Jan. 28, 1947. W. RICHTER 2,414,896

LEAD LOCATING FIXTURE

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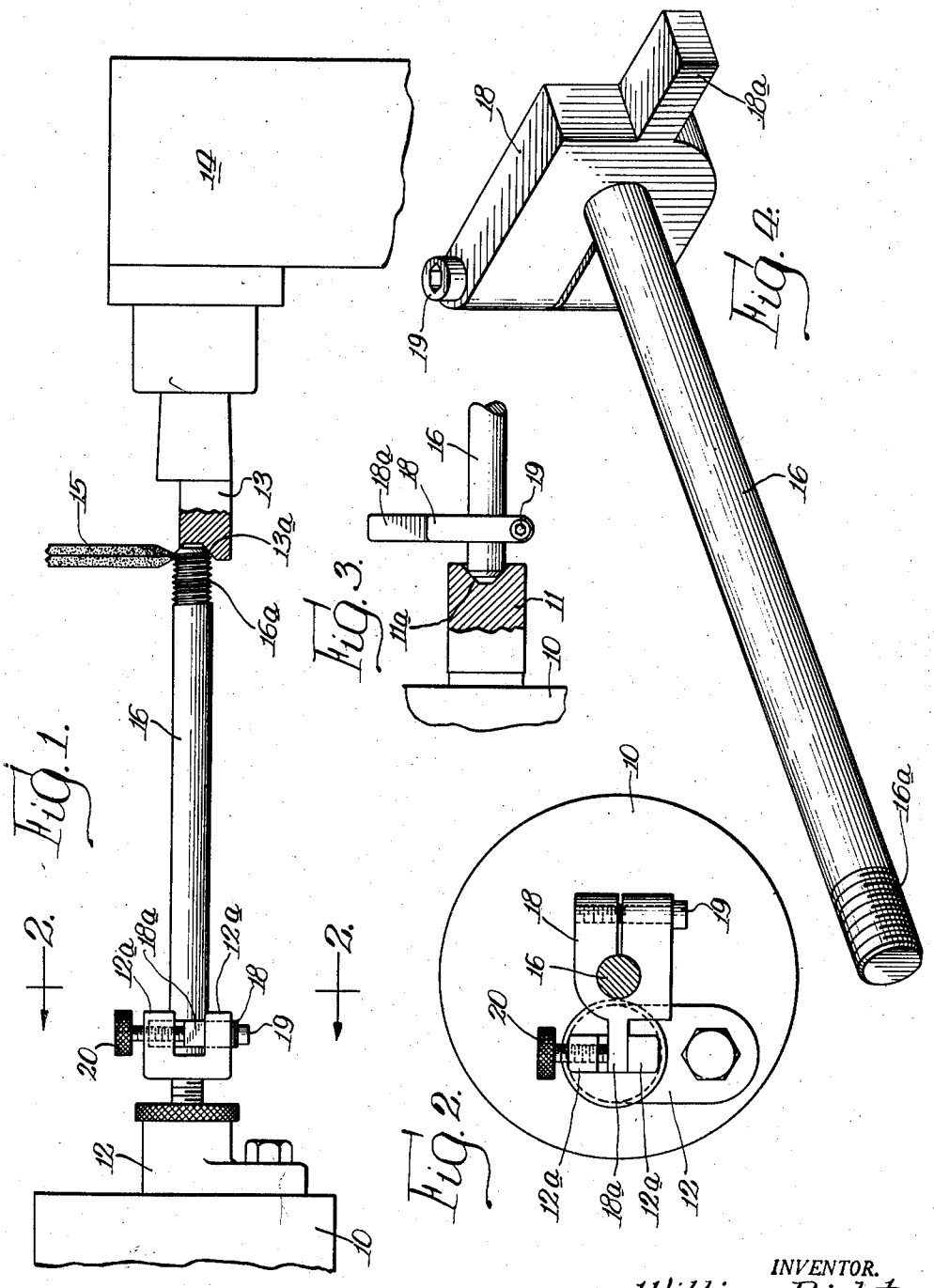

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

INVENTOR.
William Richter,
BY
Davis, Lindsey, Smith & Sheats,
Atty's.

