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J. W. POST.

Metal Turning Lathe.

No. 198,211. Patented Dec. 18, 1877.

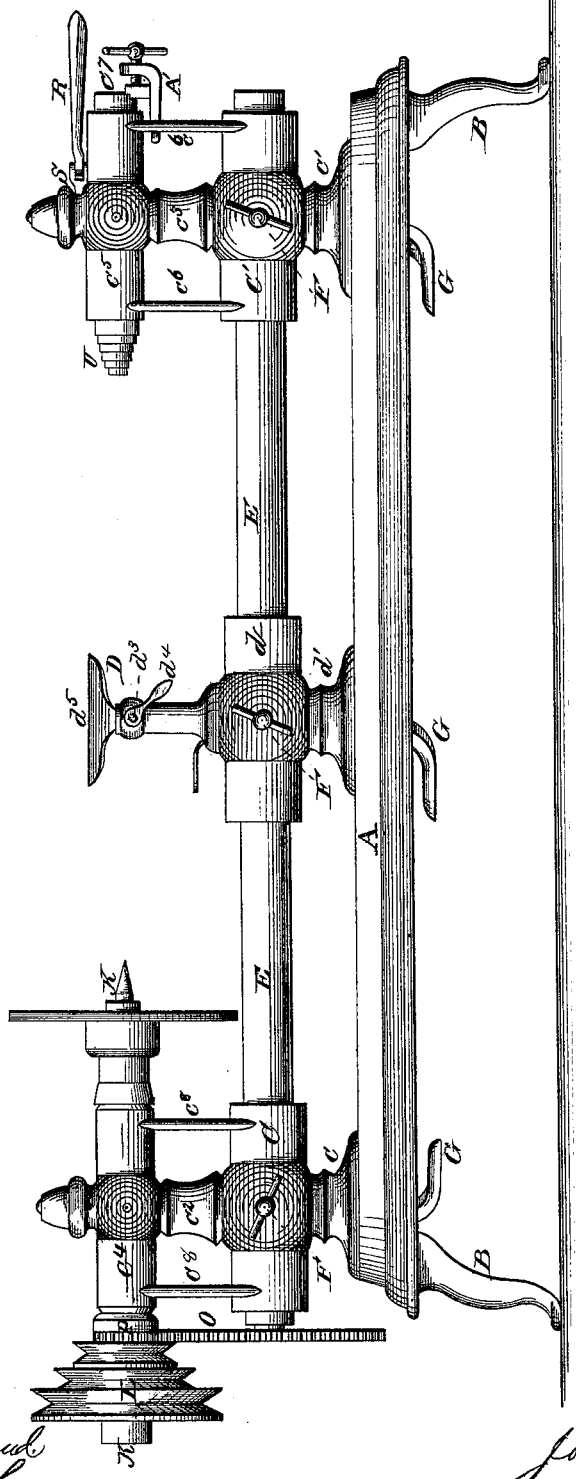

Fig. 1.

