(No Model.) 3 Sheets—Sheet 1.

W. G. BIXBY.

LATHE.

No. 590,384. Patented Sept. 21, 1897.

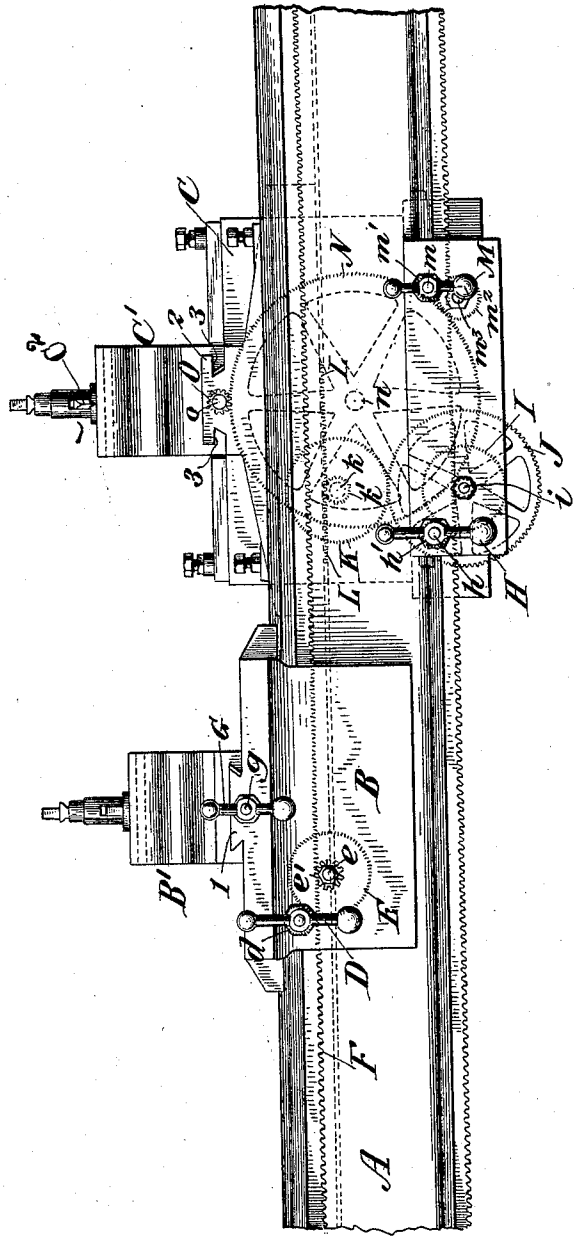

Fig. 1.

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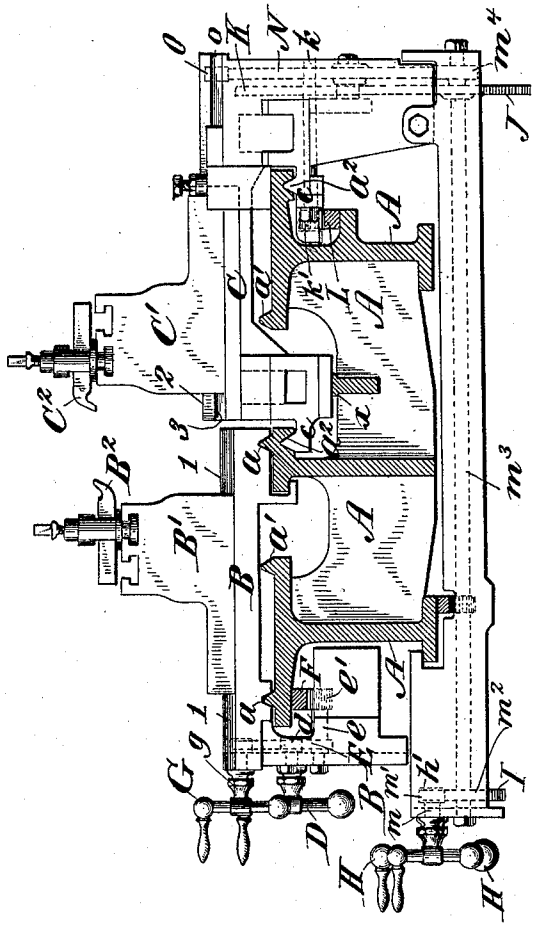
Fig. 2.



