

Feb. 25, 1941.

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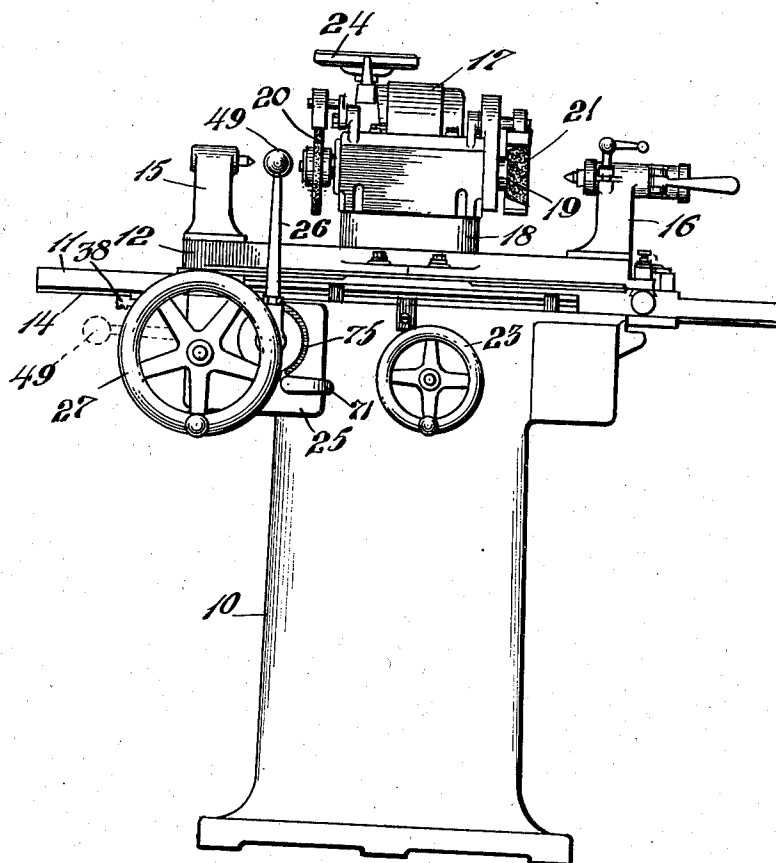
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RECIPROCATING TABLE CONTROL MECHANISM

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3 Sheets-Sheet 1

Fig. 1.



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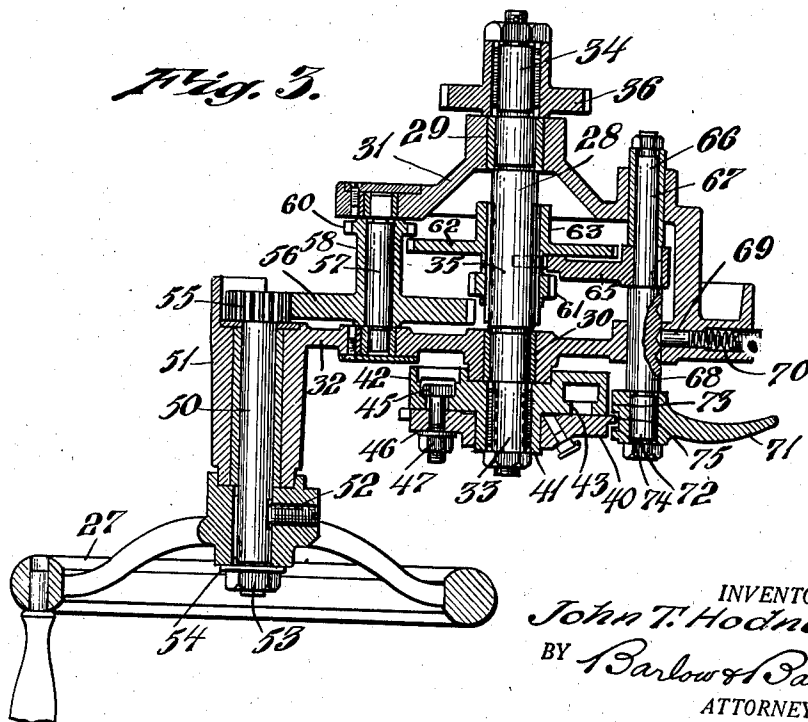
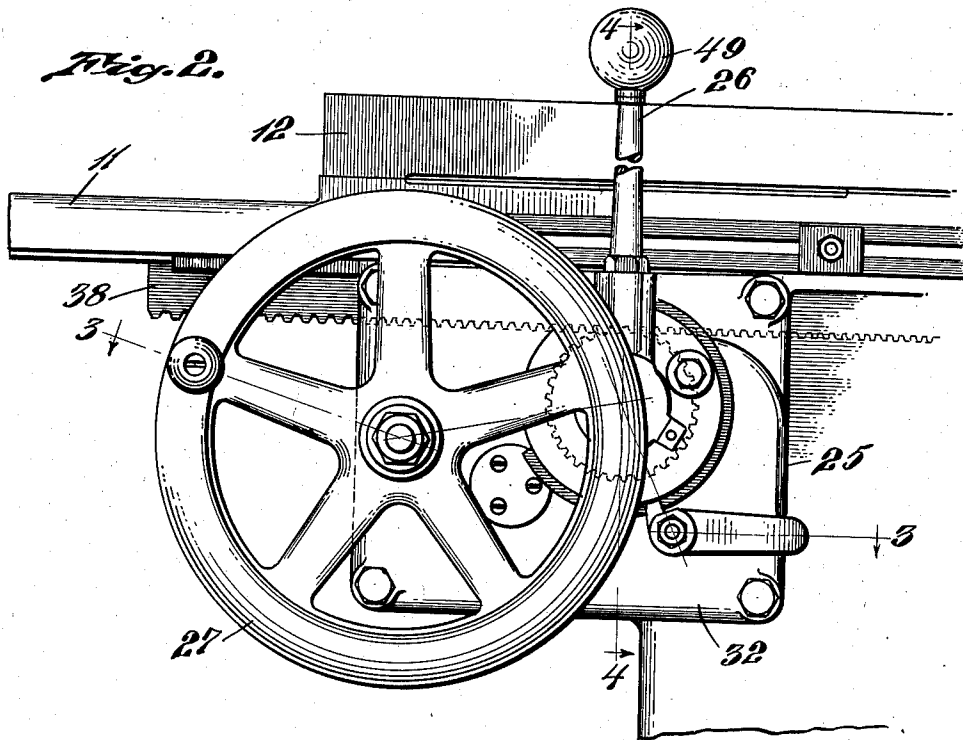
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3 Sheets-Sheet 2