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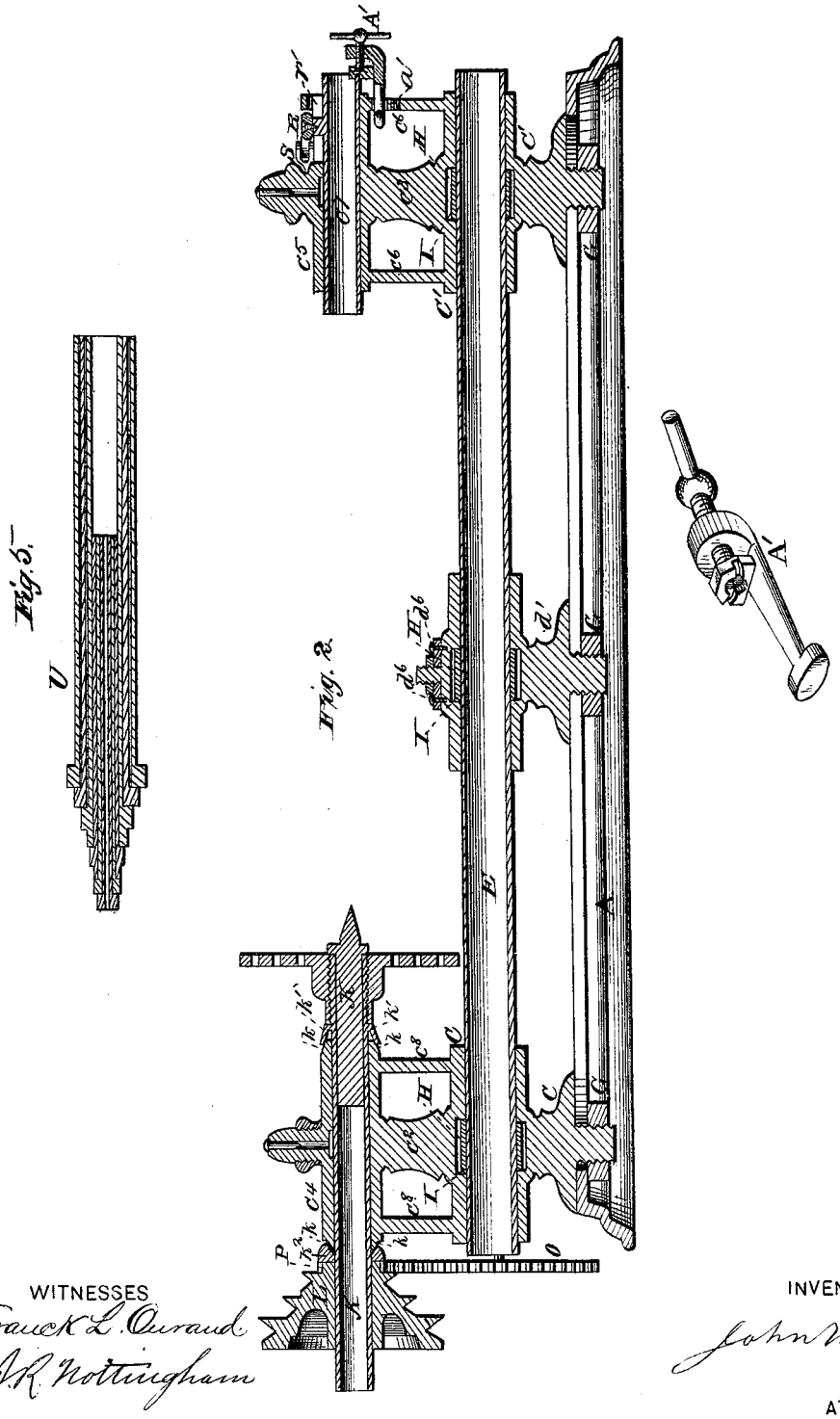

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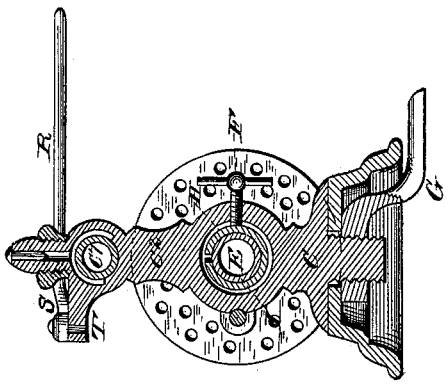

Fig. 4.

