W. BÜTTRUM.

LATHE.

APPLICATION FILED DEC. 4, 1920.

1,426,546.

Patented Aug. 22, 1922.

4 SHEETS—SHEET 1.

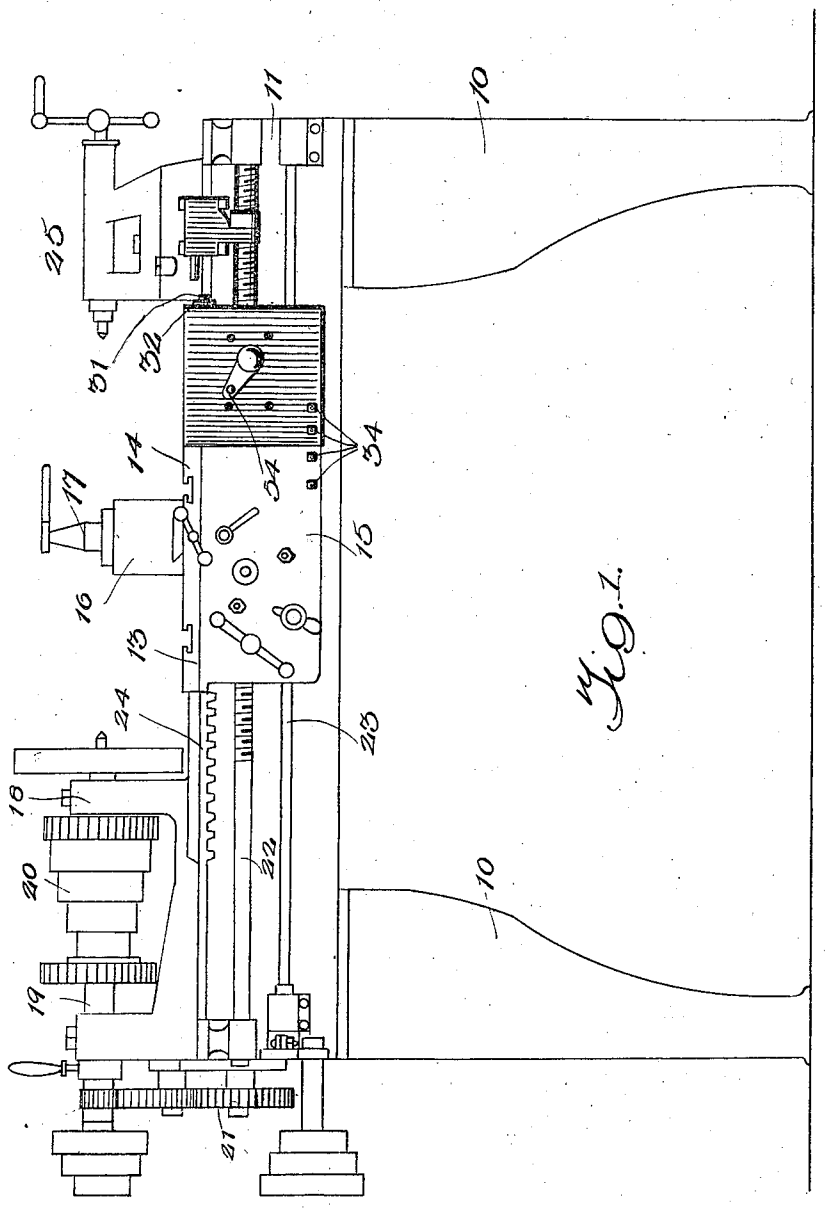


Fig. 1.