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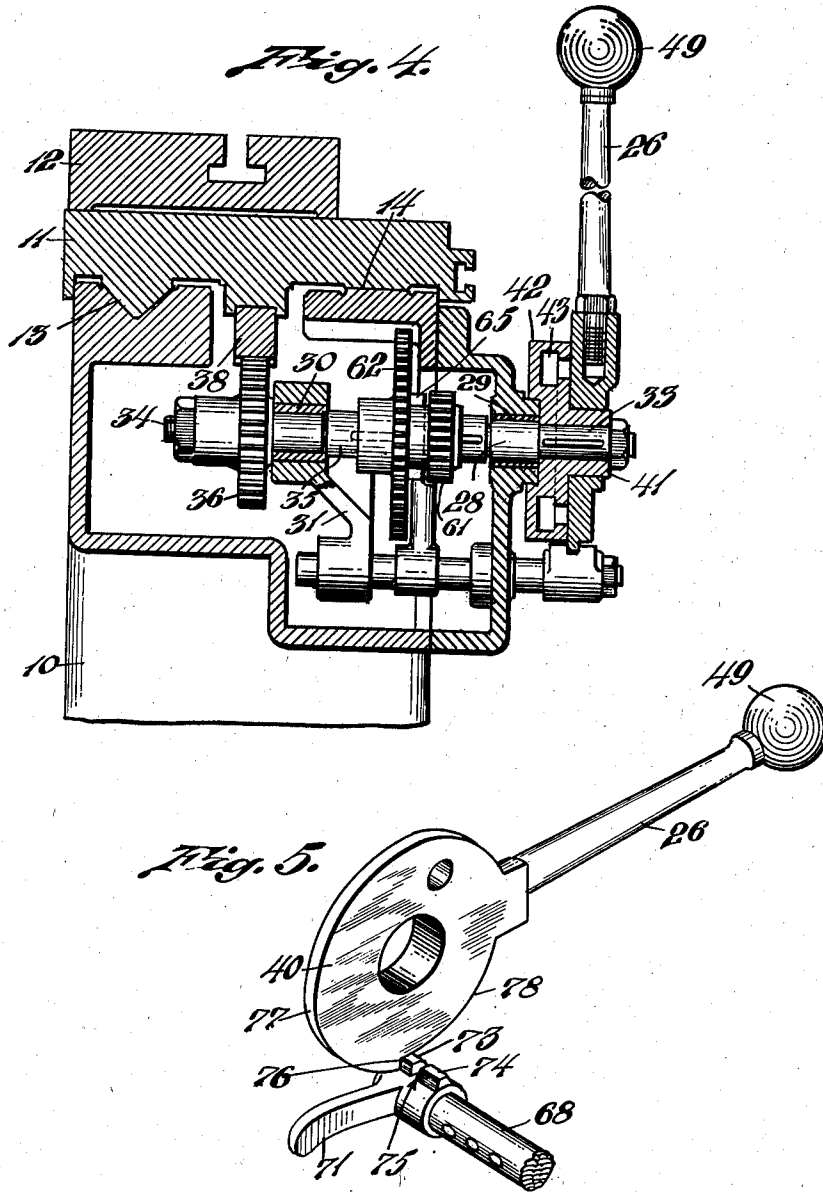
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RECIPROCATING TABLE CONTROL MECHANISM

