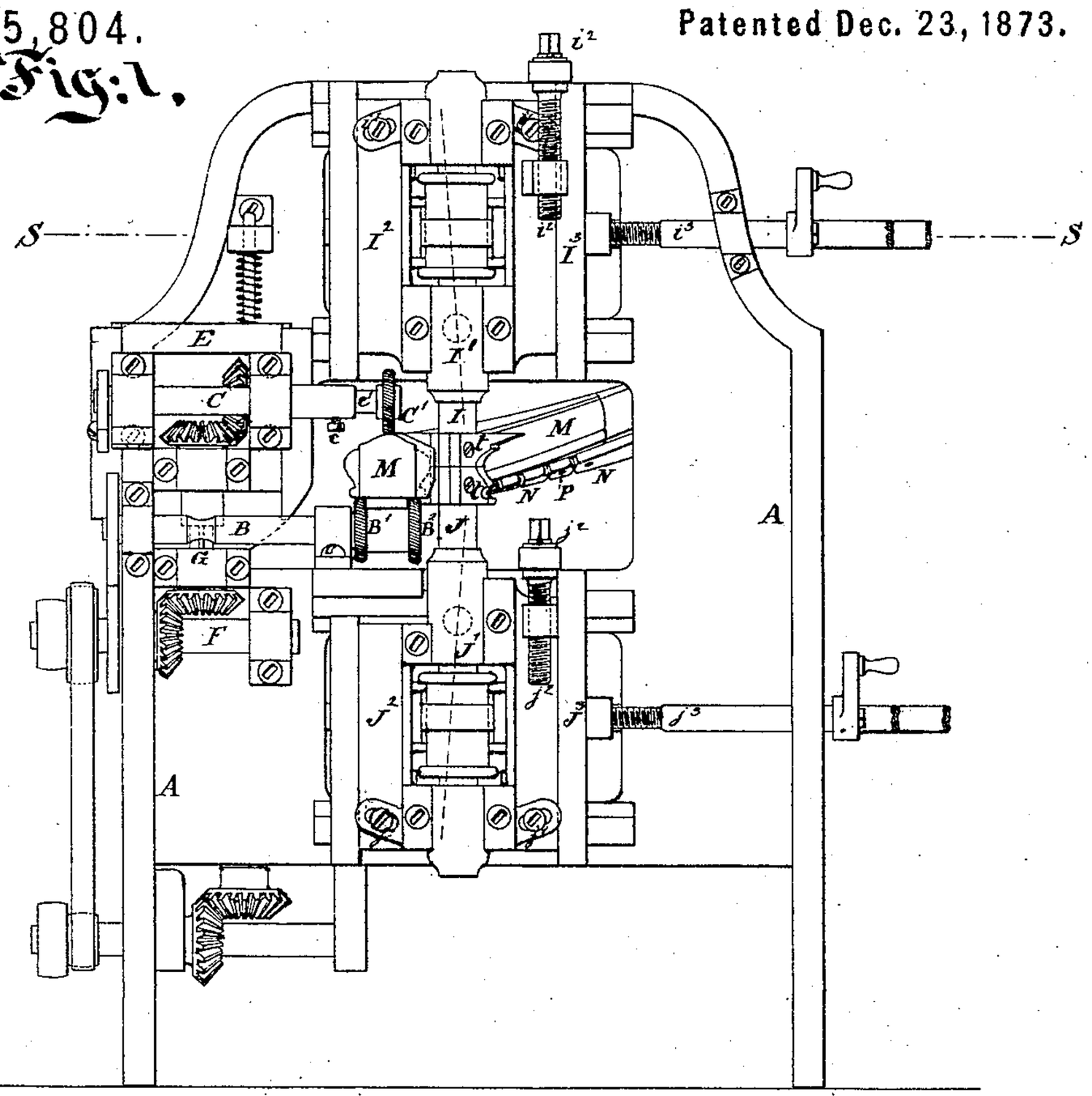
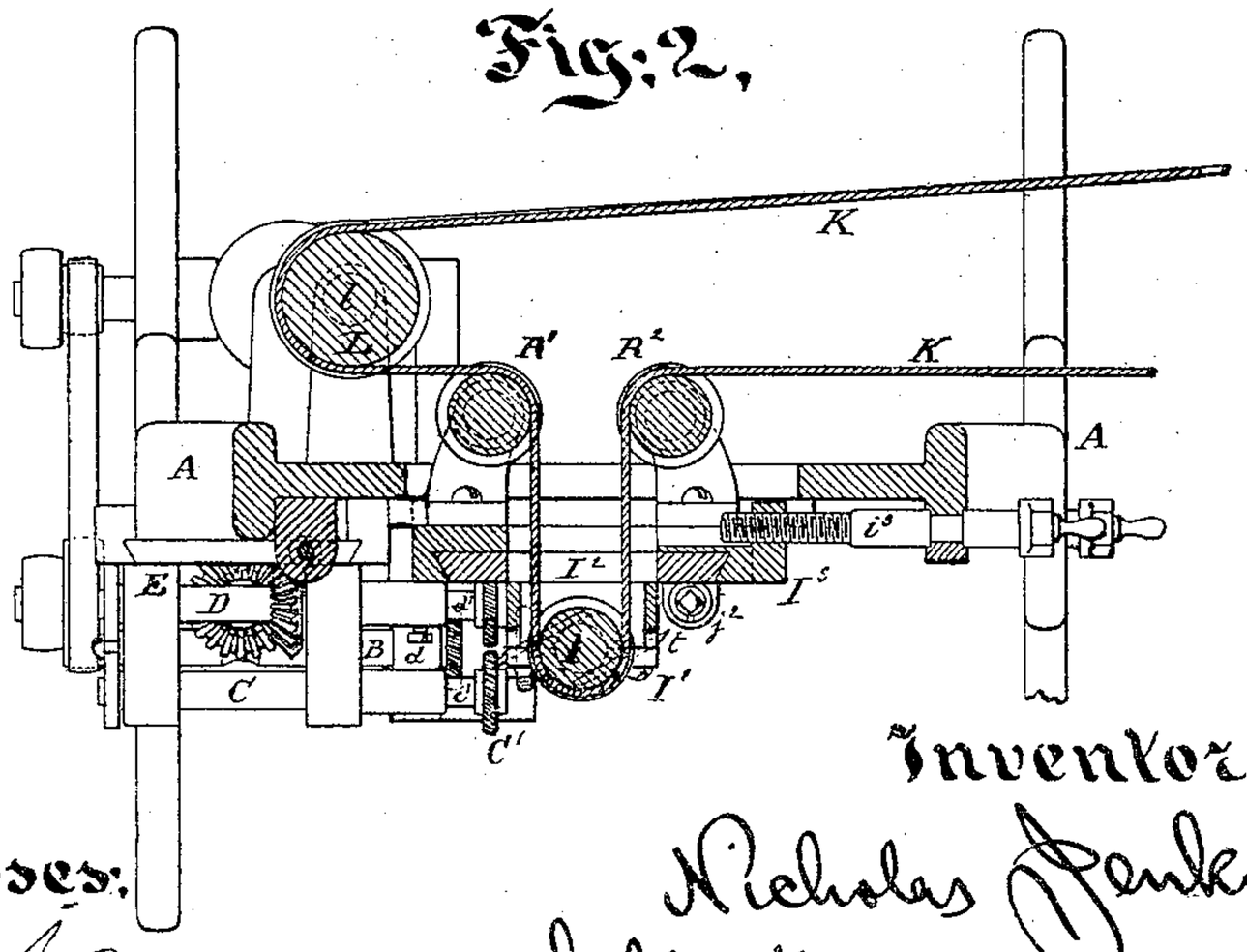