WITNESSES

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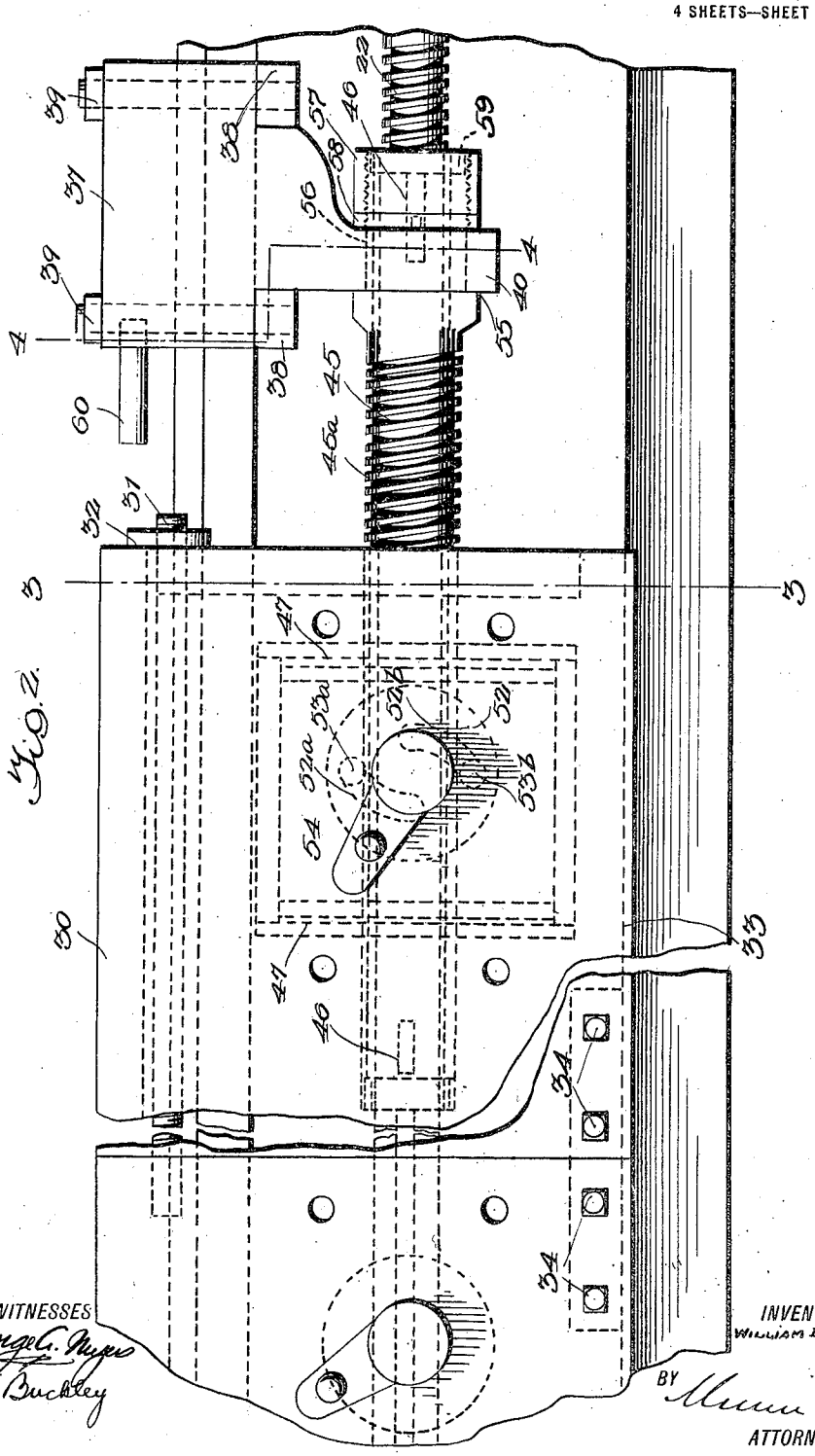
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

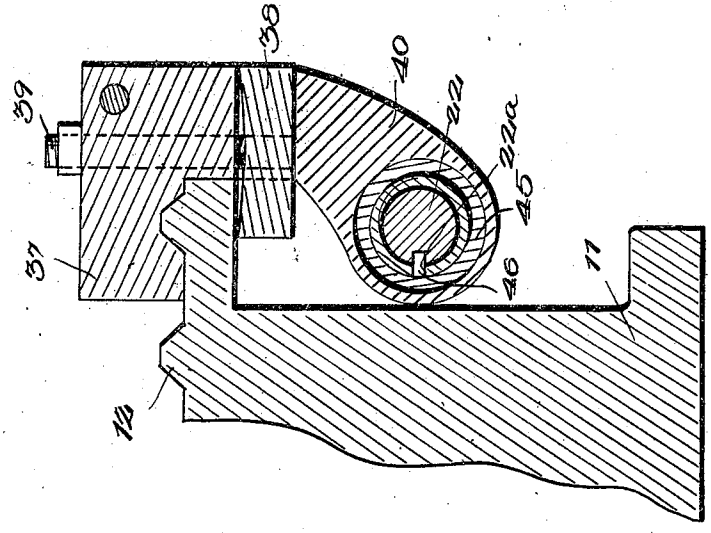


Fig. 4.

