June 22, 1937. R. ECKARDT ET AL 2,084,898

THREAD CHASING MECHANISM FOR AUTOMATIC LATHES

Filed Sept. 23, 1936 2 Sheets-Sheet 1

Fig. 1.

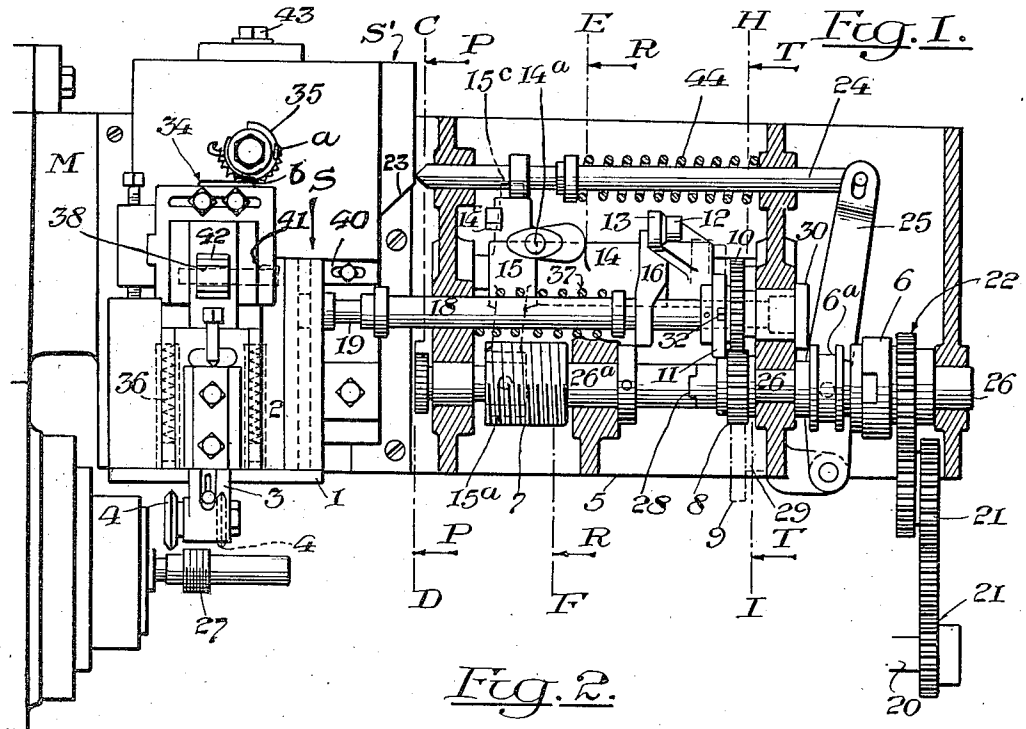
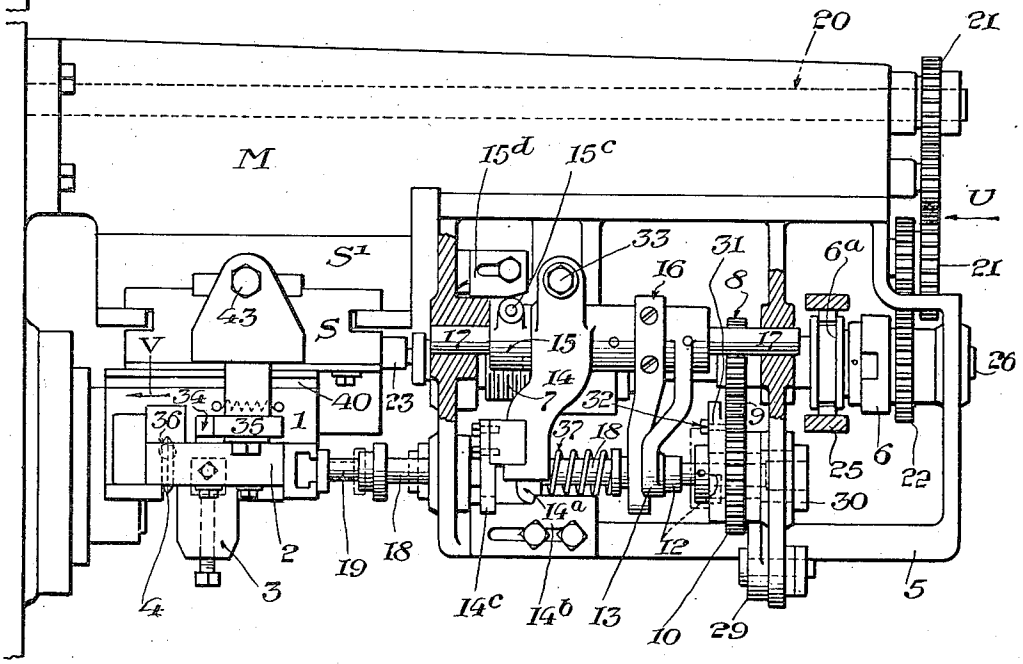


Fig. 2.



