

Nov. 17, 1925.

1,562,173

A. C. HUGUET

LATHE

Filed June 1, 1922

5 Sheets-Sheet 1

Fig. 2.

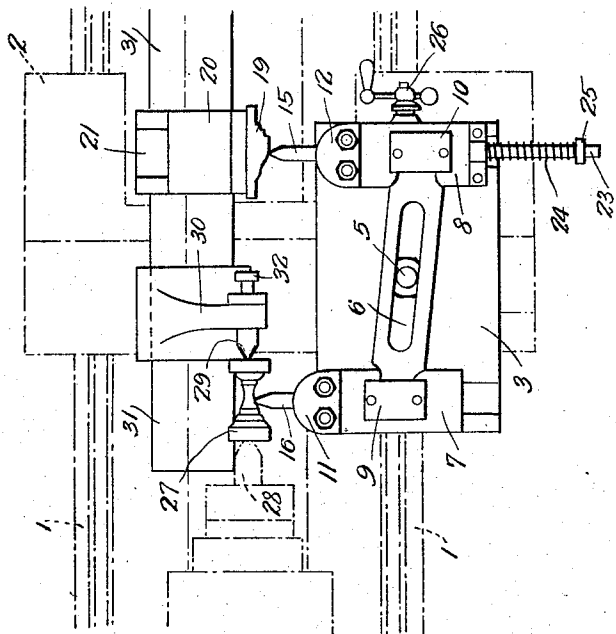
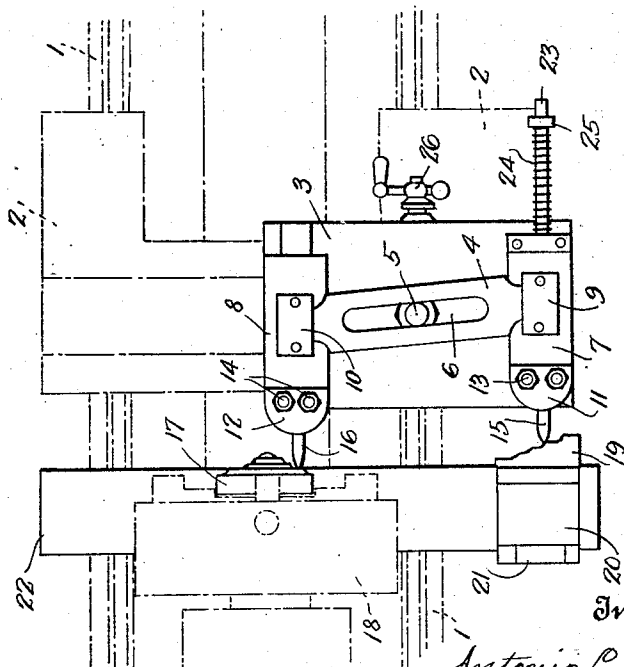


Fig. 1.



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Fig. 5.

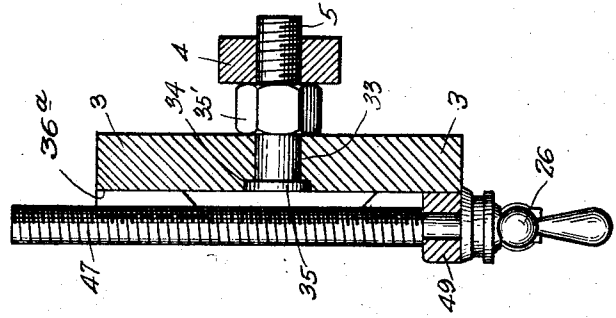


Fig. 4.