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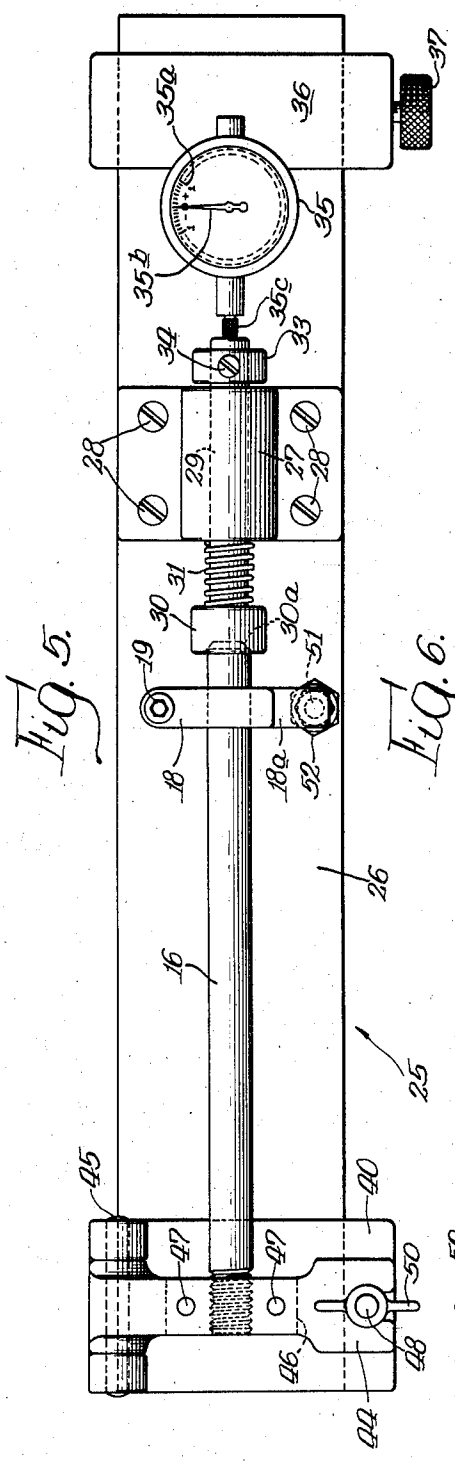

Fig. 5.