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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RECIPROCATING TABLE CONTROL
MECHANISM

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22 Claims. (Cl. 74—27)

This invention relates to table reciprocating mechanisms for machine tools, and more particularly to one which has two alternative manual controls for longitudinally traversing the work table; and has for one of its objects the provision of a table control so arranged as to render one of the table control mechanisms inoperative when the other is in an operating position.

Another object of the invention is to provide a control for the work table of a machine tool of the type in which the table movements are manually operated by either a lever or a hand wheel, which is so arranged as to permit the operation of the table by the hand wheel but to prevent the lever from being operated so that longitudinal movement of the table may be had by the hand wheel without the danger of injury to the operator by the lever control swinging into the path of the operator's hand when movement of the table is obtained by the hand wheel.

Another object of this invention is to provide table traversing mechanism which is so arranged that only one of the above manual table control devices may be operated at a given time and independently of the other.

Another object of this invention is to provide a shiftable device operable when the lever table control is in an inoperative position to shift from a fast to a slow table traversing movement for precisely positioning the work into operative relation with a grinding wheel by the hand wheel, and which is so arranged that the operator may readily shift the hand wheel table-control mechanism to a neutral position and permit a rapid operation of the table solely by the lever table-control mechanism.

Another object of the invention is the provision of means co-acting with the lever table control and so arranged that the lever must be positioned in an inoperative position before the hand wheel table control mechanism can be rendered operative.

Another object of the invention is the provision of means associated with the hand lever for co-operating with a shiftable selector lever mechanism to lock the hand wheel table traversing mechanism out of active position when the lever table control is in use.

A further object of the invention is the provision of means associated with the lever table control mechanism for releasing the same to permit movement of the selector lever mechanism for the hand wheel for causing table movement by the latter when the hand lever is moved to

an inoperative or predetermined parked position.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a front elevation of a grinding machine constructed in accordance with my invention;

Fig. 2 is an enlarged front elevational view of the feed mechanism;

Fig. 3 is a detail sectional view of said feed mechanism taken on line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view of said feed mechanism taken on line 4—4 of Fig. 2; and

Fig. 5 is a perspective view of the table reciprocating lever showing the parts for limiting the movement of the same.

In the use of reciprocable work tables of grinding machines of the type ordinarily used where a rather light cut is to be taken on the work which is carried by the table into operative relation with the grinding wheel, and particularly where manually operated means is used for reciprocating the table past the wheel as distinguished from power operated mechanism, there has sometimes been provided both a hand wheel control for causing reciprocation of the table and also a lever control therefor which will have a wide swing through an arc of substantially 180°. In such arrangements clutch devices have been usually provided for operatively connecting either of the controls for operating the table, but the arrangement has been such that disconnection of one control is essential when the other control is to be operated, so that a swinging movement of lever may not take place when the hand wheel is operated. It is particularly desirable to avoid any swinging movement of the lever while the operator is traversing the work table by the hand wheel, otherwise he might be exposed to the danger of being struck a rather hard blow from the lever and suffer serious injury if such disconnection is not provided for. Consequently, the use of the former table control mechanism employing the clutch connection system required a positive thought on the part of the operator, since any inattention on his part was likely to result in severe injury to himself; and in order to prevent this I have so arranged the table control mechanism as to alternately maintain either the lever or the hand wheel against being rendered active upon the operation of the other. Thus, the operator cannot op-

erate the hand wheel simultaneously with the lever, and vice versa, or cause the lever to throw over to inflict injury on himself or damage any parts of the machine which may be located within the path of movement of the lever; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawings wherein I have illustrated a preferred embodiment of my invention, the numeral 10 indicates the base or standard of a cutter and tool grinding machine and having on its top portion a slidable table 11 on which is swivelly mounted a work table 12 adapted for angular settings, the table 11 being slidably mounted on a V-way 13 and a flat way 14 for reciprocation longitudinally of the machine. The table 12 carries the usual head stock 15 and tail stock 16 for rotatably supporting a work piece during the grinding operation. Mounted on the top of the standard 10 and positioned laterally with respect to the work table is the usual grinding head 17 which comprises a wheel spindle column 18 for supporting a rotatable grinding spindle 19 on the outer ends of which are fixedly mounted the grinding wheels 20 and 21 respectively for rotation therewith. The head 17 including the wheel spindle column 18 is swivelly mounted on a slide member (not shown) as is a well known construction in the art, and is arranged to be fed transversely towards and from the work table by means of a cross feed mechanism (not shown), as is ordinarily employed for this purpose, and actuated by a manually operated hand wheel 23 which is mounted on the front of the machine base. A hand wheel 24 is also provided for vertically elevating the wheel head 17 and thereby effect a vertical adjustment of the wheel spindle column.