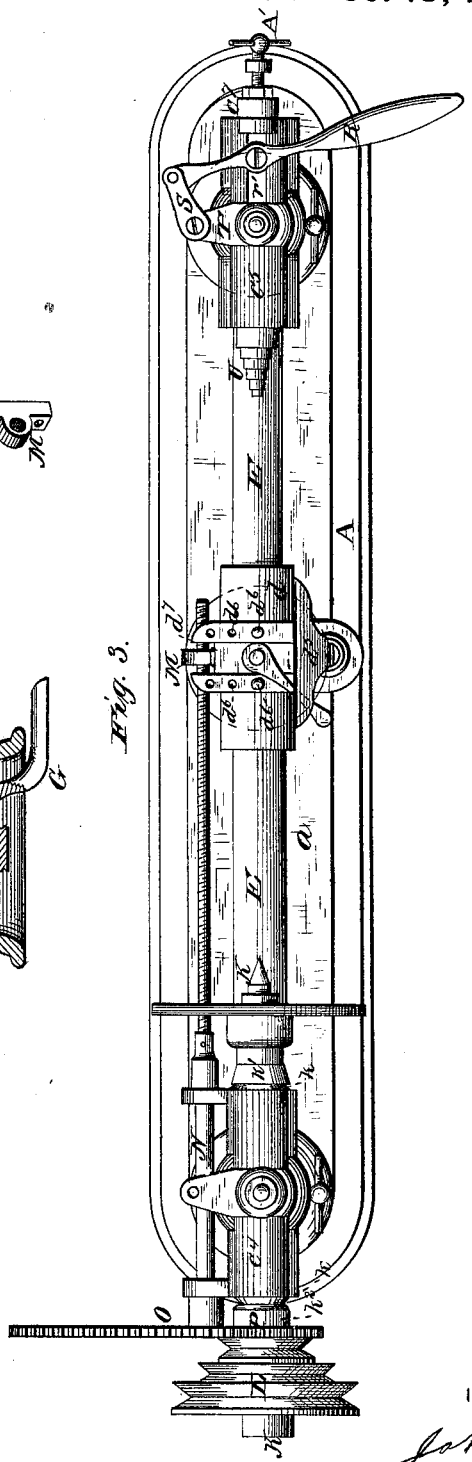

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN W. POST, OF NEW YORK, N. Y.

IMPROVEMENT IN METAL-TURNING LATHES.

Specification forming part of Letters Patent No. **198,211**, dated December 18, 1877; application filed November 28, 1877.

To all whom it may concern:

Be it known that I, JOHN W. POST, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Turning-Lathes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

It is well known to artisans and mechanics that in order to produce a perfectly-working lathe the parts thereof have to be made with the greatest accuracy, and the principal item of expense in the construction of such a lathe is the labor involved in truing up the bed and the bases of the head and tail blocks or puppets, and the rest thereof, so as to keep the centers of the puppets truly in line, no matter to what part of the length of the bed the puppets may be shifted.

The main object of my invention is to provide a cheaper and more expeditious means of truing up the bases of the puppets, and to absolutely insure the accuracy of their centers, irrespective of any irregularities in the surface of the lathe-bed, or, in other words, to provide a means wholly irrespective of the lathe-bed itself for keeping the centers of the puppets in line.

My invention further has for its object to produce a turning-lathe suitable for all of the various purposes for which the ordinary instruments can be used, and to combine with it other novel and useful devices, so as to render it a complete machine-shop within itself, and at the same time to finish all the parts so perfectly that it may be relied upon for absolute accuracy, and yet so simple in construction that the great reduction in the cost of manufacturing brings it within the reach of all; and in so improving the general style and finish that it may, with propriety, be termed the "parlor instrument," ornamental enough for the drawing-room, and useful alike to the student, the gentleman of leisure, and, in fact, all classes of amateurs, as well as to the inventor, the artisan, or the manufacturer.

My invention consists in certain combinations of devices, more fully hereinafter set forth.

In the drawings, Figure 1 represents a side elevation of my improved lathe. Fig. 2 represents a longitudinal vertical section of the same. Fig. 3 represents a top view, and Fig. 4 a transverse vertical section through the head-block or front puppet, of the lathe; and Fig. 5 is a view, in section, of the hollow mandrel and hollow bushings or centers.

The letter A represents the lathe-bed, which may be constructed of wood, with metal ways or shears *a*, or entirely of metal, and planed or otherwise trued up, as may be desired. Said bed may be mounted in any convenient manner, in the present instance being mounted upon legs or standards B. The letter C represents the head-block or front puppet of the lathe, in which the revolving mandrel or spindle has its bearings; C′, the tail-block or back puppet, carrying the longitudinally-moving mandrel; and D, the rest, which may be either an ordinary hand-rest or a slide-rest, as may be desired. The puppets C C′, as well as the rest D, are formed with cylindrical shanks or stocks $c\,c^1\,d'$, extending below their bases, said shanks or stocks being adapted to fit between the ways of the bed. By this construction provision is made for turning or reversing the head-block or front puppet, for the purpose to be hereinafter described, and also for turning off the under surface of the base, instead of planing or hand-finishing, as heretofore practiced, by which the expense of the construction of said puppets is materially lessened, as the bases may be turned off in a specially-constructed lathe with much less labor than is required for the usual planing and finishing.

The head and tail blocks or puppets each consists of a vertical standard, $c^2\,c^3$, having longitudinal parallel extensions $c^4\,c^5$, which lie in a line parallel with the ways or shears of the bed when said blocks or puppets are in position. The rest D is provided with a single extension, *d*, and the lower extensions of the two blocks and the single extension of the rest are bored or recessed longitudinally, for the reception of the guide-bar E. The recesses in the respective puppets and rest are preferably made cy-

lindrical, and the guide-bar is preferably constructed in the form of a hollow or solid cylinder, as this construction admits of the extensions being recessed in a line with each other by means of a boring-tool in a specially-constructed lathe, an operation which can be performed in much less time, and with much less labor, than if the recess were otherwise shaped, although the recesses may be made of other form, if desired, without changing the character of this part of my invention.