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Fig. 3.

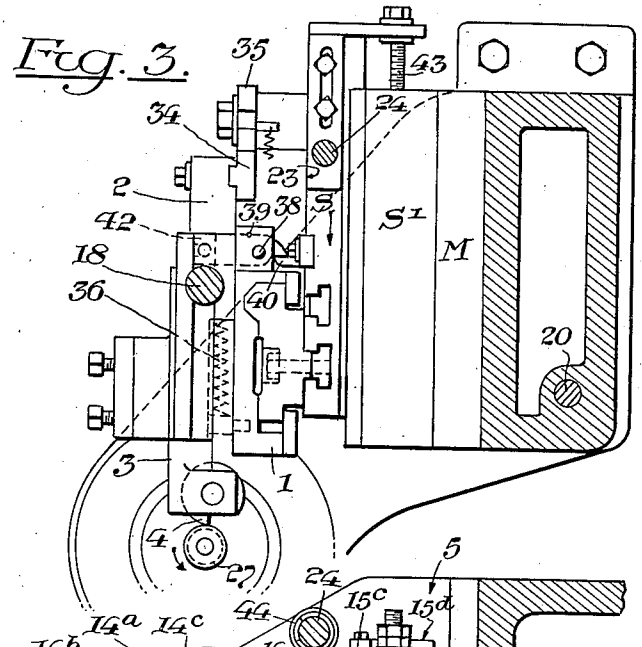


Fig. 4

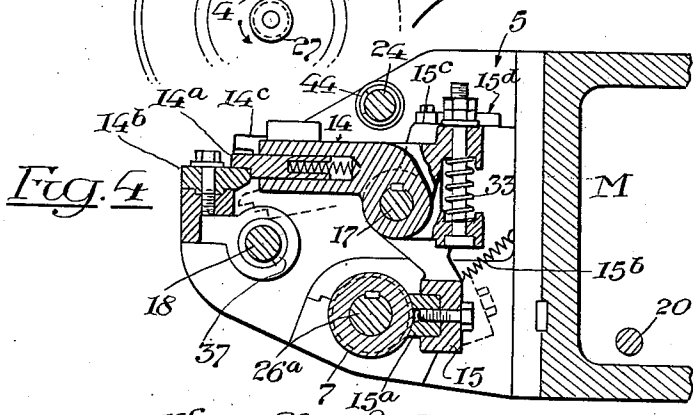
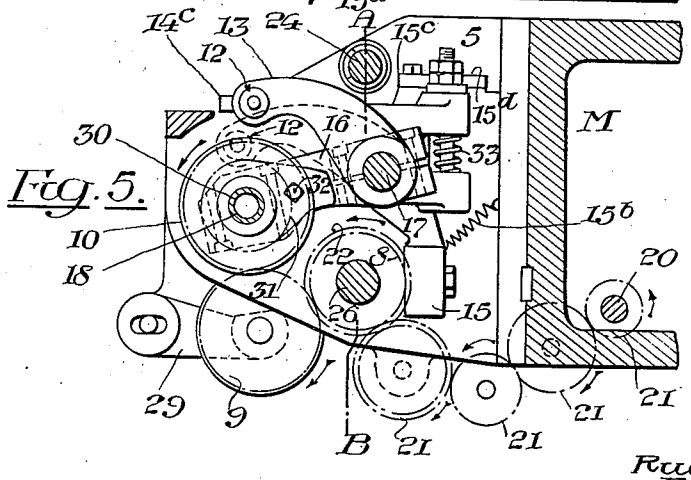


Fig. 5.