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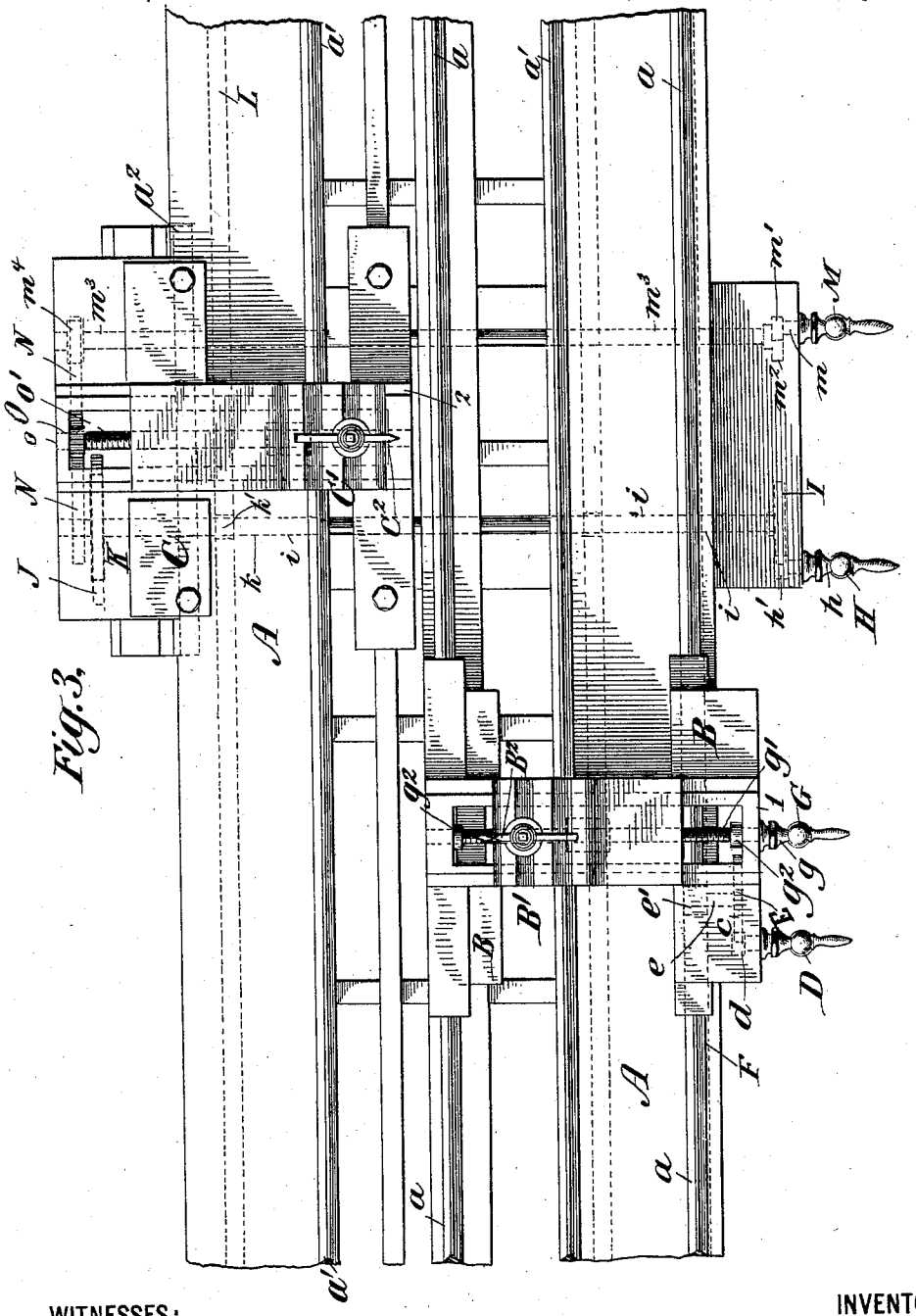

Fig. 3.

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LATHE.