The guide-bar, of course, is made of such shape as to fit accurately in the bores or recesses of the blocks or puppets and rest; and said blocks or puppets and rest are capable of a longitudinal movement therein and on the bed of the lathe, being provided with binding-screws F, by which they may be confined at any point along the guide-bar, and with eccentrics or screw-levers G, of the ordinary construction, by means of which they may be clamped in position to the bed of the lathe, as usual.

In order to prevent any injury to the guide-bar by the bearing of the ends of the binding-screws upon the same, the interiors of standards of the puppets and rest are each formed with an annular recess, H, in which is sprung a split collar, I, against which the end of the binding-screw bears, the said collar, as pressure is brought against it by the binding-screw, serving to embrace the guide-rod and hold the puppets and rest, as the case may be, firmly in place. The upper and lower extensions of the respective blocks or puppets are connected at their ends by vertical standards c^8 c^6, which serve to secure the proper steadiness to the puppets, and obviate all tremor in the same, an effect that has only been heretofore accomplished by giving great weight and body to the metal of which the puppets were constructed; and by this means I am enabled to construct the puppets of unusual lightness and grace, as well as at much less expense of material than heretofore.

The upper longitudinal extension of the head-block or front puppet C is longitudinally bored for the reception of the revolving mandrel or spindle K, and is preferably formed at each end with conical or beveled bearings or seats k, in which the revolving mandrel or spindle K has its bearings, said mandrel being provided at or near one end with a stationary conical shoulder, k^1, and at the other end with an adjustable screw-threaded conical or beveled collar, k^2, which may be adjusted to its seat, to take up wear, at the same time preserving the proper center of the mandrel K.

The mandrel or spindle K is usually, and by preference, made hollow, to increase the capacity of the lathe for long work, such as the turning of rods, shafts, axles, and the like, which may be passed through said hollow mandrel, and the rear end of said mandrel is provided with the usual cone-driving pulley L, while the front end is screw-threaded, both internally and externally, for the reception of the proper chucks and lathe-centers, as will be readily understood by artisans and mechanics.

The upper part of the central or main standard of the puppet is provided with a vertical aperture leading to the longitudinal recess or bore within, which serves as an oiler, to admit lubricants, the said upper part also serving as an attachment for certain wood-working devices, which form the subject-matter of a separate application for another patent. At the top of the rest D is provided a screw, d^3, and lever d^4, by means of which the upper section or tool-support d^5 may be clamped in position; and, to better hold said section or tool-support, the adjoining surfaces may be provided with dowels and recesses d^6, which engage each other, and hold the parts in position when clamped together. As thus far described, the rest serves to carry a simple hand-rest; but in order to adapt the same to carry a slide-rest, the standard of said rest, at one side, is provided with a dovetailed recess, d^7, in which a set of interchangeable internally screw-threaded nuts, M, of various pitches, may be secured, and the head-block or front puppet is provided with projecting arms at one side, in which is journaled a shaft, N, provided at its rear end with a gear-wheel, O, meshing in a similar wheel, P, on the rotating mandrel, the front end of said shaft being forked or recessed, for the reception of a keyed or other properly-shaped end of any one of a series of various-pitched leading-screws, corresponding with the interchangeable nuts, where the former may be secured, said screws being adapted to work within the nuts, so that the travel of the rest may be varied at will, to adapt the lathe to automatic engine-turning or screw-cutting; and, in order to adapt it to hand-work, as with an ordinary slide-rest, the pinion may be left off of said shaft, and its place be supplied by an ordinary hand-crank or wheel.

The upper longitudinal extension of the tail-block or back puppet C^1 is provided with a longitudinally-moving hollow mandrel, c^7, which is operated by means of a lever, R, fulcrumed to a link, S, which is pivoted to an arm, T, secured to one side of the main standard of said puppet. The lever is attached to said mandrel c^7 by means of a pin or screw passing through a longitudinal slot, r', formed in the upper longitudinal extension of said tail-block or back puppet.

The letter U represents a series of hollow centers, adapted to fit one within the other, as seen in Fig. 5, and the whole adapted to fit within the hollow mandrel c^7, by which means provision is made for accurately centering long work, such as rods, shafts, axles, and the like, said work being permitted to pass to the rear through said hollow centers and the hollow mandrels.

The front end of said longitudinally-moving

mandrel is adapted to receive and carry a suitable cutting-tool, a novel form of which will constitute the subject-matter of a separate application for a patent, by means of which the lathe may be adaped to cut spline, feather, or key grooves in any rod, shaft, or axle properly centered in the lathe, and in connection with a suitable gage-plate secured to the revolving mandrel of the lathe, the said lathe may be adapted at slight expense to gear and pinion cutting.