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THREAD CHASING MECHANISM FOR AUTOMATIC LATHES

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In Germany March 2, 1936

21 Claims. (Cl. 29—57)

This invention relates to thread chasing mechanism for automatic and turret lathes, the principal object of the invention being the provision of a mechanism which, by means of a changeable gear transmission into reduced speed and by means of a cam member rotating at a lower speed than the driving shaft serves to engage the thread guiding die or master thread follower independently of the rotation of the master thread gauge or pattern.

A further object of this invention is the provision of a mechanism which, when used for chasing multiple threads, provides for an accurate automatic indexing so that each thread may be chased individually and successively.

A further object of the invention is the provision of a mechanism or movement transmitting mechanism by which a too rapid disengagement of the thread guiding die from the gauge pattern and the occurrence of hard impacts or shocks is prevented, such impacts as a rule being unavoidable with a quickly rotating pattern shaft thereby to provide a smoother operation than is possible in machines in which the lifting of the thread guiding die is effected by means of cams carried by a gauge pattern shaft rotating at relatively high speed.

This invention, therefore, contemplates transmitting the movement from the gauge pattern shaft by way of an interposed oscillating shaft thus avoiding shocks which are liable to be caused by the impacts of rapidly rotating cams.

A further object of this invention is the provision of a mechanism in which the lifting or return of the chaser or tool-carrying, quick acting slide is effected after each chasing operation by a semi-circular oscillating cam.

In the present improvement, a cam lever which is pivotally fastened to the longitudinal slide establishes the starting position of the chaser for each new cutting phase. During the final phase of each return movement of the longitudinal slide, this lever engages upon a short incline and being co-operatively associated in a certain manner with the tool carrying sliding support or slide, it forces the same back into its initial position.

It is known that thread cutting or chasing mechanisms for automatic and turret lathes are driven from the work carrying spindle at a ratio of 1 to 2 so as to make possible the chasing of threads having small pitch from a master thread gauge or pattern having twice that pitch, this being desirable for the purpose of securing a satisfactory operating engagement or meshing between the master thread pattern and the associated master thread guiding die or follower. Theretofore, it has been customary to disengage the follower from the master thread by means of cams which rotate at the same speed as the master gauge shaft and it is also known to withdraw the tool or chaser from the finished work by means of cam curves and associated cam lever actuated from the control shaft of the machine.

This invention possesses other objects and features of advantage, some of which with the foregoing will be set forth in the following description. In the following description and in the claims, parts will be identified by specific means for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

In the accompanying drawings there has been illustrated the best embodiment of the invention known to us, but such embodiment is to be regarded as typical only of many possible embodiments, and the invention is not to be limited thereto.

The novel features considered characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings in which

Fig. 1 is a front elevation of the novel thread chasing mechanism of an automatic lathe, parts sectioned according to section line A—B of Fig. 5 exposing the bearings of the starting rod and the thread-pattern shaft.

Fig. 2 is a top view of the device shown in Fig. 1.

Fig. 3 shows a cross section taken along the line C—D of Fig. 1, showing the supporting frame and a side view of the upper slide and viewed in the direction of the arrows P.

Fig. 4 is a cross section through the driving mechanism taken along the line E—F of Fig. 1, viewed in the direction of arrows R. The master thread pattern and the main control parts immediately associated therewith.

Fig. 5 is a cross section viewed in the direction of the arrows T of the gear box and taken along the line H—I of Fig. 1, showing the oscillating lever controlling the follower or thread guiding die arm and the controlling cam member therefor. It also shows the changeable gear transmission between the driving shaft and the thread

pattern shaft as viewed in the direction of the arrow U in Fig. 2.

Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, we desire to have it understood that the invention is not limited to the details of construction and arrangement of parts illustrated in the accompanying drawings since the invention is capable of other embodiments, and that the phraseology which we employ is for the purpose of description and not of limitation.

In one embodiment as illustrated, the device comprises:

Firstly: Of a thread chasing or cutting mechanism comprising a primary or main slide or sliding support S operatively mounted upon the supporting frame for vertically controlled movement; a secondary or intermediate horizontally movable slide 1 operatively mounted and controlled upon the main slide S; and a quick-acting chaser carrying slide 2 preferably spring-urged in vertical direction upon the secondary slide 1 and carrying a tool carrier 3 and a thread cutting tool or chaser 4, and

Secondly: Of a gear box comprising a clutch mechanism 6, a master thread pattern 7, changeable gears 8, 9 and 10 which are selected and combined according to the pitch and the number of threads required. Further, the improvement comprises a cam member 11 adjustably connected to the driven gear 10, an oscillating arm 13 having a roller 12, a guide arm 14 resiliently connected to the thread guiding die arm 15, a tie-member 16 rigidly connecting the oscillating shaft 17 with the feed rod 18, the latter through an adjustable spindle head 19 having operating connection with the intermediate slide 1.