Fig:2.



Witnesses:

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Wm. C. Dey.

Inventor:

Nicholas Jenkins

by his attorney J. D. Stetson

2 Sheets--Sheet 2.

N. JENKINS.

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Fig: 3.

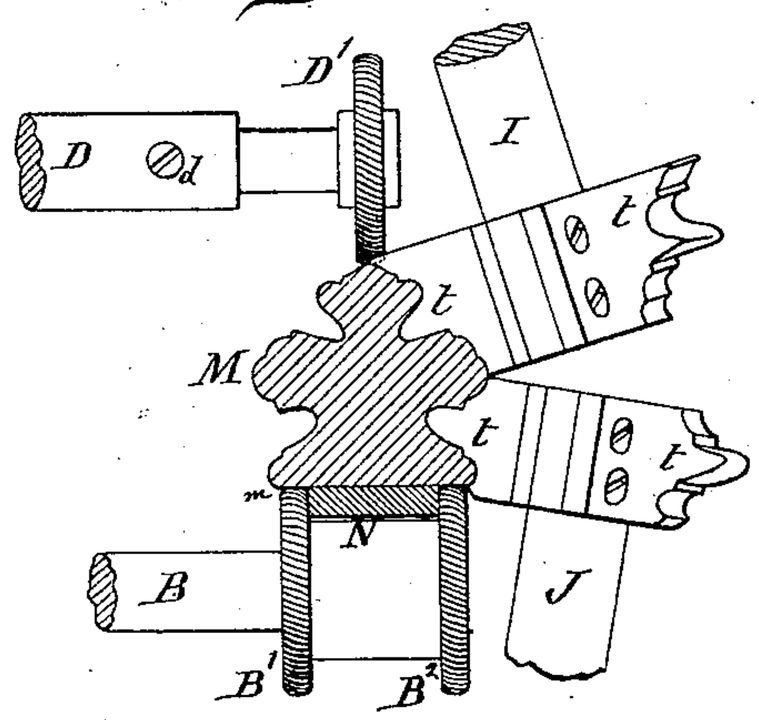

Fig: 5.