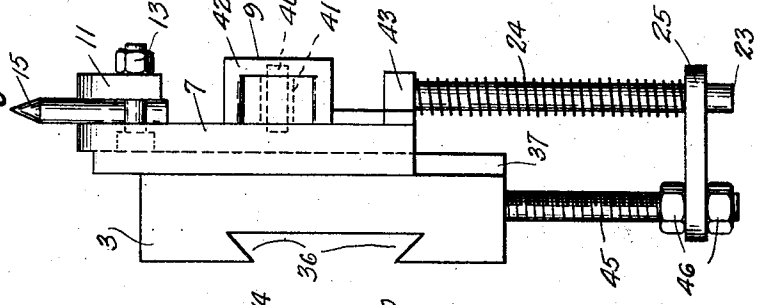
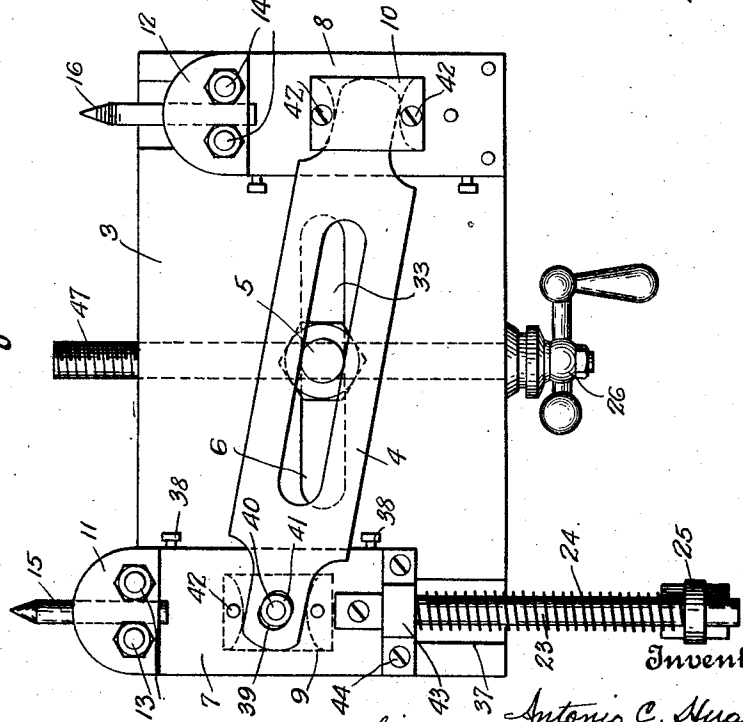


Fig. 3.



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Fig. 7.

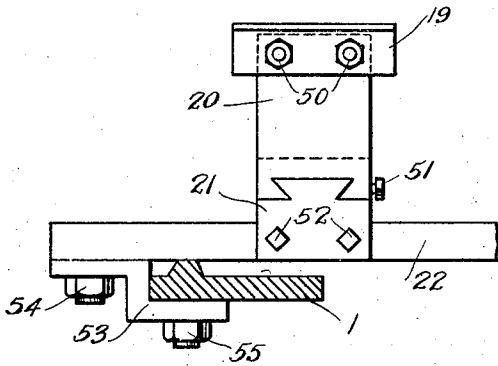


Fig. 8.

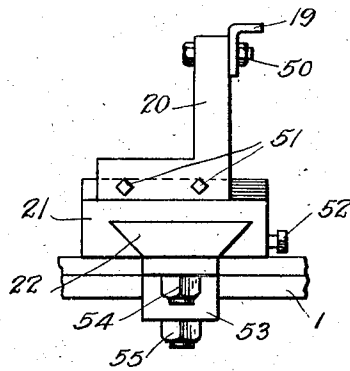


Fig. 9.

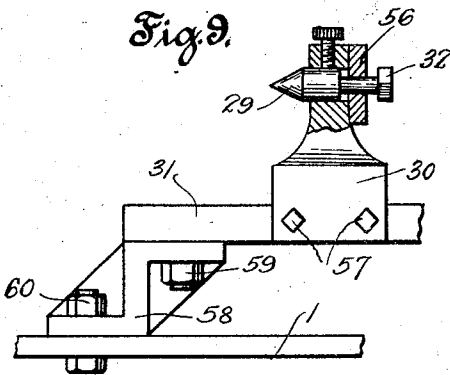


Fig. 10.