SPECIFICATION forming part of Letters Patent No. 590,384, dated September 21, 1897.

Application filed June 4, 1896. Serial No. 594,209. (No model.)

To all whom it may concern:

Be it known that I, WILLARD G. BIXBY, a citizen of the United States, and a resident of New York city, county and State of New York, have invented a new and useful Improvement in Lathes, of which the following is a specification.

My invention relates to lathes, and has for its object to increase their efficiency and their capacity for work and to render them easier of manipulation; and it consists of the devices hereinafter set forth in the claims at the end of this specification.

Heretofore lathes with two tool-carriages and tools have had but a limited use, being confined in the character of the work upon which they are employed chiefly to shaftings, pulleys, and other exceptional work of a heavy kind. This has been mainly due to the fact that either the two tool-carriages and tools did not have a capability of independent movement as regards each other or if they did have such relative independence of movement the back tool-carriage and tool could be operated only from the back part of the lathe and not from the front and because the tool-carriages and tools could not be moved by the handles forward and backward from the back and front parts of the machine, respectively, up to the vertical plane passing through the center of the lathe and parallel to the front and back of the lathe and be equally well supported at all points of their range of movement.

By my improved device two tools can be employed independent of each other in movement, both adapted to be moved by the operator from the front part of the lathe, each capable of moving forward and backward from the front or back of the lathe up to the vertical plane passing through the lathe-center and parallel to the plane of the front and back of the lathe, and each being equally well supported at all points of its range of movement. My improved lathe is accordingly well fitted for all kinds of general lathework, is easily operated, has an increased capacity for work over that of the ordinary lathe, and is very efficient in operation.

The drawings show my improved lathe in its preferred form.

Figure 1 is a front elevation of my improved lathe. Fig. 2 is a side elevation, partly in section; and Fig. 3 is a plan.

A is the bed of the lathe, upon which the movable parts are supported. B is the front tool-carriage; C, the back tool-carriage. B′ is the front cross-slide, carrying the tool B^2; C′, the back cross-slide, carrying the back tool C^2. These tools are mounted upon the cross-slides in any proper manner.

The front cross-slide B′ slides upon the rail 1, and the back cross-slide C′ slides upon the rail 2. The rail 2 is preferably made with a flat under surface, as shown in Fig. 1 at 3, under which a portion of the back cross-slide C′ projects, so that a flat-surface resistance will be offered to the upward pull upon the back cross-slide C′ when the tool C^2 is in operation, thus rendering the work of the back tool more effective.

The portions of the rail and back cross-slide which abut against each other below the flat under surface of the rail 2, above referred to, are preferably made inclined, as shown in Fig. 1, so that the abutting under and upper surfaces and the abutting inclined surfaces referred to may be properly kept in contact with one another by any suitable device.

The front tool-carriage B slides laterally upon the V's *a a*, which form part of the bed A. The V's *a′ a′* are also part of the bed, and upon them the head and tail stocks slide laterally. The head and tail stocks forming no part of my invention are, for the sake of clearness, not shown in the drawings. In the under part of a projection of the bed A there are hollow inverted-V-shaped channels or grooves a^2 a^2. In these channels slide V's *c c*, which are projections from and form part of the back tool-carriage C. The object of causing the V's *c c* of the back tool-carriage to slide in inverted-V-shaped grooves in the under surface of projections from the bed is to enable the back tool-carriage and its tool to withstand the upward pressure which normally comes upon the tool C^2 when in operation.

D is a handle mounted upon the front tool-carriage B for the purpose of giving lateral motion to the tool-carriage between the head and the tail stocks. As shown in the drawings, this is accomplished by the following

mechanism: Upon the shaft of the handle D is mounted pinion d, meshing into the teeth of the wheel E, rigidly mounted upon the shaft e. Upon the same shaft e is fixedly secured a gear-wheel e', the teeth of which mesh into the teeth of the rack F. As the rack F is fixedly secured to the bed of the lathe, the motion of the handle D either way will of course cause the tool-carriage B and all its connections to move either laterally toward or away from the head-stock.