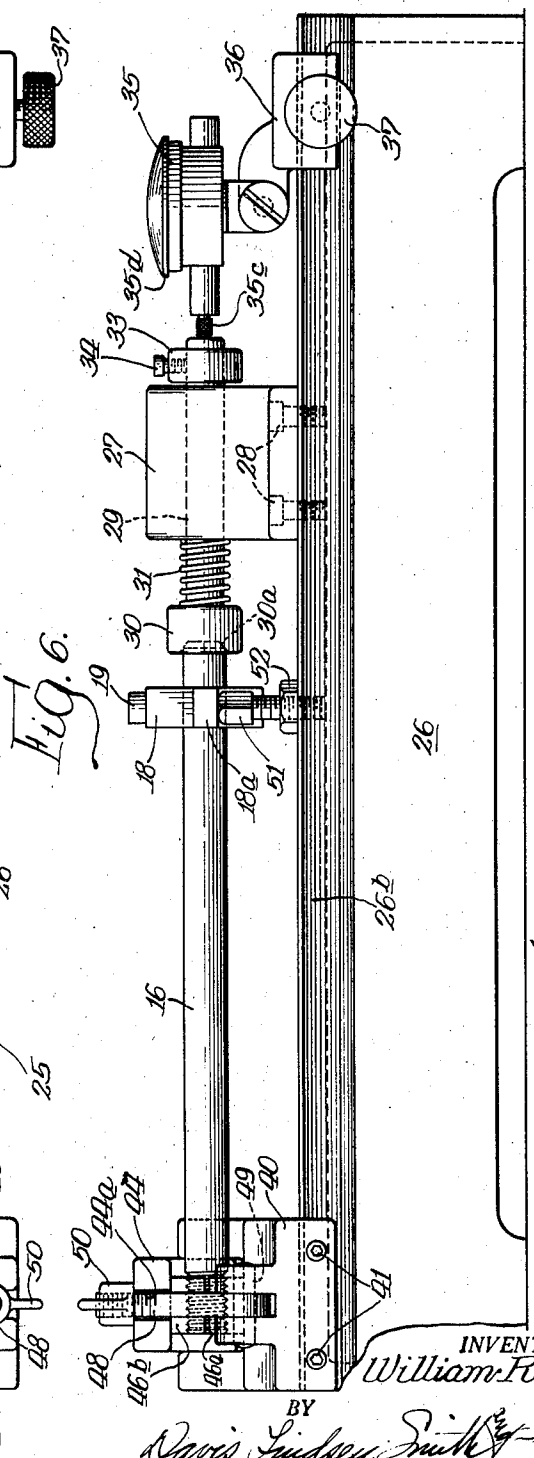

Fig. 6.

INVENTOR.
William Richter,
BY
Davis, Lindsey, Smith & Shorts,
Attys.

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Fig. 7.

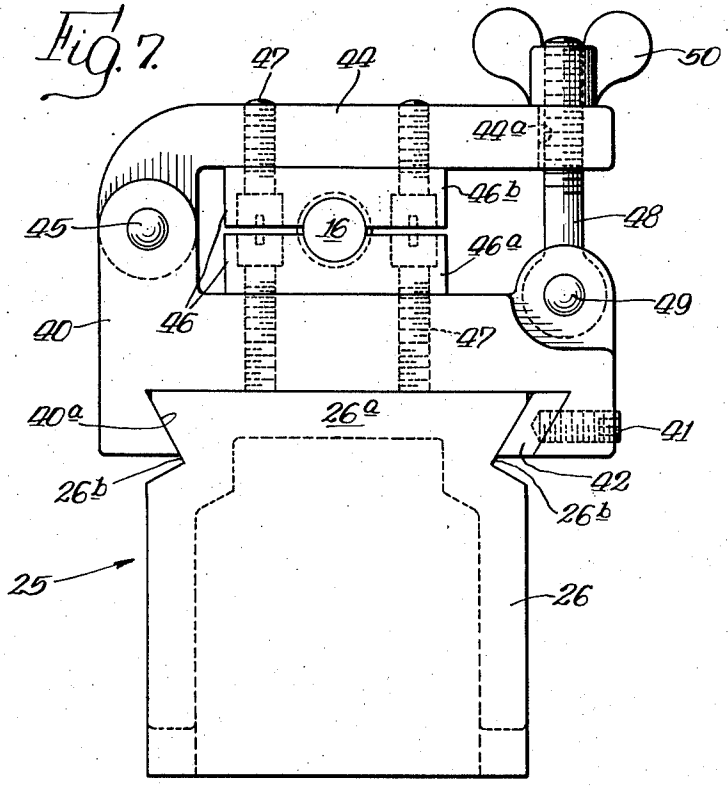
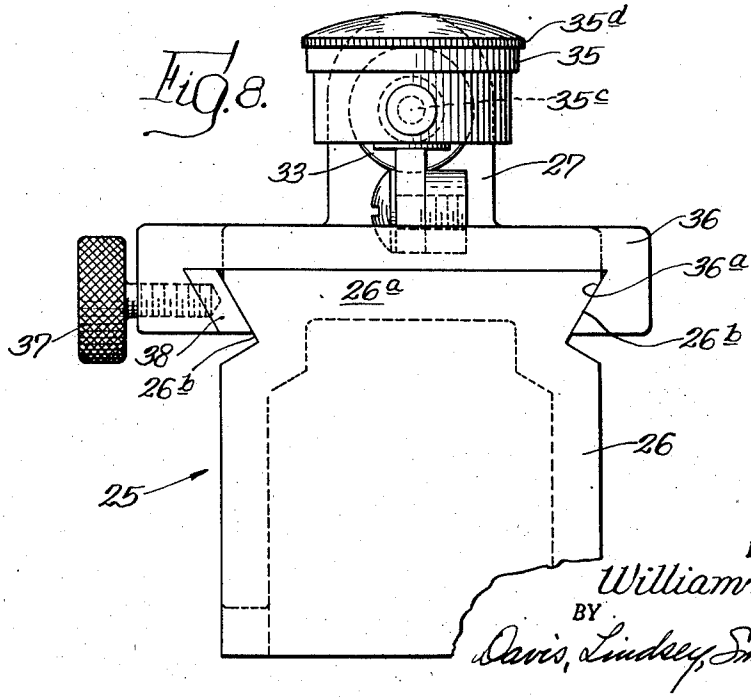