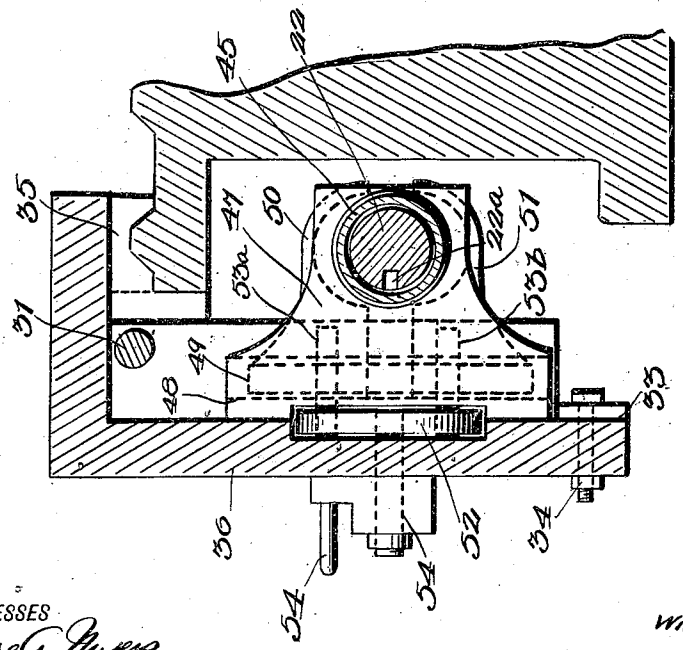


Fig. 5.

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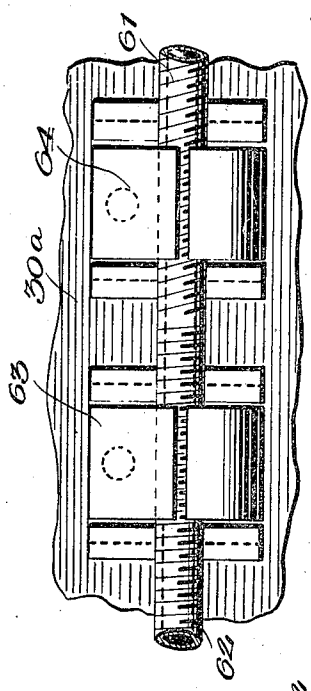


Fig. 6.

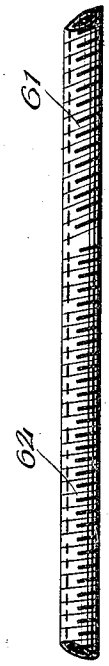


Fig. 7.

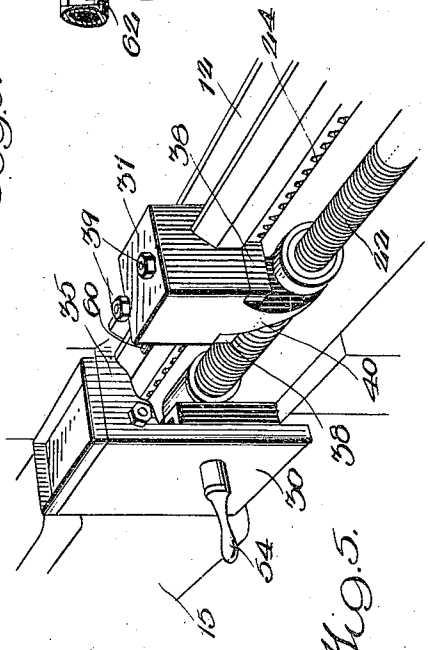


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

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LATHE.

1,426,546. Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed December 4, 1920. Serial No. 428,353.

To all whom it may concern:

Be it known that I, WILLIAM BUTTRUM, a citizen of the United States, and a resident of Joplin, in the county of Jasper and State of Missouri, have invented certain new and useful Improvements in Lathes, of which the following is a specification.