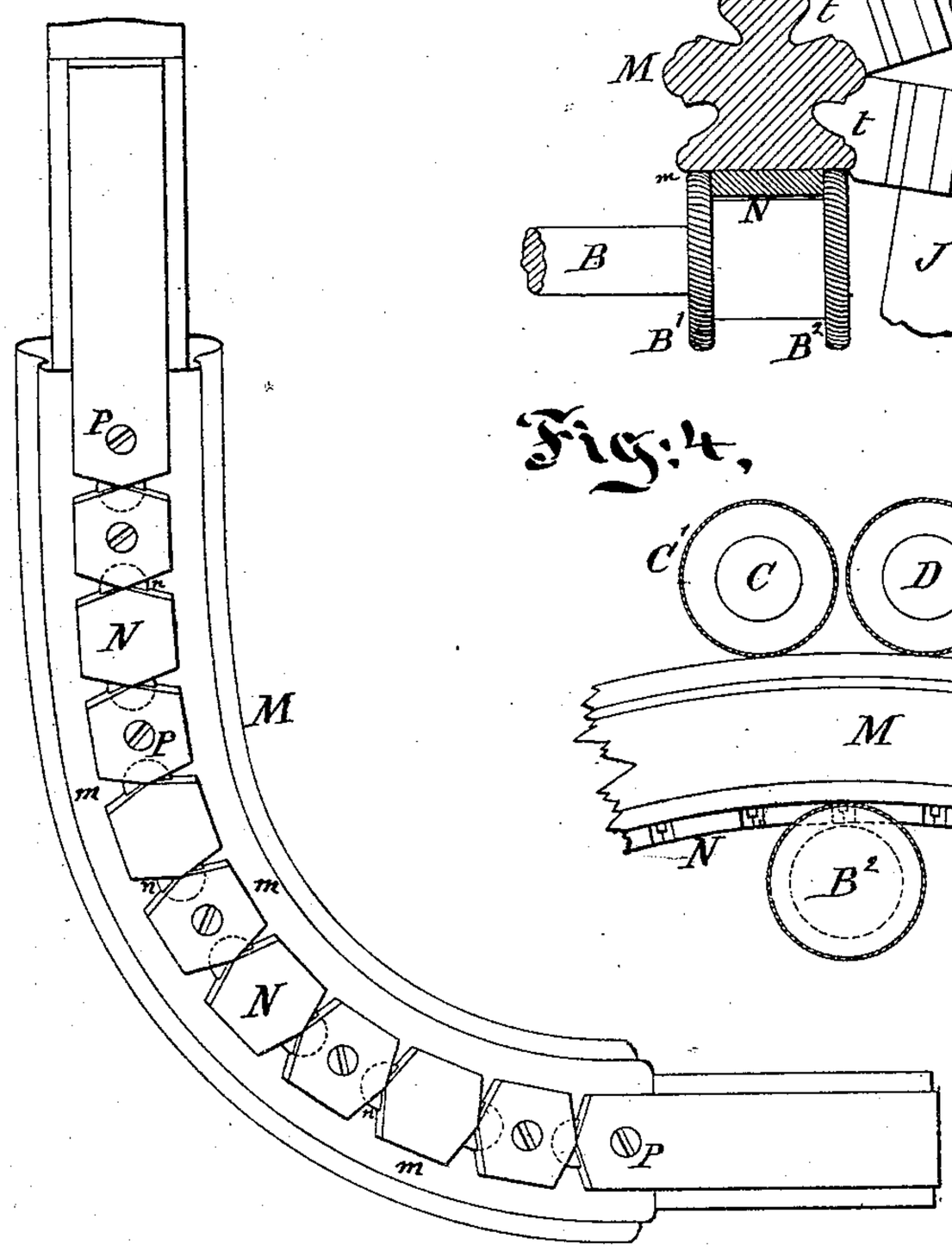

Fig: 4.

Wiknesses:

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Inventor:

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by his atty F. A. Seiter

UNITED STATES PATENT OFFICE.

NICHOLAS JENKINS, OF MADISON, ASSIGNOR TO HIMSELF AND FRANCIS O. MANCHESTER, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN MOLDING-MACHINES.

Specification forming part of Letters Patent No. **145,804**, dated December 23, 1873; application filed April 26, 1873.

To all whom it may concern:

Be it known that I, NICHOLAS JENKINS, of Madison, in the county of New Haven and State of Connecticut, have invented certain Improvements in Molding-Machines for irregular wood-working, of which the following is a specification:

One of the uses for which the machine is especially valuable is the production of elaborate hand-rails for spiral staircases. I have described it as so used, it being understood that it may also execute work which is curved only in one direction, or work a portion or the whole of which is straight.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a front elevation. Fig. 2 is a horizontal section on the line S S in Fig. 1. The remaining figures show certain parts on a larger scale. Fig. 3 shows the cutter-shafts and cutters inclined in order to cut the peculiar-shaped rail shown. Fig. 4 is a face view of the feeding-rollers with a portion of rail between them, and Fig. 5 is a plan view from below of a finished rail-section with the guide-castings secured in place.

Similar letters of reference indicate like parts in all the figures.

The stiff frame-work A supports both the cutting and the feeding and acting mechanism, and allows of an adjustment, as hereinafter described. The feeding of crooked and especially spiral work so as to present it properly to the cutters involves and necessitates attention to a number of points, which I have endeavored to provide for. To prepare the material M for spiral railing, it is first laid out and sawed to the proper curve, and one surface, *m*, is carefully finished by the draw-knife, spoke-shaves, files, &c., in the ordinary manner. This produces a true surface, the width of which is somewhat greater than it is ultimately to retain. Upon this surface I secure previously-prepared pieces of iron N by means of wood-screws P. These pieces N are linked together by joints *n*, so that only the alternate pieces, or even a smaller number, need be screwed to the