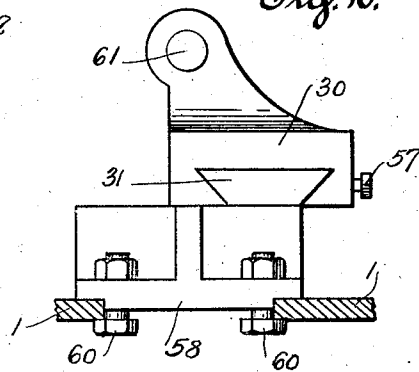
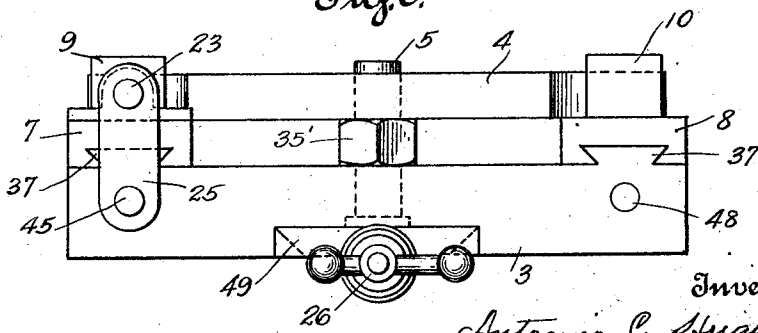


Fig. 6.



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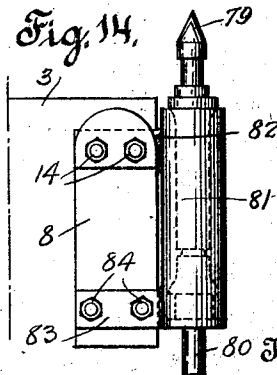
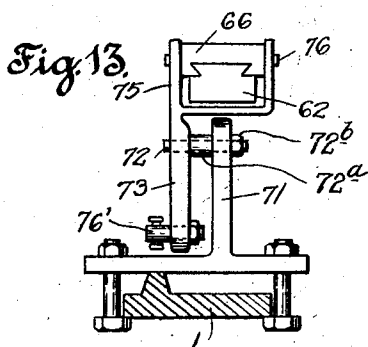
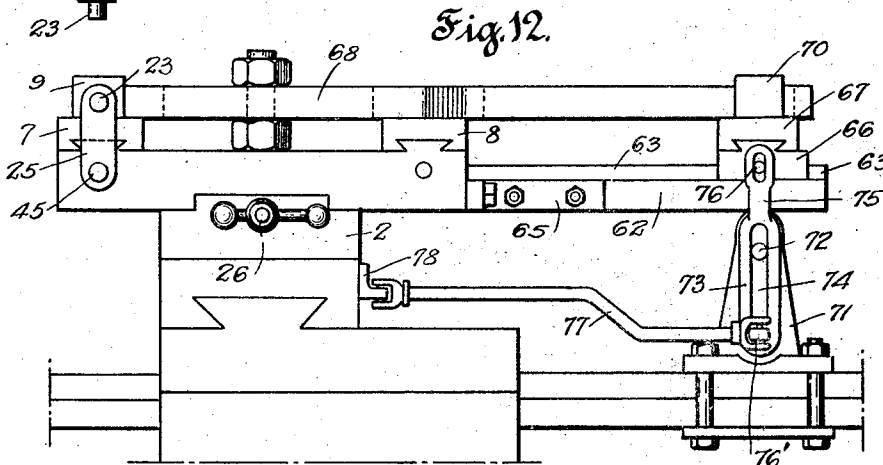
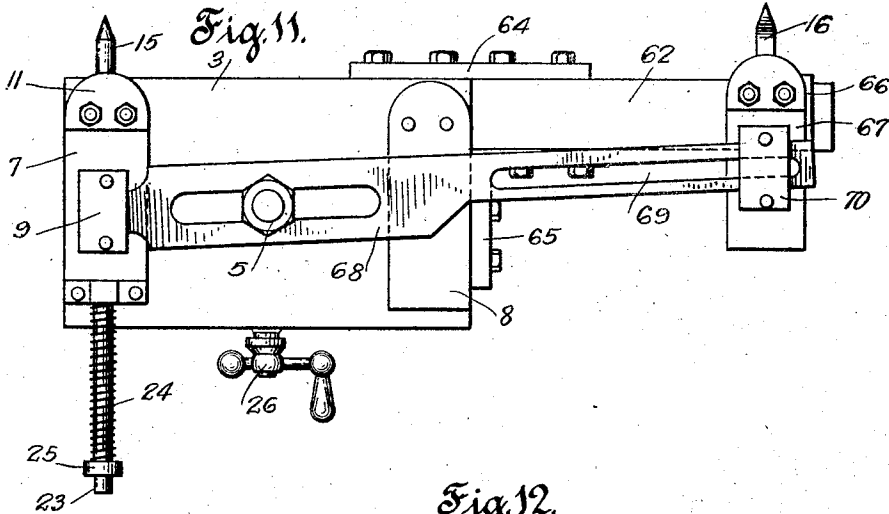
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Fig. 17.