The thread chasing mechanism is driven from a driving shaft 20 through a simple gear transmission.

The part 6 of the clutch is rotated by the gears 21 and 22. The starting movement of this part 6 is automatically initiated by the downward movement of the slide S by means of an inclined cam surface 23 thereon engaging the rod 24, the clutch lever 25 and the clutch operating sleeve 6a which is operatively connected with a disengageable part 26 of the pattern shaft. This pattern carrying shaft, herein briefly termed the pattern shaft, consists of two parts 26 and 26a. In order to avoid high speed rotation of the shaft 26—26a and to insure smooth operation thereof, the transmission gears 21 and 22 are so selected that the number of rotations of the shaft 26—26a is one-half of the number of the rotations of the shaft 20. The thread pattern 7 therefore rotates at half the speed of the work carrying spindle of the machine and of the work 27.

Hence, when cutting single threads, the pitch of the thread pattern 7 must be twice that of the work 27. The shaft portions 26—26a being separable as at 28, that is at a point between the gear 8 and the thread pattern 7, it is possible to exchange the thread patterns after withdrawing the shaft portion 26. The changeable gear 8 being rigidly connected to the part 26 actuates the gear 9 and thereby the gear 10. The gear 9 is shiftable by means of a fork 29. The gear 10 is loosely mounted on a running sleeve 30 carried by the housing 5 and the gear 10 is provided with the cam member 11 hereinbefore referred to and is adjustable by means of a slot 31 and is fastened to the gear 10 by a screw 32.

The gauge pattern and the gears 8 and 10 can be readily changed after the shaft portion 26a is withdrawn.

Shortly before the commencement of the thread chasing operation, that is to say when the chaser 4 and the cam-roller 12 of the oscillating lever 13 are in the dotted position, Fig. 5, and as soon as the chaser 4 due to the uniformly controlled progress of the sliding support S has been advanced the depth of a prospective cut, the cam 11 engages the roller 12 of the oscillating lever 13, Fig. 5, which at this moment occupies its lowered position and lifts same into the upper position shown in full lines in Fig. 5. The lever 13, the guide arm 14 and the thread guiding die arm or follower arm 15, all of which are supported upon the shaft 17, are swung from the dotted position, Fig. 5, to the position shown in the same figure in full lines; the thread guiding die 15a therefore meshes with the gauge pattern 7 and is held in this position during the chasing operation by the spring urged bolt 14a forming a movable front portion or telescoping head of the guide lever 14, which bolt co-operates with the adjustable guide 14b. The thread cutting or chasing operation proper now takes place due to the rotation of the thread pattern 7 causing the axial movement or displacement of the oscillating shaft 17 and along therewith through the tie member 16 of the feed rod 18 against the pressure of the coil spring 37. As soon as the lever head or bolt 14a slides off the stationary guide 14b (this position being shown in dotted lines in Fig. 4) the thread guiding die 15a is withdrawn from the gauge pattern 7 by the action of the spring 15b.

The oscillating movement of the lever 14 and thereby also of the lever 13 is limited by a stop plate 14c extending from the lever 14 and which, during the recoil of the arms 13, 14 and 15 engages itself upon the upper surface of the rail 14b. To ensure a proper and positive disengagement of the thread guiding die or thread follower member 15a, the roll 15c carried by the lever 15 is caused to engage upon a tapering rail 15d. Immediately after the die or follower 15a has been disengaged the levers 14 and 13 as a slidable unit are driven back, that is to say, laterally displaced due to the attendant release of the compressed spring 37 so that the cam roller 12 again enters the operating range of the cam member 11.

In order to prevent such minor irregularities as may be caused during the operating advance of the die from being transmitted to and influencing the accuracy of the thread chaser, and in order to obtain a smooth transmission from the thread pattern 7 to the feed rod 18, a resilient connecting means such as a cushioning spring 33 is shown inserted between the die arm 15 and the guide lever 14.