In order that the work may be easily moved longitudinally past the operating faces of the grinding wheels during the grinding operation, and to permit it to be adjusted relative thereto by either long or short strokes, as may be desired, I have provided a table reciprocating mechanism unit, as indicated by the numeral 25, which is placed at the front portion of the machine, and this unit comprises two independent table driving control means which are selectively arranged so that one is rendered inactive when the other is in operative relation for effecting a traversing movement of the work table. To this end, I have provided a hand lever 26 adapted to be coupled to the table driving mechanism for moving the work table with short strokes, while for a fine precision hand traverse of the work table, at either fast or slow speeds to suit the grinding conditions, there is provided a manually operated hand wheel 27 which is connectible with the table driving mechanism. As illustrated in the drawings, the table driving mechanism which is intended to be alternately connected with either the hand lever 26 or the hand wheel 27 when each is in its proper actuating relation therewith, comprises a shaft 28 of cylindrical and stepped formation and suitably journaled in bearings 29 and 30 of a supporting frame 31, the latter being constructed rigid with a front apron plate 32 bolted to the front of the machine base 10. This stepped shaft 28 is shown as being formed with front and rear sections 33 and 34, respectively, which are of smaller diameter than the central section 35 thereof, and they are arranged to extend outwardly or in opposite directions beyond

the ends of the bearings 29 and 30 respectively. Mounted on the rear end shaft section 34 is a gear 36 which is fast thereon and arranged in continuous engagement with a rack bar 38 fixedly mounted on the underside of the slidable table 11. It will be readily apparent that any rotation of the gear 36 by the shaft 28 will be transmitted to the rack to cause a rectilinear traversing movement of the table 11 to longitudinally move the latter in either direction. In order to provide a rapid traversing movement of the table to obtain a fast motion for quickly adjusting the work relative to a grinding wheel, the hand lever 26 is so arranged as to be operatively connected with the shaft 28 to positively actuate the same. This is preferably accomplished by forming the lower end or hub portion of the lever 26 with an enlarged annular plate-like portion 40 which is pivotally mounted on a sleeve 41, which sleeve is keyed to the front shaft section 33. Formed on the rear end of the sleeve 41 is an annular flange 42 of large diameter which is provided with an annular T slot 43 in its front side face into which is slidably mounted the head of a bolt 45 adapted for releasably connecting and clampingly holding the lever 26 in driving engagement with the flange 42 and the shaft 28. The shank of the bolt 45 projects outwardly from the slot 43 and passes through a suitable aperture formed in the lever plate 40. A washer 46 and a nut 47 threaded on the projecting end of the bolt 45 serves for readily connecting or releasing engagement of the lever 26 with the flange 42, as desired. The clamp bolt 45 also permits the operator to locate the lever 26 in a convenient operating position. A ball 49 mounted on the outer end of the hand lever 26 serves to provide a suitable hand grip for manual manipulation of the lever.

In order to obtain a fine precision feeding or longitudinal traversing movement of the work table, the gear 36 and its drive shaft 28 are further arranged to be actuated through an intermediate gear train which is adapted to be turned by the manually operated hand wheel 27. As illustrated, the hand wheel 27 is rigidly mounted on and keyed to the outer end of a shaft 50 which is suitably journaled for rotation in a sleeve 51 integral with the front apron plate 32 and projects forwardly thereof. A set screw 52 threaded through the hub of the hand wheel 27 and tightened against the shaft along with a nut 53 and a washer 54 which are clamped against the end face of the hand wheel, serve to fixedly hold and secure the latter fast on the shaft 50.