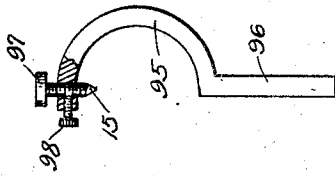


Fig. 19.

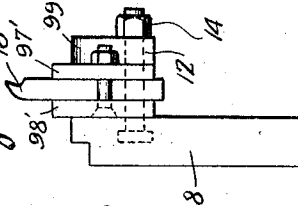


Fig. 16.

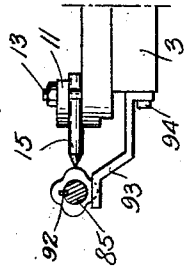


Fig. 18.

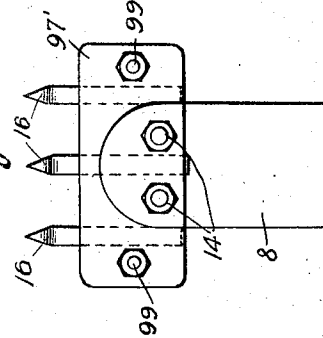
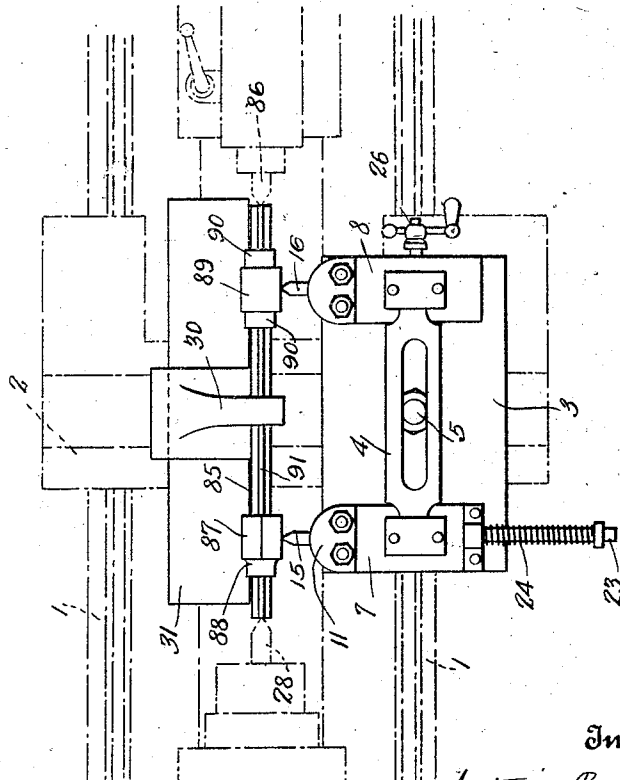


Fig. 15.



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# UNITED STATES PATENT OFFICE.

ANTONIO COSTA HUGUET, OF BUENOS AIRES, ARGENTINA.

## LATHE.

Application filed June 1, 1922. Serial No. 565,041.

*To all whom it may concern:*

Be it known that I, ANTONIO COSTA HUGUET, subject of the King of Spain, residing at 265 Jose Marti Street, Buenos Aires, Republic of Argentina, have invented new and useful Improvements in Lathes, of which the following is a specification.

This invention relates to certain useful and important improvements in mechanical lathes and cutting machines of any description and one of its objects consists in applying to the slide or rest of the same a special device which allows of mechanically and automatically turning or cutting objects of any desired shape, in relief or bas-relief, either on internal or external surfaces and with mathematic exactness.