Forward-and-backward motion is imparted to the cross-slide B′ by the handle G in the following manner: The handle G is fixedly mounted upon a shaft g, turning in bearings g^2. Upon the larger part of the shaft g a screw-thread g' is cut. The screw-threaded portion g' passes through a cylindrical opening in the body of the cross-slide, which opening is similarly screw-threaded on its inner surface. When the handle G is turned one way or the other, the screw-threaded shaft causes the cross-slide to move backward or forward. As the tool-carriage B and the rail 1 extend to the center of the lathe, and as the tool-carriage B is supported at its extreme inner end by the V a of the bed, the cross-slide B′ can move from the front of the lathe to the extreme center of the lathe and be equally well supported at the center as at other places. Tool B^2 can therefore be moved to the very center of the lathe and be used upon work having the smallest diameter and be equally well supported at the center as at any other part of its range of movement.

The handle H upon the front part of the lathe is used for the purpose of giving lateral motion to the back tool-carriage C toward or away from the head or tail stock by means of the following mechanism: The handle H is fixedly mounted upon a shaft h. Upon the same shaft is fixedly secured pinion h', meshing into the teeth of the wheel I, the latter being mounted upon the long shaft i. Near the other end of this shaft i is mounted a gear-wheel J, the teeth of which mesh with the gear-wheel K, mounted upon the shaft k. Near the other end of the shaft k is a gear-wheel k', whose teeth mesh into the teeth of the stationary rack L, which forms part of the bed of the machine. As the rack L is fixed, a movement of the handle H accordingly moves the back tool-carriage C and its appurtenances laterally toward or away from the head or tail stock. By means of the long shaft i this motion is imparted to the back tool-carriage through the handle H on the front of the lathe. The handle M, also in front of the lathe, is adapted to move the back cross-slide C′ forward and backward toward or away from the center of the lathe. The handle M is mounted upon the shaft m. Upon the same shaft is also mounted pinion m', which meshes with the teeth of the wheel m^2, mounted upon the shaft m^3. The shaft m^3 runs from the front part of the lathe to the rear, and near its rear end there is mounted upon it a pinion m^4. The latter meshes with the teeth of the large idle-wheel N, the latter engaging with the teeth of the pinion O, mounted upon the shaft o. This shaft o is screw-threaded, as at o'. The screw-threaded portion runs through a cylindrical opening in the back cross-slide C′, which cylindrical opening is similarly screw-threaded. The turning of the handle M will cause the screw-threaded shaft o' to rotate and to force the back cross-slide C′ forward or backward. Thus by means of my improved devices the back tool-carriage C and back cross-slide C′ can be moved laterally between the head and tail stocks and toward and from the center of the lathe by the operator while standing in front of the lathe.

As the back tool-carriage C extends substantially to the center of the lathe and is supported by the bed of the lathe at substantially its center, as at x, and is supported from upward pressure by the bed at a^2, and as the rail 2 extends substantially to the center of the lathe, the back cross-slide C and back tool C^2 can be moved up to the center of the lathe, so that the back tool can operate upon work of the smallest diameter, and both back tool-carriage and back tool are as equally well supported at the center as at any other place in their range of movement.

The handle H, shaft h, pinion h', wheel I, and shaft i, and the handle M, shaft m, pinion m', wheel m^2, and shaft m^3 are contained in or supported by a framework on the front of the lathe. This part of the framework I will speak of as the "handle-carrier" of the back tool-carriage. It may be joined to the framework of the back tool-carriage, as shown in the drawings, or it may, if found necessary or desirable, form a separate framework. The latter form would be necessary in lathes supported upon more than two legs. In both cases, however, the back tool-carriage and the handle-carrier move laterally together, so that the handle-carrier and the handles it contains are always opposite the back tool-carriage. Thus while the workman turns either the handle H or the handle M he is always opposite and in close proximity to the back tool, and he can give the necessary attention to guiding it in its work without being obliged to step away from it in order to adjust the handles H and M.