The gearing for transmitting the rotation of the hand wheel 27 to impart a longitudinal movement to the work table 12 comprises a pinion 55 fixedly mounted on the rear end portion of the shaft 50 to rotate therewith, and is in continuous engagement with a gear 56 which is rotatably mounted on a cross shaft 57 interposed between the shafts 28 and 50 and journaled in the frame 31 and extending laterally thereof, the axis of the shaft 57 being arranged parallel with that of the shafts 28 and 50. The gear 56 is provided with an elongated hub 58 which extends from the rear face thereof and on the end of which is integrally formed a pinion 60. The gear 56 and the pinion 60 which is carried thereby are arranged to turn freely on the shaft 57 and they are adapted to be selectively engaged by a shiftable gear unit mounted on the shaft 28 for sliding movement therealong. This gear unit comprises a set of gears 61 and 62 respectively, both formed integral with a common

sleeve 63 which is splined upon the central shaft section 35 of the shaft 28 and slidable thereon for axial movement. The various gears illustrated in the drawings may be of any suitable gear ratio as will give the desired speed of table movement when the hand wheel 27 is revolved.

In order that the shiftable gear unit composed of gears 61 and 62 may be easily manipulated to selectively effect either a fast or slow precision traversing movement of the table when the hand wheel 27 is in use, and also to further insure that either the hand wheel 27 or the lever 26 is rendered inactive and out of operating engagement with the table drive shaft 28 when one of these manual control members is in operative table driving relation, I have provided a manually shiftable lever mechanism comprising a fork member 65 keyed to a shiftable rod 66 and extending laterally thereof into an embracing relation about the intermediate body portion of the sleeve 63 disposed between the gears 61 and 62 thereof. The rod 66 is of stepped formation and is provided with sections 67 and 68 which are slidably mounted in suitable bearings in the frame. There is provided a spring pressed plunger 69 slidably mounted in a hole 70 formed longitudinally in the apron plate 32 and engaging one of a series of three aligned spaced depressions formed on the rod section 68 for restraining the rod 66. A handle 71 is fixedly secured on a stem 72 which comprises the outer end portion of the shaft 66 and serves for providing manual manipulation of the rod, this handle projecting laterally from the movable rod and being disposed on the outside of the apron plate 32 where it may be easily reached and moved by the operator. The entire shiftable table drive control lever mechanism is shown as being mounted on the opposite side of the drive shaft 28 than is the hand wheel 27.

In order that there may be no active connection of the hand wheel 27 with the table when movement of the latter is to be effected by the lever 26, I have provided means having interlocking relation with the lever 26 and comprising a pair of spaced lugs 73 and 74 on the outer surface of the hub portion of the handle 71 and they project outwardly therefrom at a point angularly related from the handle. The adjacent side walls of the lugs 73 and 74 are formed with substantially flat parallel faces which in the juxtaposed spaced arrangement, as shown in Fig. 5, provide a notch 75 for the reception of an abutment 76 for interlocking engagement therewith. The lugs 73 and 74 may comprise separate members formed either integral with the handle hub or bolted thereon, or they may be made by slitting an elongated rib member formed integral with the hub. As shown in Fig. 5, the abutment 76 presents a radial face portion or shoulder which extends inwardly from the peripheral edge 77 of the annular flange 40 of the lever 26. This abutment 76 may be formed by either cutting out or initially shaping the rim portion of the flange 40 along an arc of the latter's periphery so as to relieve the same of material to the desired extent and depth. Thus, the abutment 76 thus formed on the plate 40 of the lever is capable of being moved into the notch 75 when the shiftable gear unit consisting of gears 61 and 62 are moved into a neutral position, and with the plunger 69 being forced into engagement with the corresponding depression on the rod for this position of the gear unit. Thus, when this position of the handle 71

is had the nut 47 may be tightened and the lever 26 operated.

When it is desired to change over the control of the table movement from the lever 26 to the handle wheel 27, the lever 26 is moved to the stored position shown in dotted lines in Fig. 1 and the nut 47 is loosened to free the flange 40 from the flange 42. The selector lever handle 71 is then given either a pull by the operator to draw the rod 66 forwardly and cause engagement of the teeth of the gears 56 and 61, or similarly the handle 71 given a push to bring the gears 60 and 62 into mesh, depending upon which position of the parts is desired for effecting either a fast or slow speed of the travel of the table. In either case, the forward or rearward movement of the handle from the neutral position of the shiftable gear unit, as shown in Fig. 3, will act to slidably position one of the lugs 73 or 74 into the path of the abutment 76 and thus prevent movement of the lever 26 when the hand wheel 27 is in use. Since the lever 26 has been previously disconnected from driving engagement with the drive shaft 28 by unloosening the nut 47 on the clamp bolt 45 to release the lever 26 from clamping engagement with the flange 42, the latter is now free to turn within the plate-like hub 40 of the lever 26 as the shaft 28 is being rotated by the hand wheel 27, while the lever 26 is held locked against rotation by contact of the abutment 76 with one of the lugs 73 or 74 respectively.