This invention essentially consists in arranging on the slide or rest of the lathe or cutting machine, a particular tool support, adapted to slide in an endwise direction, and a guide supporting device, also mounted to perform an endwise sliding motion, which latter device acts on a pattern or model secured to a fixed part of the lathe frame and urged against the same by means of a spring, both sliding devices being suitably linked together in order that the movements of one of the same will cause a corresponding movement of the other device.

The invention further has for object a device of the above kind in which the thickness of the article to be turned or cut may be reduced or increased at will in relation to the thickness of the pattern or model, or the length of said article in relation to the length of the pattern, or both may be varied at a time, all such objects being obtained automatically and in a reliable manner, without requiring the aid of expert operators or turners, whereby not only a considerable saving in the cost of manufacture may be obtained, but also the respective objects may be turned or cut within a much lesser period of time.

The invention also views other objects which will appear in the course of this specification and will particularly be pointed out in the claiming clauses hereto annexed.

In order that the invention may be readily understood and carried into practice without difficulties, a preferred form of embodiment and several modifications of the

same have been represented in the accompanying drawings, in which:—

Figure 1 is a plan view of the corresponding part of a lathe provided with the improvements in accordance with this invention, arranged for front turning.

Figure 2 is a view similar to Figure 1, but with the device arranged for lateral turning.

Figure 3 illustrates in plan view, on a larger scale, the device according to my invention, as applied to the slide of the lathe.

Figure 4 illustrates a side view of the same.

Figure 5 shows a cross section of the said device, on a line passing through the central pivot of the link or joint.

Figure 6 is a rear view of the device as applied to the slide.

Figure 7 illustrates in front view the arrangement of the pattern or model with its supporting elements in the arrangement of Figure 1.

Figure 8 is a side elevation also corresponding to the arrangement of Figure 1.

Figure 9 is a side elevation, partially sectional, of the element carrying the tail stock of the lathe, while the Figure 10 illustrates a front view of the same.

Figure 11 illustrates a modified construction of the device according to this invention, as applied to obtain variations in the length of the object to be turned with regard to that of the pattern or model.

Figure 12 shows a front elevation of the same.

Figure 13 is a side view which illustrates the operation of said device.

Figure 14 illustrates the manner of applying a rotative cutter to the tool supporting device.

Figure 15 is a similar view to Figures 1 and 2 which illustrates this invention as applied to the turning or cutting of objects of different sections, either variable or constant and provided or not with designs or letters in relief or bas-relief.

Figure 16 illustrates a modification of the pattern support in the foregoing arrangement which causes the pattern to follow the slide in its movement; according to this arrangement, objects of a length equal to that of the lathe may be turned by using a short pattern.

Figure 17 illustrates a modified construction of the guiding device for the case when a positive pattern is to be used.

Figure 18 illustrates the tool supporting device provided with a series of tools, for operating on several objects in series, and

Figure 19 is a side elevation of the same device.

In all the said figures, the same numbers of reference indicate like or corresponding parts.

Referring to the embodiment of the invention as shown in Figures 1, 2 and 15, 1 is the base frame of the lathe which may be of any suitable or desired type, independent of this invention and which carries the usual rest or slide block 2, adapted to perform a lengthwise sliding motion with regard to said base frame said slide block being provided with a cross slide for transverse movement. On the said slide block 2 is mounted a plate 3, adapted to perform the movements hereafter to be described. Said plate carries the parts 7 and 8, mounted to slide in parallel direction thereon and linked together by means of a connecting member 4 mounted to oscillate on a pivot 5, adapted to be adjusted horizontally by means of a slot 6 formed in connecting member 4. The ends of said member 4 are arranged below the bridges 9 and 10, secured to said sliding devices so that any movement of one of said devices will cause an inverse movement of the other, the range of such movement being controlled by the position of the pin 5, as will be readily understood. One of the said devices, such as 7, carries the guiding centre 15, suitably clamped by the plate 11 secured in position by means of screws and nuts 13, while the other device 8 supports the tool 16, clamped by the plate 12, secured in position by means of the screws and nuts 14. In Figure 1 the object to be turned, indicated at 17, is suitably supported on the rotating chuck 18 of the lathe. 19 indicates the model or pattern followed by the guiding center 15 and whose shape or contour is a negative or counter-part of the object to be turned, although it will be evident that a positive model or pattern might be employed, in which case the element 15 is replaced by the device illustrated in Figure 17 which consists of a curved rod 96 which carries at its end the guiding center 15 in a reversed condition, said center being carried in this case by the screw 97, for the purpose of facilitating the adjustment of its position. After having effected such adjustment, the screw 97 is locked by means of the set screw 98. The rod 96 is also secured by means of the plate 11 and the screws 13 on the sliding center-support 7. In this case the model or pattern is turned, causing the same to pass to the opposite side of the slide block 22. The pattern or model is carried