The letter A′ represents a detachable screw-clamp, which may be secured to the rear of the tail-block or back puppet in a slot, *a′*, made in the rear standard thereof for the purpose, in such manner, that the screw of said clamp may be brought to bear on the rear end of the longitudinally-moving mandrel, so as to advance it to the work.

The operation of my improved lathe is as follows: The parts being all arranged, as shown in Fig. 1, it will be evident that the tail-block or back puppet can be shifted on the bed in the ordinary manner, so as to center the work; but it will be observed that the bed of the lathe in the present instance serves merely as a support for the puppets and the rest, while the guide-bar serves to keep the puppets and their centers truly in line, wholly irrespective of the lathe-bed.

As thus arranged the lathe can be operated precisely in the manner of an ordinary lathe.

In order to give greater swing to the lathe the guide-bar may be withdrawn from its bearing in the head-block or front puppet, when necessary to adapt the lathe to larger work.

When it is required for still larger work the head-block or front puppet may be turned on its shank or stock, so as to swing the front end of the revolving mandrel or spindle over the end of the lathe-bed, in which position provision is made for the revolution of work of any diameter, thus enabling the lathe to be employed in facing wheels and disks of indefinite size, which will only be limited by the power which can be applied to the cone or driving pulleys.

The rear end of the mandrel or spindle may be screw-threaded externally, to provide for the attachment of a circular saw or other wood-working machinery to be operated in connection with certain attachments forming the subject-matter of an independent application.

The rest *d*, as has before been stated, can be employed with an ordinary hand-rest, or with an automatically-working slide-rest, and one of the most important features of the present invention is the comparative inexpensive manner in which the said rest may be adapted to operate as a slide-rest, for it will be evident that by the simple application of the interchangeable screw-nuts and leading-screws all the various operations incident upon engine-turning and screw-cutting can be accomplished without the employment of the complicated train-gearing heretofore used, and that a truly perfect-working slide-rest can be thus formed at an expense merely nominal as compared with the expense attendant upon the construction of the slide-rest, as heretofore made and adapted to travel on ways on the bed of the lathe, which can only be formed at great expense, and which necessitates the most accurate and laborious construction of the traveling surfaces of such rest, in order to preserve its proper relative position in regard to the puppets and the work as it travels along its course.

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

1. In a lathe, a longitudinal guide-bar, upon which the puppets and the rest, each provided with means for independent attachment to the bed, are adapted to be shifted, whereby the centers of the lathe are kept truly in line, irrespective of the bed, substantially as specified.

2. The combination, with a lathe and its puppet and rest, of a longitudinal guide-bar, adapted to be withdrawn from the head-block or front puppet, but passing through the tail-block or rear puppet and rest, to retain them truly in line, and provide for a greater swing of the lathe, substantially as specified.

3. The head and tail-blocks or puppets of a lathe, constructed substantially as described, with a central or main standard, and two parallel horizontal extensions connected by two vertical end standards, and provided with a base-plate resting on the bed, and means for attachment thereto, whereby the requisite lightness and solidity is obtained, substantially as set forth.

4. The rest D, constructed substantially as described, with the shank or stock d^1, extension *d*, annular recess H, split collar I, binding-screw F, threaded extension for the attachment of the tool-post, dowels, and recesses d^6, and the tool-post, in combination with the lathe-bed and guide-bar, substantially as and for the purpose specified.

5. The combination, with the rest D, adapted to slide upon the guide-bar E, and provided with the dovetail d^7, the head-block or puppet carrying the revolving spindle K, gears P O, and counter-shaft N, of the removable screw and nut, substantially as and for the purpose specified.

6. In a lathe, provided with adjustable puppets and rest, fitted to a single central guide-bar, and capable of independent attachment to the bed, the combination of the hollow mandrels and hollow centers, substantially in the manner described.

7. In combination with the hollow longitudinally-moving mandrel, the removable screw-clamp A′, adapted to be secured to the tail-block or rear puppet of a lathe, for ad-

vancing the work to the front center, substantially as specified.

8. The removable hollow centers, constructed as shown and described, in combination with the hollow mandrel of the tail-block or rear puppet of a lathe, whereby the same is adapted to long work of various diameters, substantially as specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN W. POST.

Witnesses:

CHARLES A. RAY,

ANTONIO PELLETIER.