The rate of feed of the die 15a is greater or smaller depending upon the adjusted effective length of the stationary guide 14b. For chasing short threads it is sufficient to select the gear ratio of the gears 8 and 10 and the pitch of the pattern gauge 7 in such a manner that after each rotation of the cam member 11 the oscillating lever 13 is raised, whereupon the die 15a again meshes with the thread pattern 7.

When chasing long threads or threads with a small pitch the cam member 11 makes several rotations before the roller 12 of the lever 13 is again displaced into the range of the cam member 11. When chasing multiple threads the

change gears 8, 9, and 10 themselves are used as indexing mechanism. In this case the gear ratio and the number of the thread enterings of the gauge pattern 7 is to be selected in such a manner that the cam member 11 during the chasing operation is advanced relative to the prior indexing position an angular distance required by the index of the multiple screw 27.

Corresponding to the number of thread enterings, the operating phase of the die 15a when actuated by the lever 13 is then relatively shifted or staggered with respect to the pattern 7 a number of degrees which corresponds to the required index. For instance, for cutting a quintuple thread, a quintuple thread pattern and change gears with 20 and 44 teeth respectively should be selected.

The longitudinal displacement of the shaft 17 is transmitted to the feed rod 18 by the tie-member 16 so as to permit the shaft 17 to move the rod 18 engaging a T-shaped undercut groove of the secondary slide by means of an adjustable spindle head 19.

This secondary slide is advanced during the thread chasing operation by the feed rod 18 in the direction of the arrow V, Fig. 2, as long as the upper guide rail 34 of the quick acting or tool holding slide 2 contacts with the outer periphery of the semi-circular cam 35, Fig. 1. But, as soon as the end of the guide rail 34 reaches the shoulder b of the cam 35, the slide 2 is drawn upward through the action of the springs 36 at the moment when the thread guiding die 15a is disengaged from the thread pattern 7 by the tension of the spring 15b and the stop rail 15d.

The pressure of the spring 37 having been compressed by the chasing operation returns the feed rod 18 and the secondary slide 1 to their initial position. The guide rail 34 at its right hand edge portion engages the shoulder b of the oscillating cam 35, Fig. 1, returning the same to its initial position. At the same time the cam lever 39 pivoted at 38 to the slide 1 has its recessed portion or tooth travel over a guide rail 40 having a short incline 41 and adjustably fastened to the main sliding support S. However, before the oscillating lever 13 is again lifted by the cam member 11, the tooth of the cam lever 39 has reached the incline 41 causing the cam lever 39 to swing about the pivot 38 and its opposite end to press the tool carrying slide 2 downward, thereby again bringing the chasing tool 4 into its operating position relative to the work 27. As soon as the thread is cut to its desired depth, the feed of the main sliding support S is limited due to a set screw 43 abutting against the portion S' of the machine frame. The slide S along with the slides 1 and 2 is retracted in an upward direction through the customary cam member of the control shaft of the machine in a direction opposite to the arrow near S, Fig. 1.

Due to the urge of the compressed spring 44 the rod 24 moves down the incline 23 of the main slide S and to the left and thus disengages by means of the lever 25 and through the clutch actuating sleeve 6a, the clutch 6. The chasing tool 4 remains inactive until, by the downward feed of the main slide S (direction of arrow near S), the clutch is again thrown into engagement due to the displacement on the incline 23 of the rod 24. The cutting operation above described is then repeated upon another work piece 27.

It is to be understood that by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of our said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, we claim:

1. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide.

2. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft and comprising cam controlled means, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide.

3. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft and comprising cam controlled means connected with the rotating means of the pattern shaft for effecting co-operation of the pattern and its co-operating means, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide.

4. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, a thread guiding die carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, cam means for oscillating said shaft, and

a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide, the organization being such that the pattern is rotated at half the speed of the work.

5. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, a thread guiding die carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, cam means for oscillating said shaft, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide, the pitch of the thread pattern being twice that of the work.

6. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, a thread guiding die carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, cam means for oscillating said shaft, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide, the organization being such that the pattern is rotated at half the speed of the work and the pitch of the thread pattern being twice that of the work.

7. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it at a reduced speed, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide.

8. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it at half the speed of the work, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft, and a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide.

9. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the sliding mechanism for controlling the clutch of the pattern shaft, an axially movable oscillating shaft, means operated by said oscillating shaft during its axial movement for horizontally shifting the slide mechanism and thereby the chaser, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, and means for oscillating said shaft at a predetermined time.

10. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the sliding mechanism for controlling the clutch of the pattern shaft, an axially movable oscillating shaft, means operated by said oscillating shaft during its axial movement for horizontally shifting the slide mechanism and thereby the chaser, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, and means for oscillating said shaft at a predetermined time and including cam means.

11. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the sliding mechanism for controlling the clutch of the pattern shaft, an axially movable oscillating shaft, means operated by said oscillating shaft during its axial movement for horizontally shifting the slide mechanism and thereby the chaser, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft at a predetermined time, and means for disengaging the chaser from the work and including means for controlling such disengagement at a predetermined time.

12. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the sliding mechanism for controlling the clutch of the pattern shaft, an axially movable oscillating shaft, means operated by said oscillating shaft during its axial movement for horizontally shifting the slide mechanism and thereby the chaser, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft at a predetermined time, and means for disengaging the chaser from the work and including means for controlling such disengagement at a predetermined time and comprising cam means.

13. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the sliding mechanism for controlling the clutch of the pattern shaft, an axially movable oscillating shaft, means operated by said oscillating shaft during

its axial movement for horizontally shifting the slide mechanism and thereby the chaser, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft at a predetermined time, and means for disengaging the chaser from the work and including means for controlling such disengagement at a predetermined time and comprising a semi-circular cam.

14. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft, a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide, and means carried by the main slide and contacting with the chaser slide for controlling the disengagement of the chaser from the work.

15. Thread chasing mechanism for automatic lathes comprising a compound slide mechanism consisting of a vertically movable main slide, a horizontally movable intermediate slide mounted thereon and a vertically movable chaser carrying slide mounted on said intermediate slide, a pattern carrying clutch controlled shaft, means for rotating it, means operated by the main slide for controlling the clutch of said pattern shaft, an axially movable oscillating shaft, means carried by the oscillating shaft and co-operating with the pattern of the pattern carrying shaft for axially moving said oscillating shaft, means for oscillating said shaft, a feed rod tied to said oscillating shaft for horizontally shifting the intermediate slide and thereby the chaser slide, and means carried by the main slide and contacting with the chaser slide for controlling the disengagement of the chaser from the work and comprising a semi-circular cam.

16. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, means for shifting a part of the slide mechanism horizontally and comprising a rotary pattern controlled means, and means controlled by the slide mechanism for throwing into operation said slide shifting means.

17. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, means for shifting the slide mechanism horizontally and comprising a clutch controlled pattern shaft, a clutch shifter, a spring controlled clutch shifter rod co-operating with the slide mechanism and means controlled by the pattern shaft and connected with the slide mechanism, and means controlled by the slide mechanism for throwing into operation said slide shifting means.

18. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, means for shifting the slide mechanism horizontally and comprising a clutch controlled pattern shaft, a clutch shifter, a spring controlled clutch shifter rod co-operating with the slide mechanism and means controlled by the pattern shaft and connected with the slide mechanism and including an oscillating shaft tied to the means connected with the slide mechanism, and means controlled by the slide mechanism for throwing into operation said slide shifting means.

19. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, means for shifting the slide mechanism horizontally and comprising a clutch controlled pattern shaft, a clutch shifter, a spring controlled clutch shifter rod co-operating with the slide mechanism and means controlled by the pattern shaft and connected with the slide mechanism and including an oscillating shaft tied to the means connected with the slide mechanism, means controlled by the slide mechanism for throwing into operation said slide shifting means, and means for oscillating said shaft.

20. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism carrying a chaser, means for shifting the slide mechanism horizontally and comprising a clutch controlled pattern shaft, a clutch shifter, a spring controlled clutch shifter rod co-operating with the slide mechanism and means controlled by the pattern shaft and connected with the slide mechanism and including an oscillating shaft tied to the means connected with the slide mechanism, means controlled by the slide mechanism for throwing into operation said slide shifting means, and means for oscillating said shaft and comprising cam means and rotary driving means for the clutch controlled pattern shaft and effective to rotate it at reduced speed relative to the work.

21. Thread chasing mechanism for automatic lathes comprising a vertically and horizontally movable slide mechanism comprising a series of three superposed slides carrying a chaser, means for shifting a part of the slide mechanism horizontally and comprising a rotary pattern controlled means, and means controlled by the slide mechanism for throwing into operation said slide shifting means.

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