Numerous modifications in details may be made without departing from the spirit of my invention. Thus wheels could be used in place of the handles for operating the tool-carriages and cross-slides. The long shafts i and m^3 could be placed in different parts of the lathe from those shown in the drawings, such changes involving no more than ordinary mechanical skill. The handles can, of course, be operated by power in any well-known manner.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a lathe, the combination with a back

tool-carriage independent of the front tool-carriage and adapted to carry a cutting-tool, of a handle-carrier in the front of the lathe adapted to move laterally with the back tool-carriage, a handle mounted in the said handle-carrier, and means connecting the said handle with the back tool-carriage, whereby the movement of the handle will cause the back tool-carriage and the handle-carrier to move laterally between the head and tail stocks, substantially as set forth.

2. In a lathe, the combination with a back tool-carriage independent of the front tool-carriage and adapted to carry a cutting-tool, of a handle-carrier in the front of the lathe adapted to move laterally with the back tool-carriage, a handle mounted in said handle-carrier, a shaft for transmitting the motion of the handle to the back of the lathe, and connecting mechanism between the shaft and the handle and the shaft and the back tool-carriage, whereby the movement of the handle will cause the back tool-carriage and the handle-carrier to move laterally between the head and tail stocks, substantially as set forth.

3. In a lathe, the combination with a back tool-carriage, independent of the front tool-carriage and adapted to carry a cross-slide and a cutting-tool, of a handle-carrier in the front of the lathe adapted to move laterally with the back tool-carriage, a handle mounted in said handle-carrier and means connecting the said handle and the back cross-slide, whereby the movement of the handle will cause the back cross-slide to move toward or away from the vertical plane passing through the center of the lathe parallel to the front and back of the lathe, substantially as set forth.

4. In a lathe, the combination with a back tool-carriage independent of the front tool-carriage and adapted to carry a cross-slide and a cutting-tool, of a handle-carrier in the front of the lathe adapted to move laterally with the back tool-carriage, a handle mounted in said handle-carrier, a shaft for transmitting the motion of the handle to the back part of the lathe, and connecting mechanism between the shaft and the handle and between the shaft and the back cross-slide, whereby the movement of the handle will cause the back cross-slide to move toward or away from the vertical plane passing through the center of the lathe parallel to the front and back of the lathe, substantially as set forth.

5. In a lathe, the combination with a back tool-carriage independent of the front tool-carriage and adapted to carry a cross-slide and cutting-tool, of a handle-carrier in the front of the lathe adapted to move laterally with the back tool-carriage, handles mounted in said handle-carrier, and means connecting the handles with the back tool-carriage and the cross-slide, whereby the movement of one handle will cause the back tool-carriage and the handle-carrier to move laterally between the head and tail stocks, and the movement of the other handle will cause the back cross-slide to move toward or away from the vertical plane passing through the center of the lathe parallel to the front and back of the lathe, substantially as set forth.

6. In a lathe, the combination with a back tool-carriage independent of the front tool-carriage and adapted to carry a cross-slide and cutting-tool, of a handle-carrier in front of the lathe adapted to move laterally with the back tool-carriage, handles mounted in said handle-carrier, shafts for transmitting the motion of the handles to the back part of the lathe, mechanism connecting the handles to the shafts and mechanism connecting the shafts with the back tool-carriage and cross-slide, whereby the movement of one of the handles will cause the back tool-carriage and the handle-carrier to move laterally between the head and tail stocks, and the movement of the other handle will cause the back cross-slide to move toward or away from the vertical plane passing through the center of the lathe parallel to the front and back of the lathe, substantially as set forth.

7. In a lathe, the combination with a back tool-carriage adapted to carry a cutting-tool, inverted-V-shaped grooves on the under side of the bed of the lathe, and inverted-V-shaped projections forming part of the back tool-carriage adapted to slide within said grooves, whereby upward pressure upon the back cutting-tool is resisted, substantially as set forth.

8. In a lathe, the combination of two tool-carriages independent of each other, each extending substantially to the vertical plane passing through the center of the lathe parallel to the front and back of the lathe, cross-slides upon said tool-carriages, a handle-carrier on the front of the lathe, handles mounted in the front of the lathe for moving the tool-carriages laterally between the head and tail stocks, and handles mounted in the front of the lathe for moving the cross-slides toward or away from the said central vertical plane of the lathe, and mechanism connecting said handles with the said tool-carriages and with the cross-slides respectively, all so arranged that said tool-carriages may be moved laterally between the head and tail stocks independently of each other, and the cross-slides may be moved independently of each other and up to the said central vertical plane of the lathe or away from it to the extreme front or back of the lathe, substantially as set forth.