Fig. 8.



INVENTOR.
William Richter,
BY
Davis, Lindsey, Smith & Evans,
Atty's.

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LEAD LOCATING FIXTURE

William Richter, Kankakee, Ill., assignor to Paramount Textile Machinery Co., Kankakee, Ill., a corporation of Illinois

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13 Claims. (Cl. 51—277)

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This invention relates to improvements in lead locating fixtures adapted for use in connection with the operation of thread grinding machines and the like for picking up the lead of previously ground or cut threads so that the threads may be reground with accuracy and precision.

It frequently is necessary to regrind threaded pieces which have previously been threaded by grinding or cutting operations for the purpose of removing burrs, chatter marks or other imperfections, which may be present either because of defects in their original formation or on account of damage resulting from use, or for the purpose of finishing the grinding to the desired pitch diameter or of reducing the pitch diameter of previously formed threads.

The principal object of the present invention is to provide an improved fixture by the use of which the lead of a thread in relation to the center or chamfer of the work piece and the driver may be located with an accuracy within one ten-thousandth of an inch, thus permitting the original threads to be further ground with great precision. Another object is to provide a lead locating fixture which may be employed as an auxiliary device by the operator of a thread grinding machine to permit work pieces to be properly located in the grinding machine and without loss of time so that improved accuracy is obtained without any sacrifice of efficiency in the grinding operation. A further object is to provide a new method of locating the lead of previously ground or cut threads which comprises the steps of securing the threaded member in a nut, moving it endwise by rotation until its end or center reaches a predetermined position, which has previously been determined by reference to a master work piece and which may be shown by an indicator, and then securing in a predetermined angular position on the work piece to be reground a driving dog adapted to be engaged by the driving member of the thread grinding machine to which the work piece is then transferred. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment of the invention is illustrated. In the drawings,

Figure 1 shows a partial side elevation of a portion of a thread grinding machine illustrating the head stock, tail stock, driving member and cutting and grinding tool;

Fig. 2 shows a sectional view taken on the line 2—2 of Fig. 1;

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Fig. 3 shows a partial plan view of the left-hand portion of the machine illustrated in Fig. 1, showing the head stock and the driving dog;

Fig. 4 is a perspective view of a work piece having the driving dog secured thereon;

Fig. 5 shows a top plan view of the improved lead locating fixture with a work piece mounted therein;

Fig. 6 shows a side elevation of the fixture illustrated in Fig. 5;

Fig. 7 shows an end elevation of the left-hand end of the device illustrated in Figs. 5 and 6; and

Fig. 8 shows an end elevation or the right-hand end of the device shown in Figs. 5 and 6.