The present invention relates in general to lathes, and more particularly to an attachment for lathes especially adapted to facilitate the carrying out of various thread cutting operations.

The object of the invention is to provide an attachment for lathes of this character which adapts the conventional or standard lathe to carry out the accurate cutting of threads of various pitches of standard or special design, with a minimum expenditure of time and of skill and without impairing the original capacities or advantages of the lathe; which is of simple and durable construction, reliable in operation, and easy and inexpensive to manufacture, and which in general endows the lathe with new features, advantages and capacities without detracting from those originally existent therein.

Other objects and advantages of the invention reside in certain novel features of construction, combination and arrangement of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming part of this specification, and in which:

Figure 1 is a side elevational view, showing the invention assembled upon a conventional lathe;

Figure 2 is a detail view in side elevation of the invention, parts being shown in dotted lines for the sake of illustration;

Figure 3 is a transverse vertical sectional view on line 3—3 of Figure 2, looking in the directions of the arrows;

Figure 4 is a transverse vertical sectional view on line 4—4 of Figure 2, looking in the direction of the arrow;

Figure 5 is a detail perspective view of the invention and the associated portions of the lathe;

Figure 6 is a fragmentary rear elevational view of a modified form;

Figure 7 is a fragmentary detail view in side elevation of the type of screw used in the modified form.

Referring to the drawings, it will be seen that the invention contemplates a lathe of any standard or conventional construction which includes as usual a suitable base such as legs 10 upon which a bed 11 is supported. The bed 11 includes ways or shears 12 which slidably receive a carriage 13 including a saddle 14 and an apron 15. A cross slide 16 is arranged upon the saddle and carries a tool post 17. The head stock 18 is arranged at one end of the lathe and in it is journaled a lathe spindle 19 adapted to be driven directly or by suitable gearing from the cone pulley 20. Change gears 21 are provided, and drive a lead screw 22, which is adapted to cooperate with the mechanism of the apron of the carriage for feeding the carriage longitudinally and for operating the cross feed when desired. A feed rod 23 is also provided, and is adapted to be driven from the spindle of the lathe to feed the carriage longitudinally through the cooperation therewith of the conventional mechanism of the lathe apron and rack 24 secured to the bed of the lathe.

An extension 30 for the carriage is provided and is secured to the carriage by means of screws 31 and nut 32 and a strap 33 and bolts and nuts 34. The extension 30 includes a saddle portion 35 adapted to cooperate with the ways or shears of the lathe and an apron portion 36.

A bearing bracket 37 is adjustably arranged on the ways or shears of the bed of the lathe, and is adapted to be secured in adjusted position by means of a bowed clamp plate 38 and clamp nuts and bolts 39. The bracket includes a depending bearing portion 40.

An auxiliary lead screw 45 of tubular form is arranged upon the lead screw 22 and is splined thereto so as to be constrained to partake of the rotary motion of the lathe screw while free to partake of relative longitudinal motion with respect thereto. For this purpose the lead screw is provided with a key way 22^a throughout its entire length with which is adapted to cooperate feathered keys or the like 46 carried by the auxiliary lead screw and slidably received in the key-way of the lead screw 22. The periphery of the auxiliary lead screw 45 is provided with screw threads 45^a of a pitch and character corresponding to the pitch of the threads to be cut. The extension 30 to the

carriage is provided on the rear face of its apron with spaced plates 47 having provided therein ways 48 which slidably receive flanges 49 carried by sections 50 and 51 of a split clamp nut adapted to engage the threads of the auxiliary screw. Means is provided for moving the clamp nut sections into and out of engagement with the auxiliary screw and includes a cam disk 52 having cam grooves 52^a and 52^b therein adapted to coact respectively with pins 53^a and 53^b carried upon the sections 50 and 51, respectively of the clamp nut. The cam disk is controlled by a handle 54 carried at the outer end of a shaft 54^a to the inner end of which the cam disk is secured.