wood. They are all of uniform width, and their ends are so formed that they may be placed at a desirable angle relative to each other. In other words, they may be mounted in lines of various degrees of curvature. These pieces N, which may be produced from cast-iron finished very accurately by machinery, I will hereafter term "castings." They are of uniform width, and by their means the material M is guided very accurately by the feeding mechanism of the machine. The lower feed-shaft B, driven by gearing, as shown, is mounted in fixed bearings in the frame-work, and carries two wheels, B^1 B^2, mounted at a proper distance apart to apply singly on each side of the castings N. These wheels B^1 B^2 are preferably milled on the periphery. The material M being pressed down upon them, the prepared lower surface *m* is acted on by their milled periphery, and compelled to move therewith. I employ two upper feed-shafts, C D, driven by gearing, as shown, and carrying wheels correspondingly milled, as indicated by C′ D′, adapted to act on the upper surface of the material M. Neither of the wheels C′ D′ is directly over the shaft B. The space over the shaft B is left vacant, so that the cutters (to be described hereafter) may work clear to the center line, or beyond it, without striking the upper feed-wheels. The wheels C′ D′ are mounted on the overhanging ends of their respective shafts, as shown, and are adjustable out and in on these ends by being fixed on necks *c′ d′*, fitted and adjustable in sockets in the ends of their respective shafts C D. Their surface is confined by set-screws *c d*. The upper wheels C′ D′ are mounted in bearings carried on a sliding carriage, E, which is capable of a vertical movement only. The gearing is guided by a feathered shaft, G, which conveys the motion from the shaft F to the gearing of the upper feed-rolls, and allows the lever to rise and sink. The cutters *t t* are adapted to work out the moldings, respectively, on the upper and lower halves of the hand-rail. They are carried on separate shafts, I J, mounted in supporting-pieces I^1 J^1, which are capable of being set at various degrees of inclination by means of the set-screws i^1 j^1, which are tapped into the carriages I^2 J^2. These carriages are adjustable vertically by means of

screws i^2 j^2 in carriages I^3 J^3. These latter carriages are adjustable by screws i^3 j^3 to allow the shafts I J and their connections to be moved bodily toward or from the wood M.