In Fig. 1 of the drawings, there is illustrated a portion of a thread grinding machine comprising the grinding member 10 having mounted thereon the head stock 11 and the driving member 12. The head stock 11 is provided with the usual center recess 11a to receive one end of the work piece although it will be understood that it might be provided with a projecting center pin to engage a corresponding recess in the work piece. The tail stock 13 is similarly provided with a center recess 13a to receive the other end of the work piece and this tail stock is carried in the usual fashion by the head 14. The grinding wheel 15 is adapted to grind the threads 16a which are formed in the work piece 16 adjacent to the tail piece 13. On the opposite end portion of the work piece 16 there is mounted a driving dog 18 which is formed as a split member embracing the work piece and adapted to be clamped thereon by a threaded stud 19. The driving dog 18 has a projecting lug 18a which is adapted to extend between the arms 12a of the driving member, as shown in Fig. 2, being secured in position by a set screw 20. In this way, the driving member 12, carried by the rotatable head 10, is adapted to impart rotation to the work piece 16 through the driving dog 18, thus rotating the work piece during the operation of the grinding wheel 15.

As illustrated in Figs. 5, 6, 7 and 8, the lead locating fixture 25 comprises a base 26 having the upper part thereof formed as a guideway 26a provided with outwardly flaring sides 26b. This base is adapted to be mounted upon a table or other support adjacent to the grinding machine or upon a part of the grinding machine and it carries the parts by which the lead of the thread on a work piece is located and fixed with respect to the driving dog 18 before the work piece and the driving dog are put in the grinding machine. This lead locating apparatus comprises a stationary block 27 which is secured to the base 26 by means

of studs 28 and which has slidably and rotatably mounted therein a spindle 29 upon one end of which there is fixed a chuck 30 which is similar in size and formation to the tail piece 13 in that it has a recess 30a provided with tapered annular walls similar to the recess 13a for receiving the threaded end of the work piece 16. A coil spring 31 is mounted between the chuck 30 and the block 27 and normally tends to move the spindle 29 and the chuck 30 toward the left as viewed in Figs. 5 and 6, this movement being limited by the engagement with the block 27 of a collar 33 which is secured on the right-hand end of the spindle 29 by a setscrew 34 so that it normally engages the face of the block 27 under the influence of the spring 31.

At the right of the block 27, as viewed in Figs. 5 and 6, there is located an indicator 35 which is carried by a bracket 36 having on its under side an undercut groove 36a, shown in Fig. 8, which slidably engages the outwardly flaring guideway 26a formed upon the bed or base 26. A setscrew 37 engages one side of the bracket 36 and enters a recess in a shim 38 which may be pressed against the side of the guideway 26 by the adjustment of the screw 37 for the purpose of securing the bracket 36 and the indicator 35 in adjusted position longitudinally of the fixture. The indicator 35 has graduations 35a over which a pointer 35b is adapted to move and this pointer is actuated by a plunger 35c which extends endwise from the casing of the indicator in axial alignment with the axis of the spindle 29. The graduations 35a are carried by a dial 35d which is rotatable on the casing of the indicator and which is normally held by friction in adjusted position, this being a well-known form of indicator now in commercial use.

At the other end of the bed or base 26, there is mounted a block 40 which is provided on its under side with an undercut groove 40a engaged by the guideway 26a formed on the upper part of the base and this block is adapted to be secured in adjusted position on the base 26 by setscrews 41 engaging a threaded aperture in the side of the undercut groove in the block and entering a recess in a shim 42 which is adapted to be pressed against the side of the guideway by the adjustment of the screw. An arm 44 is hinged at one end on the block 40, as shown at 45, and the complementary parts 46a and 46b of a split nut 46, threaded to receive the threaded end of the work piece 16, are secured to the block 40 and the arm 44, respectively, by the studs 47, as shown particularly in Fig. 7. At the end thereof opposite the hinge pin 45, the block 40 carries an eye-bolt 48 which is pivoted thereon at 49 and which is adapted to engage a U-shaped slot 44a formed in the free end of the arm 44. A wing nut 50 engages the threaded end of the eye-bolt 48 and when the threaded portion of the work piece 16 is in place between the parts of the split nut 46, the wing nut may be tightened in order to regulate the frictional resistance to the turning of the work piece in the split nut.