At one end, the auxiliary screw 45 is enlarged and provided with a shoulder 55 which is adapted to abut the bearing portion 40 of the bracket and beyond the shoulder 55 the auxiliary screw is formed with a reduced extension 56 received in the bearing of the bearing portion 40 and extending therebeyond. The portion extending beyond the bearing 40 is provided with screw threads with which a nut 57 and thrust collar 58 engage. The thrust collar 58 cooperates with the opposite side of the bearing portion from the shoulder 55 and maintains the auxiliary screw against longitudinal motion with respect to the bed of the lathe. At each end of the auxiliary screw and between the auxiliary screw and the lead screw are carrier rings 59 to properly support the auxiliary screw or the lead screw.

An adjustable stop pin 60 projects laterally from one side of the bearing bracket and is adapted to engage the carriage to limit the movement thereof toward the bearing bracket.

In practice an auxiliary screw is selected which has on its periphery threads of the character and pitch corresponding to the threads to be cut and this auxiliary screw is then assembled on the lead screw of the lathe, as shown in Figure 2. The bearing bracket is then adjusted to the position on the bed of the lathe which will give the carriage a range of action and location which is best adapted to carry out the operations upon the peculiar work in the lathe and the bearing bracket is then clamped in this position by means of the clamp nut and bolts 39 and clamping plate 38. The tool etc., of the lathe is manipulated in the usual manner but the longitudinal feed of the carriage is controlled by the auxiliary lead screw. The utility of the adjustment may perhaps be best understood by a consideration of its action with respect to a certain form of lathe rather widely used. This type of lathe is equipped with a standard 4-thread lead screw and in cutting an 8-thread, the gear ratio is set at 48—96 or two to one, that is for every turn of the lathe screw there is two turns at the cutter. Consequently, the cutter will catch on any position of the lead screw and the four positions of the lead screw is represented by every other thread cut. Now however in cutting a 7-thread with the same lead screw the gear ratio is changed from 48—96 to 48—84 and only one position of the 4-thread on the lead screw will catch, for now every thread on the lead screw corresponds to $1\frac{3}{4}$ threads at the cutting edge. To cut the 7-thread, it is therefore necessary to catch the tool in every fourth position. This requires a stopping of the lathe and the measuring back of an equal number of inches for the correct position or else the leaving of the machine run and dropping back one inch beyond the beginning of the thread to waiting of the rotation of the lead screw for the correct position of the lead screw to be presented so that it will catch and then following it up to the beginning to be sure you have the correct position. If it is in the wrong position the same operation is repeated making it a "cut and try" method.

In a cutting of a 7-thread with my attachment, the gear ratio is not changed, but left the same as an 8-thread. The lead screw is changed from a four thread to a $3\frac{1}{2}$ thread screw and a $3\frac{1}{2}$ screw bears the same ratio to a 7-thread that a 4-thread screw bears to an 8-thread. This makes the cut of the 7-thread screw as simple as that of an 8-thread.

In the above illustration reference is made to a 7-thread entirely but the same theory is applicable to and is carried out by the present invention with respect to a 5, 9 or any odd thread required by simply inserting the attachment of the proper pitch. For example, a 5-thread requires a $2\frac{1}{2}$ pitch in the attachment, a 9-thread a $4\frac{1}{2}$ pitch, etc.

In the modification of my invention shown in Figures 6 and 7, the auxiliary screw is shown as having its exterior provided with two sets of screw threads, designated at 61 and 62 of different pitch and corresponding to different character of threads to be cut. The extension of the lathe apron, designated at 30^a is provided with two sets of split clamp nuts, designated at 63 and 64 of a construction identical with the single clamp nut of the preferred form of invention. It is to be understood that the clamp nut 63 is adapted and only cooperates with the section of the lead screw 62 and that the clamp nut 64 corresponds to and is adapted to cooperate only with the section of the lathe screw bearing the lead screw 61.

The action and operation of the modification is substantially the same as that of the preferred form first described except that in this instance two varieties of thread may be cut from the same auxiliary screw.

In either embodiment of the invention it is to be understood that there is provided a sufficient variety of auxiliary screws to take care of the various thread cutting operations, although by the provision of threads of different pitches on the same screw a wide range of selection may be had from a compartively few auxiliary screws. In this latter event it is not necessary to change the auxiliary screws to meet the exigencies of each particular thread cutting operation.