9. The combination, in a lathe, of two tool-carriages independent of each other, each adapted to carry a cutting-tool and extending substantially to the vertical plane passing through the center of the lathe and parallel to the front and back of the lathe, and cross-slides upon which the tools are mounted, whereby the tools mounted upon said cross-slides may be moved up to the said central vertical plane of the lathe, inverted-V-shaped grooves on the under side of the bed of the lathe and inverted-V-shaped projections

forming part of the back tool-carriage adapted to slide within said grooves whereby upward pressure upon the back cutting-tool is resisted, substantially as set forth.

10. In a lathe, the combination with a back tool-carriage independent of the front tool-carriage and adapted to carry a cutting-tool, of a handle in the front part of the lathe for moving the back tool-carriage laterally between the head and tail stocks, and means connecting the back tool-carriage and the handle whereby the movement of the handle will cause the back tool-carriage to move laterally between the head and tail stocks, a portion of the back tool-carriage sliding under a part of the bed of the lathe whereby upward pressure upon the back cutting-tool is resisted, substantially as set forth.

11. In a lathe, the combination with a back tool-carriage independent of the front tool-carriage and adapted to carry a cutting-tool, of a handle in the front part of the lathe for moving the back tool-carriage laterally between the head and tail stocks, and means connecting the back tool-carriage and the handle whereby the movement of the handle will cause the back tool-carriage to move laterally between the head and tail stocks, inverted-V-shaped grooves on the under side of the bed of the lathe and inverted-V-shaped projections forming part of the back tool-carriage adapted to slide within said grooves whereby upward pressure upon the back cutting-tool is resisted, substantially as set forth.

12. In a lathe, the combination of two tool-carriages independent of each other, each extending substantially to the vertical plane passing through the center of the lathe and parallel to the front and back of the lathe, cross-slides upon the said tool-carriages, handles in the front part of the lathe for moving the tool-carriages laterally between the head and tail stocks and handles in the front part of the lathe for moving the cross-slides toward or away from the said central vertical plane of the lathe, and mechanism connecting said handles with the said tool-carriages and with the cross-slides respectively, all so arranged that said tool-carriages and cross-slides may be moved independently of one another between the head and tail stocks and up to and away from the said central vertical plane, inverted-V-shaped grooves on the under side of the bed of the lathe and inverted-V-shaped projections forming part of the back tool-carriage adapted to slide within said grooves whereby upward pressure upon the back cutting-tool is resisted, substantially as set forth.

13. In a lathe, the combination of two tool-carriages independent of each other, each extending substantially to the vertical plane passing through the center of the lathe and parallel to the front and back of the lathe, cross-slides upon the said tool-carriages, handles in the front part of the lathe, moving at the same time and speed as the respective tool-carriages and adapted to move the tool-carriages laterally between the head and tail stocks and adapted to move the cross-slides toward or away from said central vertical plane of the lathe, and mechanism connecting said handles with the said tool-carriages and with the cross-slides respectively, all so arranged that said tool-carriages and cross-slides may be moved independently of one another between the head and tail stocks and up to and away from the said central vertical plane, inverted-V-shaped grooves on the under side of the bed of the lathe and inverted-V-shaped projections forming part of the back tool-carriage adapted to slide within said grooves whereby upward pressure upon the back cutting-tool is resisted, substantially as set forth.

14. In a lathe having two tool-carriages independent of each other, the combination with the back cross-slide of a rail upon which said cross-slide is adapted to slide, said rail having a flat under surface, and also having inclined surfaces, and a projection from the cross-slide having a flat upper surface adapted to take against the flat under surface of the said rail whereby upward pressure upon the back cutting-tool is resisted, and having inclined surfaces adapted to take against the inclined surfaces of the rail whereby the said abutting surfaces may be kept in contact with one another, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLARD G. BIXBY.

Witnesses:
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GEORGE W. MILLS, Jr.