by a support 20, adapted to slide on the member 21 which in turn is mounted to perform a sliding movement in a direction normal to that of the support 20 on the block 22, suitably secured to the base frame of the lathe. The center support 7 is formed integral with a rod 23 on which is mounted a spring 24 which bears on a fixed collar 25, for the purpose of constantly urging the guide center against the surface of the pattern or model, as will be readily understood. The pressure must be controlled in accordance with the class of material under treatment and in accordance also with the depth of the work to be performed, all of which is obtained by varying the tension of the spring or by the mechanical devices hereinafter to be described. 26 indicates a handle for imparting a longitudinal movement to the plate 3 on the slide 2, in order to cause the working tool to approach to the object to be turned or recede from the same to the required extent.

In the modified construction shown in Figure 2, the invention is used for turning objects in a longitudinal direction in relation to the lathe. In this case, the plate 3 is mounted on the slide in a position at right angles to that of Figure 1 and in the manner hereinafter to be explained. The guide block 31 (similar to the block 22 in Figure 1) is placed in the longitudinal direction of the lathe and on said block is slidably mounted the tail stock 30 carrying the dead center 29 of the lathe; 28 indicates the live center, the object to be turned, indicated at 27, being supported between the said dead and live centers in the usual manner. The pattern 19 is in this case also placed on the sliding member 20, in the endwise direction of the lathe. The member 20 slides transversely on the member 21 and the latter travels in an endwise direction on the guide 31. A screw 32 is used to secure the engagement of the dead center 29 with the object 27 to be turned.

Figures 3, 4 and 5 illustrate details of the construction of this preferred embodiment of the invention. The plate 3 is formed with a transverse slot 33 disposed at right angles with regard to the direction movement of the two sliding members 7 and 8. The slot 33 is enlarged or widened at the underside of plate 3, as shown at 34, to receive the head 35 of the pin 5, which pin is secured in position by means of a nut 35', for the purpose of varying the length of the arms of the lever 4. At the centre of said plate 3 at the underside thereof are formed two grooves 36 and 36', of swallow tail cross section and arranged at right angles with regard to each other, by means of which said plate is allowed to slide along a corresponding guide formed in the slide 2. In the top surface of the plate 3 are

formed swallow-tailed grooves 37 in which travel the sliding members 7 and 8, as will be seen when referring to the drawing, a neat adjustment of the parts being obtained by means of the screws 38. At one of its ends, the lever 4 is provided with a somewhat elongated hole 39 within which moves a pin 40, provided with a sleeve 41, said pin being formed integral with the sliding center-support 7 and placed below the bridge 9, the opposite end of said lever extending below the bridge 10. The bridges 9 and 10 are secured by means of the screws 42 to the respective sliding members 7 and 8. 43 indicates a support secured by means of the screws 44 to the rear of the sliding center-support 7 and which may also be secured to the other sliding member 8, so as to permit of a change, to which end the said sliding member is formed with a series of screw holes, as clearly shown in Figure 3. To the said support 43 is secured the rod 23, above referred to; said rod carries at its end a fixed eye or ring 25, secured after the manner of a clamp between two nuts 46 on the end of a screw 45 secured to the plate 3, so that by varying the position of said nuts, the pressure exerted by the aforesaid spring 24 on the sliding center-support 7, may be increased or decreased as required. 47 is a screw operated by means of the handle 26 and adapted to turn in a bracket 49 formed integral with the plate 3 and which at its opposite end is threaded into the slide; this arrangement allows of varying the position of the plate 3 in relation to the said slide and causes the same to approach to, or recede from the object to be turned and the pattern or model as the turning operation progresses, thereby adjusting the pressure applied to the work. Said screw may be placed in one direction or another, according to the position occupied by the plate with regard to the rest or slide. In order to change the position of the screw 45, the plate 3 is formed with a hole 48, below the sliding piece 8 (see Fig. 6).