In the operation of this device, a master work piece 16 which has been accurately formed in the grinding machine and which still has the driving dog 18 clamped thereon, is placed in the lead locating fixture 25 with the threads of the work piece engaging the threads of the lower portion 46a of the split nut and with the arm 44 swung upwardly out of position, the two threaded portions being mated in such relationship to each other that the collar 33 on the spindle 29 will be moved away from the face of the block 27. Having thus located the master work piece, the arm 44 is moved downwardly and is secured in place by the eye-bolt 48 and the wing nut 50, the wing nut being tightened to put a slight friction on the threads to resist the turning of the work piece. The lug 18a on the dog 18 fixed on the master work piece is then moved downwardly against a stop screw 51 which is mounted in a thread recess formed in the base 26 and which is adapted to be secured in adjusted position by a lock nut 52. The indicator bracket 36 is then adjusted on the guideway 26a of the base 26 to cause the plunger 35c to engage the end of the spindle 29 with sufficient pressure to move the pointer 35b a portion of a revolution from its normal position. After the indicator has been secured in this position by the tightening of the setscrew 37, the dial 35d is turned to locate the pointer 35b at the zero graduation 35a. The parts of the fixture have now been adjusted to determine the characteristics of the master work piece 16 which has thus been located in the fixture.

After making this preliminary setting of the parts of the fixture with respect to the master work piece, a threaded work piece 16 of the same size and formation as the master work piece, but having threads which require regrinding, is placed in the fixture in the manner previously described but with a driving dog 18 thereon in loose position.

When placing this new work piece in the fixture, the threads thereof do not have any definite setting with respect to those of the split nut 46 but after the parts of the nut have been closed the eye-bolt 48 is swung upwardly and the wing nut 50 is tightened to apply friction to the threads of the work piece. After this has been done, the work piece is rotated by hand in a counterclockwise direction until the pointer 35b of the indicator is again brought back to the zero position on the dial, which zero position was determined by adjusting the dial when the master work piece was in the fixture. Having thus adjusted the work piece, the driving dog 18 thereon is rotated until its lug 18a engages the top of the stop screw 51 and its setscrew 19 is then tightened to secure the driving dog in that position on the work piece. The parts have now been adjusted to correspond to the relative positions of the corresponding parts when the master work piece was in the fixture and the new work piece may then be removed from the fixture and placed in the grinding machine to be rotated by the driving member 12 and operated upon by the grinding wheel 15 with the certainty that the threads 16a of the new work piece will be reground with accuracy and precision in conformity with the lead of the threads which were originally formed therein.

Although one example of the new method of locating the lead of a threaded member and one embodiment of the new lead locating fixture have been illustrated and described, it will be understood that the invention may be constructed in various other embodiments which come within the scope of the appended claims.

I claim:

1. A lead locating fixture comprising a nut mounted in fixed position for receiving a correspondingly threaded end portion of a work piece, a spindle mounted in a fixed bearing for endwise movement with respect to said nut and having at one end thereof a part adapted to support and position axially the end of the work piece opposite said threaded portion, and means for indi-

cating the endwise position of said spindle when it is engaged by the work piece.

2. A lead locating fixture comprising a nut mounted in fixed position for receiving a correspondingly threaded end portion of a work piece, a spindle mounted in a fixed bearing for endwise movement with respect to said nut and having at one end thereof a part adapted to support and position axially the end of the work piece opposite said threaded portion, means for indicating the endwise position of said spindle when it is engaged by the work piece, and means for locating a driving dog in fixed angular position on said work piece.

3. A lead locating fixture comprising a base, a nut mounted in fixed position on said base for receiving a correspondingly threaded end portion of a work piece, a spindle mounted for endwise movement on said base and having a part to support and position axially the opposite end portion of the work piece, an indicator mounted on said base and having an operating part engageable by the end of said spindle, and a driving dog adapted to be secured on said work piece.