The shafts I J may be operated in line with each other or out of line, as the exigencies of the work or the peculiarities of the patterns may require.

Some patterns might be worked with cutters *t t* mounted all on the same shaft. Other patterns require the two shafts I J to be set, both in inclined positions, or with one in a vertical position, and the other inclined.

The horizontal guides for the carriages I^3 J^3 are, of course, fixed in the frame A. The vertical guides for the carriages I^2 J^2 are fixed on the aforesaid horizontal moving carriages.

I drive the cutter-shafts I J by belts leading from pulleys on a vertical shaft, (not represented,) and the adjustments required are effected without varying the tension on the belts. A description of the uppermost will suffice for both. The upper belt K runs on a pulley, L, mounted on a shaft, *l*, turning in fixed bearings on the frame A. The belt K then runs on a pulley, R, and passes down around a pulley on the cutter-shaft I, and thence upwardly around a pulley, R^2, and thence away to the driving-pulley. (Not shown.) The pulleys R^1 R^2 are supported on the horizontal moving carriage I^3, and the turning of the screw i^3, in adjusting the carriage I^3 toward or away from the work, moves both of the pulleys R^1 R^2 to the same extent as the cutter-shaft. The provisions for driving the lower cutter-shaft J are the same as for the upper, just described, except that the lower belt, in addition to driving the lower cutters, drives the feed mechanism by gearing, as plainly represented, while the upper belt has nothing to do but drive the cutters.

Many modifications of some or all of these parts may be made by any good mechanic without departing from the principles of the invention. Thus the feed-shafts B C D may be vertical or variously inclined with a corresponding change of position of the cutter-shafts. The feed-shafts C D may be below and the single feed-shaft B above; or, in other words, the machine may be completely reversed in position. The feed-wheels may be pressed to their work by springs or weights, instead of gravity, or in addition thereto.

The surface and speed of the milled feed-wheels C′ D′ may be exactly equal to that of the lower feed-wheels B^1 B^2. I have represented the gearing as so arranged; but provision may be made for varying the speed by means of cone-pulleys, or other well-known devices, so that by feeding the upper side of the piece M a little faster or a little slower than the lower side it facilitates the production of curved work, if such a refinement should be considered necessary.

The lower feed-wheels B^1 B^2 are here represented as fixed firmly in the same shaft B, in which condition they would necessarily have precisely the same surface exposed. This is a very familiar and reliable mode of mounting; but in case it should be desirable to feed curved work still more perfectly, I propose to mount the innermost, B^1, on a sleeve, which shall be loose, and be capable, by cone-pulley connection or other desirable device, of being actuated faster or slower, at will. Another modification I propose to adopt is to have the feed-wheel B^2 firmly mounted on the shaft B, and leave the feed-wheel B^1 loose. This latter will then serve simply as a guide, and the feeding motion will be derived entirely from the outer and from the upper wheels. Friction may be employed to drive the wheel B^1, so that it shall tend to move with the same surface speed as the other wheel B^2, but may yield, by the friction of a sleeve, to the necessities of the work without inducing any slipping of the milled periphery.

I may remark that, in practice, it will be often preferable to run one of the carriages I^3 or J^3 with its connections back out of the way and allow the other alone to serve, thus dressing at a single operation only a portion of the side, instead of the whole side, of the rail.

I claim as my invention—

1. The wheels B^1 B^2 C′ D′, in combination with suitable cutters *t*, and arranged to operate, relatively thereto and to the material M, as herein set forth.

2. The feeding and guiding shafts B C D, with their respective wheels, in combination with suitable cutters *t*, and with the castings N, fixed upon the material M, all as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 3d day of April, 1873, in the presence of two subscribing witnesses.

NICHOLAS JENKINS.

Witnesses:

WM. C. DEY,

F. O. MANCHESTER.