In the form of construction represented in Figures 1 and 2, the model or pattern 19 is supported on the member 20 by means of screws 50 in the manner shown in Figs. 7 and 8. Said support 20 is provided at its lower face with a swallow-tailed groove which engages with a corresponding guide formed on the upper part of the member 21, being secured in position by means of the screw 51. The supporting member 21 in turn, is mounted to slide on the slide block 22, in a similar way, being conveniently secured in position by means of the screws 52. The said slide block 22 is secured to the base frame 1 of the lathe by means of a clamp 53, which is perforated at its opposite ends for engagement with threaded

studs 54<sup>a</sup> and 55<sup>a</sup> carried respectively by the block 22 and frame 1, the clamp being secured on said studs by nuts 54 and 55 respectively. The block 22 is thus rigidly secured to the frame 1. In the construction above described, the position of the pattern 19 with regard to the centre guide 15 may be adjusted constantly and at will according to the requirements of the work and to suit the pattern as the operation proceeds. The arrangement of the elements just described is the same with regard to the longitudinal slide block or guide 31 in the case illustrated in Figure 2, the block 31 in said figure corresponding to the block 22 aforementioned.

Said block 31 is supported on the base frame 1 of the lathe by means of the bracket 58 (Figs. 9 and 10) at a suitable distance above said frame so as to allow of the passage of the slide 2. Said bracket is secured to the block 31 and frame 1 respectively by means of studs and nuts 59 and 60, as is clearly shown in Figures 9 and 10. On said block 31 is mounted for endwise sliding motion, by means of the swallow tail guide shown, the tail stock 30 carrying the dead center 29 of the lathe, the latter being arranged within a circular opening 61 formed in said tail stock which when desired may also be used as supporting block, as will hereinafter be explained.

Said circular opening is closed by means of a plate 56 secured to the support by means of screws and provided with an opening into which may be threaded the screw 32, for the purpose of applying pressure to said dead center.

The operation of the devices above described requires no further explanation, as the same will be readily understood from the foregoing description by any person skilled in the art. The relation of depth between the pattern and the object operated upon is adjusted by means of the screw 5, by varying its position in the groove 33.

For the purpose of adjusting the relative length between the pattern or model and the object under treatment, by varying at will the proportions of the same, the arrangement illustrated in Figures 11 to 13 may be employed. In said views, 62 indicates an additional slide block provided at its upper face with a swallow tail guide secured in position as an extension of the plate 3 by means of the brackets 64 and 65, or in any other suitable way, or which even may be formed integral with the said plate. On said swallow-tail guide 63 slides the member 66, and on said member 66 is mounted to slide in a direction at right angles to the direction of movement of said member, a tool support or head 67 which is similar in all respects to the tool-carrier 8, above described. In this form of construction, the



bridge of the tool-carrier 8 has been dispensed with and the lever 68, which takes the place of the lever 4 hereinbefore described, carries an extension provided with an elongated slot 69 placed below the bridge 70 of the tool-carrier 67 and which bridge may be provided with a depending stud (not shown) for engagement with said stud thereby to assist in guiding the tool carrier in its reciprocatory movements transversely of the member 66. The provision of the slot also serves to lessen the weight of the lever 68. The sliding movements in a direction parallel to the guide support 7 are transmitted in the same manner as before by means of the said rod or lever 68 and the relations of depth may be adjusted by positioning the pin 5. As hereinbefore stated, the tool-carrier 67 also is capable of sliding movement in a longitudinal direction, corresponding to the length of the work to be turned. These movements, which may be obtained in several ways, are produced in the present instance as follows:

The slide member 66 is provided with two lateral stops 76 with which engages a fork 75, formed integral with a lever 73, which is provided with a longitudinal groove 74. To the lower part of the said lever is linked the end 76' of a rod 77 the opposite end of which is pivotally connected at 78 to the slide or rest. The lever 73 is pivoted, intermediate its ends, to a stud 72 carried by a bracket 71 which is rigidly secured to the bed frame of the lathe, the vertical portion of the bracket being also provided with a slot similar to the slot 74, whereby the stud may be secured to said bracket at any point in the length of its slot and of the slot 74 in the lever, by means of a collar 72<sup>a</sup> fixed on the stud and a nut 72<sup>b</sup> threaded on the end of said stud as clearly shown in Fig. 13. It will thus be seen that, by varying the position of the pivot 72, the ratio of the length of one arm of the lever 73 to that of the other may be varied, and therefore, for a given movement of the slide, the tool-carrier 67 will be given a movement proportionate to the ratio between said lever arms, as will be readily understood.

When desired, a revolving cutter 79 may be arranged on the tool-carrier, as shown in Fig. 14 said cutter being mounted in a sleeve 81, provided with ears 82 and 83, secured by means of the screws 14 and 84 to the sliding plate of the tool-carrier. The tail or end 80 of said cutter may be rotated from any suitable source of power and by any convenient means.

When it is desired to operate in series on several pieces of work, then several tools may be positioned in series on the tool-carrier which may be effected by means of two plates 97' and 98' (see Figs. 18 and 19), secured by the common plate 12 and the

screws 14, between which the tools 16 are secured in position. In order to more securely retain the said tools in position, I arrange suitable studs at the ends of the plates, with their corresponding nuts 99. 70

Figure 15 illustrates another form of applying this invention for turning objects of varying or constant cross sections, provided or not with designs in relief or bas-relief. In the form shown, the model or pattern as well as the object to be turned are placed on the longitudinal shaft 85, caused to rotate by means of the lathe in the usual way and supported by the dead center 86. The model 87 is secured on the shaft by a collar 88 fixed by means of screws or the like, while the object 89 to be operated upon is secured to said shaft by collars 90 and suitable set screws, said collars being splined to the shaft by means of keys 92 which engage a longitudinal groove 91 in the shaft thereby to prevent rotation of the collars relatively to the shaft. The operation of the device will be readily understood and the model or pattern may be reproduced of the same or other lengths, either as a positive or negative, as may be desired. When it is desired to reproduce a short model or pattern of unvarying cross section along an indefinite length on the object operated upon, then the collar 88 is removed from the model and this latter is secured by means of a fork 93, secured at 94 to the guide support, so that as the slide 2 moves along, the model will also be shifted, as will be clearly understood. 80 85 90 95 100

It will be evident that the invention may be carried into practice in manners different from that above described and shown and that in consequence the invention is not limited thereto, but, on the contrary, the same may be varied as to the construction and arrangement of parts within the scope of the claims hereunto annexed. 105

The several manners of using this invention have not been set forth in detail, as these may be all or any of the uses of a lathe while it allows of automatically performing operations which up to this date could be done only by hand, thereby effecting considerable saving in time and labor and permitting of the exact and perfect reproduction of the model or patterns. 110 115

Having now described my said invention, I declare that what I claim as new and desire to secure by Letters Patent, is:— 120

1. In a machine of the class described, the combination of a slide block, a plate supported thereon, a pair of members carried by said plate and slidable in parallelism thereon, one of said members being adapted to carry a tool and the other to support a center guide, a pivoted link connection between said slidable members, the pivotal point of said link being adjustable, means for supporting a pattern on the frame of the 125 130

machine in position to be followed by said center guide, said means being adjustable to vary the position of the pattern relatively to the guide, and means for constantly urging said center guide against the surface of the pattern.

2. In a machine of the class described, the combination of a slide block, a lever carried by said block and pivoted at a point intermediate its ends, said lever carrying at one side of its pivot a tool support and at the other side a center guide adapted to follow a pattern supported at a fixed point on the

machine, said tool support being movable with said lever when the latter is swung on its pivot and also movable longitudinally of the lever, a second lever pivotally connected to said tool support and mounted on a pivot adjustable longitudinally of the lever, and a rod pivotally connected at one end to said slide block and at its opposite end to said second lever.

In testimony whereof I have signed my name to this specification.

ANTONIO COSTA HUGUET.