4. A lead locating fixture comprising a base, a nut mounted in fixed position on said base for receiving a correspondingly threaded end portion of a work piece, a spindle mounted for endwise movement on said base and having a part to support and position axially the opposite end portion of the work piece, an indicator mounted on said base and having an operating part engageable by the end of said spindle, a driving dog adapted to be secured on said work piece, and means for predetermining the angular position of said driving dog on said work piece.

5. A lead locating fixture comprising a threaded member engageable by the threaded end portion of a work piece, a member movable axially of said work piece and having a part adapted to engage and support the opposite end portion of said work piece, and means for indicating the endwise position of said axially movable member.

6. A lead locating fixture comprising a threaded member engageable by the threaded end portion of a work piece, a member movable axially of said work piece and having a part adapted to engage and support the opposite end portion of said work piece, an indicator adapted to be actuated by endwise movement of said axially movable member when said work piece is placed in said fixture, and means for adjusting the indication of said indicator for a predetermined work piece.

7. A lead locating fixture comprising a threaded member engageable by the threaded end portion of a work piece, a member movable axially of said work piece and having a part adapted to engage and support the opposite end portion of said work piece, means for indicating the endwise position of said axially movable member, a driving dog adapted to be clamped on said work piece, and means for determining the angular position of said driving dog when said driving dog is clamped on said work piece.

8. A lead locating fixture comprising a threaded member engageable by the threaded end portion of a work piece, a member movable axially of said work piece and having a part adapted to engage and support the opposite end portion of said work piece, an indicator adapted to be actuated by endwise movement of said axially movable member when said work piece is placed in said fixture, means for adjusting the indication of said indicator for a predetermined work piece, a driving dog adapted to be clamped on said work piece, and means for determining the angular position of said driving dog when said driving dog is clamped on said work piece.

9. A lead locating fixture comprising a split nut mounted in fixed position and engageable by the threaded end portion of a work piece, a relatively fixed bearing, a spindle mounted for endwise movement in said bearing and having a part adapted to position and support the other end of said work piece, and means normally moving said spindle toward said work piece.

10. A lead locating fixture comprising a split nut mounted in fixed position, said nut having a hinged part movable away from the remainder of the nut to permit the insertion of the threaded end portion of a work piece, means for adjustably clamping said hinged part on said threaded portion, and means engageable with the other end of said work piece for indicating and recording the position of said work piece in said nut.

11. A lead locating fixture comprising a split nut mounted in fixed position, said nut having a hinged part movable away from the remainder of the nut to permit the insertion of the threaded end portion of a work piece, means for adjustably clamping said hinged part on said threaded portion, a spindle for resiliently engaging the other end of the work piece, and an indicator actuated by the endwise movement of said spindle away from said nut.

12. A lead locating fixture comprising a split nut mounted in fixed position, said nut having a hinged part movable away from the remainder of the nut to permit the insertion of the threaded end portion of a work piece, means for adjustably clamping said hinged part on said threaded portion, a spindle for resiliently engaging the other end of the work piece, an indicator actuated by the endwise movement of said spindle away from said nut, and means for adjusting said indicator to give a predetermined indication when a master work piece is in the fixture.

13. The method of locating the lead of a thread in a work piece which comprises the steps of placing the threaded portion of a master work piece in engagement with a threaded member while causing the other end of said master work piece to effect endwise movement of another member, turning said master work piece in said threaded member to cause a driving dog fixed in said work piece to assume a predetermined angular position, then recording the endwise position of said second named member, then removing said master work piece and replacing it by a new work piece to be ground with the threaded portion of the new work piece engaging said threaded member and with the other end thereof engaging said second named member, then turning said new work piece in said threaded member until said second named member reaches said previously mentioned endwise position, and then securing a driving dog on said new work piece in the same angular position as that occupied by said previously mentioned driving dog on said master work piece.

WILLIAM RICHTER.