The operation of the machine will be readily apparent from the foregoing disclosure. Assuming the selector control rod 66 to be held by the plunger 69 in a neutral position and with the shiftable gear unit of gears 61 and 62 also being in a neutral or central position, such as shown in Figs. 3 and 4, to render the hand wheel 27 inactive, the operator swings the lever 26 which is first made fast with the shaft 28, either to the right or to the left, as desired, for causing sliding movement of the rim 77 of the lever 26 through the groove 75 between the lugs 73 and 74 and to produce a lever controlled traversing of the table 11 and adjust the position of the work in close proximity to the operating face of one of the grinding wheels. When it is desired, however, to obtain a fine, precise traversing movement of the work, the hand wheel 27 is used, in which case the operator swings lever 26 to an inoperative position (Fig. 5), then unloosens the nut 47 on the bolt 45 to unclamp the lever 26 from frictional driving engagement with the keyed flange 42 on the shaft 28, after which he shifts the gear unit of gears 61 and 62 to cause connection of the hand wheel 27 with the shaft 28, as previously described, and so effect reciprocation of the table 11. If a fast feeding motion of the shaft 28 by the hand wheel 27 is desired, the selector handle 71 is pulled outwardly to draw the gear 61 into mesh with the gear 56. When it is desired to change to a slow traversing movement by the hand wheel 27 the operator pushes the handle 71 inwardly to its rearward position to bring the gear 62 into engagement with the gear 60 and thus obtain a slow longitudinal traverse of the work under the guidance of the hand wheel operated table reciprocating mechanism.

It will now be apparent that in accordance with this construction, I have provided a table traversing mechanism which is capable of being separately actuated by two independent and alternative manual control devices, and of permitting one of such devices to be rendered in-

active and held inoperative while the other is in an operative relation.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In combination with a reciprocable table, a table driving mechanism, a first manual table driving control means, a second manual table driving control means located within the field of the operator's arm in engaging either one of them, each of said control means being connectible into driving relation with said table driving mechanism for manual actuation of the same, and means interconnecting said two manual driving control means so related as to prevent simultaneous operation of both of said manual table driving control means.

2. Table traversing mechanism for a machine tool having a movable table, comprising two independent manual driving control means for manually moving the table, and a manually operable connector device having means to render one of said manual driving means operative into driving relation with said table when moved in one direction and at the same time prevent movement of the other manual table driving control means from operating the table, said device being so constructed that the inactive manual driving means is rendered operative into driving relation with said table while the other previously active manual driving means is rendered inoperative when said connector device is manually moved in another direction.

3. Table traversing mechanism for a machine tool having a slidable table, comprising driving mechanism therefor operatively connected therewith to move the table, means including a hand wheel for manually moving said table driving mechanism, means including a hand lever for manually actuating said table driving mechanism, and shiftable means for connecting said hand wheel means with said table driving means and at the same time blocking operation of the lever means.

4. Table traversing mechanism for a machine tool having a slidable table, comprising driving mechanism therefor operatively connected therewith to move the table, means including a hand wheel for manually moving said table driving mechanism, means including a hand lever for manually actuating said table driving mechanism, and separate handle-operated shiftable means for movement in one direction to connect said hand wheel means with said table driving means for causing longitudinal movement of the table and at the same time blocking operation of the lever means and for movement in another direction to permit operation of said lever means to produce a traversing movement of the table while rendering said hand wheel means inoperative.

5. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism therefor operatively connected therewith to traverse the table longitudinally, a hand wheel and gearing for manually moving said table driving mechanism, means including a hand lever for manually moving said table driving mechanism independently of said hand wheel, shiftable mechanism including some of

said gearing for operatively connecting said hand wheel means with said table driving mechanism, and means for alternately selectively blocking either said hand wheel or said lever from operative table drive upon connection of the other for effecting a traversing movement of said table.

6. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism therefor operatively connected therewith to traverse the table longitudinally, a hand wheel and multi-speed gearing for manually moving said table driving mechanism, means including a manually operable lever for actuating said table driving mechanism independently of said hand wheel, shiftable mechanism including some of said gearing for operatively connecting said hand wheel means with said table driving mechanism for obtaining either fast or slow table movements by the hand wheel, and means for alternately rendering either said hand wheel or said lever inoperative upon connection of the other for effecting a traversing movement of said table.

7. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism therefor operatively connected therewith to traverse the table longitudinally, a hand wheel and gearing for manually moving said table driving mechanism, means including a hand lever for manually moving said table driving mechanism independently of said hand wheel, shiftable mechanism including some of said gearing for operatively connecting said hand wheel means with said table driving mechanism, and means including a part of said shiftable mechanism for alternately blocking either said hand wheel or said lever from operative table drive upon connection of the other for effecting a traversing movement of said table.

8. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism therefor operatively connected therewith to traverse the table longitudinally, a hand wheel and gearing for manually moving said table driving mechanism, means including a hand lever for manually moving said table driving mechanism independently of said hand wheel, shiftable mechanism including some of said gearing for operatively connecting said hand wheel means with said table driving mechanism, means for alternately blocking either said hand wheel or said lever from operative table drive upon connection of the other for effecting a traversing movement of said table, and means cooperating with said lever constructed to hold the latter when the hand wheel means is in coupled table driving position.

9. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism therefor operatively connected therewith to traverse the table longitudinally, a hand wheel and gearing for manually moving said table driving mechanism, means including a hand lever for manually moving said table driving mechanism independently of said hand wheel, shiftable mechanism including some of said gearing for operatively connecting said hand wheel means with said table driving mechanism, means for alternately rendering either said hand wheel or said lever inoperative upon connection of the other for effecting a traversing movement of said table, and abutment means having interlocking relation with said lever constructed to hold the latter when the hand wheel means is in coupled table driving position.

10. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism connected therewith to move the table, two manual control devices for independently manually operating said table driving mechanism, one of which comprises a hand wheel and gearing connectible with said table driving mechanism and the other a pivotally mounted lever releasably coupled to said driving mechanism, shiftable control means movable laterally for rendering said hand wheel operative to independently move said table driving mechanism for effecting longitudinal movement of the table or to enable said lever to be operative, and abutment means movable with said lever to prevent lateral shifting movement of said shiftable control means for coupling said hand wheel gearing into an operative driving relation with the table until the lever control means has first been swung to an inactive position.

11. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism connected therewith to move the table, two manual control devices for independently manually operating said table driving mechanism, one of which comprises a hand wheel and gearing connectible with said table driving mechanism and the other a pivotally mounted lever releasably coupled to said driving mechanism, shiftable control means movable laterally for rendering said hand wheel operative to independently move said table driving mechanism for effecting longitudinal movement of the table or to enable said lever to be operative, and at the same time rendering the other actuating device inoperative, and abutment means having interlocking relation with said lever constructed to hold the same out of driving relation with the table when the hand lever means is in a table driving relation.

12. Table traversing mechanism for a machine tool having a reciprocable table, comprising driving mechanism connected therewith to move the table, two manual control devices for independently manually operating said table driving mechanism, one of which comprises a hand wheel and gearing connectible with said table driving mechanism and the other a pivotally mounted lever releasably coupled to said driving mechanism, shiftable control means movable laterally for rendering said hand wheel operative to independently move said table driving mechanism for effecting longitudinal movement of the table or to enable said lever to be operative, and a notched member movable with said shiftable means, and an abutment movable with said lever and arranged to engage said notch to prevent lateral shifting movement of said shiftable control means for coupling said hand wheel gearing into an operative driving relation with the table until the lever control means has first been swung to an inactive position.

13. Table traversing mechanism for a machine tool having a reciprocable table, comprising a rack fixedly connected to said table, a gear drive to traverse the table longitudinally comprising a rotatable drive shaft and a gear arranged to mesh with said rack, a manually operable lever engageable with said drive shaft for manually actuating said gear to reciprocate the table, a hand wheel, a gear connected therewith, shiftable control mechanism including a slidable plunger and movable gearing for connecting said hand wheel gear to said drive shaft for reciprocating the table independently of said lever, and means

mounted on said plunger including a notched member and an abutment arranged for relative movement to engage the abutment within said notch to lock and hold said shiftable mechanism and said table control lever out of active position when the hand wheel is in use and until said table control lever is subsequently moved to an inoperative position to cause a release of the locking members.

14. Table traversing mechanism for a machine tool having a reciprocable table, comprising a rack fixedly connected to said table, a gear drive to traverse the table longitudinally comprising a rotatable drive shaft and a gear arranged to mesh with said rack, a manually operable lever engageable with said drive shaft for manually actuating said gear to reciprocate the table, a hand wheel, a gear connected therewith, shiftable control mechanism including a slidable plunger and movable gearing for connecting said hand wheel gear to said drive shaft for reciprocating the table independently of said lever, and means mounted on said plunger including a notched member movable with said shiftable mechanism, and an abutment movable with said table control lever arranged for relative movement to engage the abutment within said notch to lock and hold said shiftable mechanism and said table control lever out of active position when the hand wheel is in use and until said table control lever is subsequently moved to an inoperative position to cause a release of the locking members.