I claim:

1. A thread cutting attachment for lathes including a bed, a carriage and a lead screw and comprising an extension, means for securing said extension to the carriage, a bracket having a depending portion provided with a bearing, means for adjustably securing said bracket to the bed, an auxiliary screw having its exterior provided with threads of a pitch corresponding to the threads to be cut and adapted to be arranged upon and constrained to rotate with the lead screw, said auxiliary screw having a shoulder abutting the bearing of the bracket and a reduced extension beyond the shoulder rotatably received in the bearing, means for maintaining the auxiliary screw in proper relation with respect to the bearing including a thrust collar secured to the auxiliary screw and engaging the bearing, and a nut for securing the thrust collar in position, and a split nut carried by the extension and engageable with the auxiliary screw.

2. A thread cutting attachment for lathes including a bed, a carriage and a lead screw and comprising an extension, a bracket having a depending portion provided with a bearing, an auxiliary screw having its exterior provided with threads of a pitch corresponding to the threads to be cut and adapted to be arranged upon and constrained to rotate with the lead screw, said auxiliary screw having a shoulder abutting the bearing of the bracket and a reduced extension beyond the shoulder rotatably received in the bearing, and means for maintaining the auxiliary screw in proper relation with respect to the bearing including a thrust collar secured to the auxiliary screw and engaging the bearing, and a nut for securing the thrust collar in position, and a split nut carried by the extension and engageable with the auxiliary screw.

3. A thread cutting attachment for lathes including a bed, a carriage and a lead screw and comprising an extension, a bracket having a depending portion provided with a bearing, an auxiliary screw having its exterior provided with threads of a pitch corresponding to the threads to be cut and adapted to be arranged upon and constrained to rotate with the lead screw, said auxiliary screw having a shoulder abutting the bearing of the bracket and a reduced extension beyond the shoulder rotatably received in the bearing, and means for maintaining the auxiliary screw in proper relation with respect to the bearing including a thrust collar secured to the auxiliary screw and engaging the bearing, and a nut securing the thrust collar in position.

4. A thread cutting attachment for lathes including a carriage and a lead screw and comprising an extension adapted to be directly and rigidly secured to the carriage, an auxiliary screw adapted to be arranged upon and constrained to rotate with the lead screw and having its exterior provided with threads of a pitch corresponding to the threads to be cut, and a split nut carried by the extension and engageable with the auxiliary screw.

5. A thread cutting attachment for lathes including a bed, a carriage and a lead screw and comprising an extension adapted to be directly and rigidly secured to the carriage, a bracket adapted to be adjustably secured to the bed and provided with a bearing, an auxiliary screw adapted to be arranged upon and constrained to rotate with the lead screw and to be rotatably journaled in the bearing of the bracket and having its exterior provided with threads of a pitch corresponding to the threads to be cut, and a split nut carried by the extension and engageable with the auxiliary screw.

6. A thread-cutting attachment for lathes including a lead screw and a carriage and comprising an auxiliary screw adapted to be arranged upon and constrained to rotate with the lead screw and having its exterior provided with threads of a pitch corresponding to the threads to be cut, and means directly and rigidly connected with the carriage and operable to be selectively engageable with the auxiliary screw, all as and for the purpose set forth.

7. A thread cutting attachment for lathes including a carriage and a lead screw having a spline, and comprising an extension adapted to be secured to the carriage, a hollow auxiliary screw having its exterior provided with threads of a pitch corresponding to the threads to be cut and adapted to be arranged upon the lead screw, a feathered key cooperable with the spline of the lead screw to constrain the auxiliary screw to rotation with the lead screw and a split nut carried by the extension and engageable with the auxiliary screw.

8. In a lathe, in combination with a bed, a carriage and a lead screw, an auxiliary screw associated with the lead screw and having the exterior provided with threads of a pitch corresponding to the threads to be cut and a manually operable split nut directly and rigidly connected to the carriage and operable so as to be engageable with the auxiliary screw.

9. A thread-cutting attachment for lathes including a carriage and a lead screw and comprising an extension adapted to be rigidly and directly secured to the carriage, a bracket having a bearing adapted to be secured to the bed, a hollow auxiliary screw adapted to be arranged upon and constrained to be rotated with the lead screw and to be rotatably journaled in the bearing of the bracket, and means carried by the extension and cooperable with the auxiliary screw whereby said cutting motion is imparted to the carriage.

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