15. Table traversing mechanism for a machine tool having a reciprocable table, comprising a rack fixedly connected to said table, a gear drive to traverse the table longitudinally comprising a rotatable drive shaft and a gear arranged to mesh with said rack, a hand lever releasably connected with said drive shaft for manually actuating said gear to reciprocate the table, a hand wheel, a gear connected therewith, shiftable control mechanism including a slidable plunger and laterally movable gearing for connecting said hand wheel gear to said drive shaft for manually reciprocating the table independently of said lever, and means carried by said plunger and shiftable therewith in one position to prevent operation of said control mechanism or said lever by interfitting relation therewith when said means is shifted into another position to hold either said control mechanism or lever against being rendered active during the manual operation of the table by the other.

16. In a machine tool, a base, a reciprocable table, a rack connected to said table, a gear operatively engaging said rack for causing movement thereof, a rotatable shaft fixed to said gear, a manually operable lever pivotally mounted on said shaft, means for clampingly coupling said lever to said shaft for turning the same, a hand wheel, gears operatively connected to said hand wheel for rotation thereby, a shiftable gear splined to said rotatable shaft and movable therealong for engaging said hand wheel actuated gears, and means for coupling said shiftable gear with said hand wheel actuated gears for independently manually reciprocating said table when said lever is in an uncoupled position, said means carrying an abutment cooperating with means on said lever to block movement of the latter when the hand wheel is in a coupled position.

17. In a machine tool, a base, a reciprocable table, a rack connected to said table, a gear op-

eratively engaging said rack for causing movement thereof, a rotatable shaft fixed to said gear, a manually operable lever pivotally mounted on said shaft, means for clampingly coupling said lever to said shaft for turning the same, a hand wheel, gears operatively connected to said hand wheel for rotation thereby, a shiftable gear unit splined to said rotatable shaft and movable therealong for engaging said hand wheel actuated gears when moved in different directions, said shiftable gear unit being formed with two gears to provide fast or slow speeds of rotation of said rotatable shaft when turned by the hand wheel, and means for coupling said shiftable gear with said hand wheel actuated gears for independently reciprocating said table when said lever is in an uncoupled position, said means being constructed to render said lever inoperative when the hand wheel is in a coupled position.

18. In a machine tool, a base, a table slidably mounted thereon for relative reciprocation, a rack connected to said slidable table, a gear operatively engaging said rack, a rotatable shaft fixed to said gear to rotate the same, two independent manually operable devices to bodily reciprocate said table, each of said devices being separately connectible to rotate said shaft, one of said devices comprising a hand wheel and multi-speed gearing operatively connected to rotate therewith, the other of said devices comprising a hand lever and clamping means adapted to operatively couple the lever to said shaft to turn the same, a slidable shift control device having a compound gear member movable therewith in different directions for separately connecting one of said hand wheel gears to said rotatable shaft while said lever device is in an inoperative position to provide either a fast or slow table movement, and means movable with said shift control device for preventing operating movement of said lever when in an uncoupled position and while the hand wheel control is in operative position.

19. In a machine tool, a base, a table slidably mounted thereon for relative reciprocation, a rack connected to said slidable table, a gear operatively engaging said rack, a rotatable shaft fixed to said gear to rotate the same, two independent manually operable devices to bodily reciprocate said table, each of said devices being separately connectible to rotate said shaft, one of said devices comprising a hand wheel and

multi-speed gearing operatively connected to rotate therewith, the other of said devices comprising a hand lever and clamping means adapted to operatively couple the lever to said shaft to turn the same, a slidable shift control device having a compound gear member movable therewith in different directions for separately connecting one of said hand wheel gears to said rotatable shaft while said lever device is in an inoperative position to provide either a fast or slow table movement, and means movable with said shift control device for preventing operating movement of said lever when in an uncoupled position and while the hand wheel control is in operative position, said lever having an abutment movable therewith, and said holding means comprising a projecting member cooperating with said abutment on said lever for preventing relative movement of said parts.

20. Table traversing mechanism for a machine tool having a movable table, comprising two manual independent driving control means for moving the table, and means so constructed and arranged that one of said driving control means is maintained inoperative for moving the table until the other of said driving control means is first established in a predetermined position of rotation, said means serving to block shifting except when in said position of rotation.

21. Table traversing mechanism for a machine tool having a movable table, comprising two independent driving control means for moving the table, one of said driving control means being operable by a hand wheel and the other being actuated by a hand lever, and means so constructed and arranged that the hand wheel controlled driving means is maintained in an inoperative table driving relation until the hand lever control member is first located in a predetermined stored position.

22. Table traversing mechanism for a machine tool having a movable table, comprising two manual independent driving control means for moving the table, and means so constructed and arranged that either of said driving control means is maintained inoperative for moving the table until the other of said driving control means is first established in a predetermined position of rotation, said means serving to block shifting except when in said position of rotation.

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