Feb. 22, 1949. M. G. HIMOFF ET AL 2,462,498

CROSS SLIDES AND CONTROL MECHANISM THEREFOR

Filed July 16, 1943 3 Sheets-Sheet 1

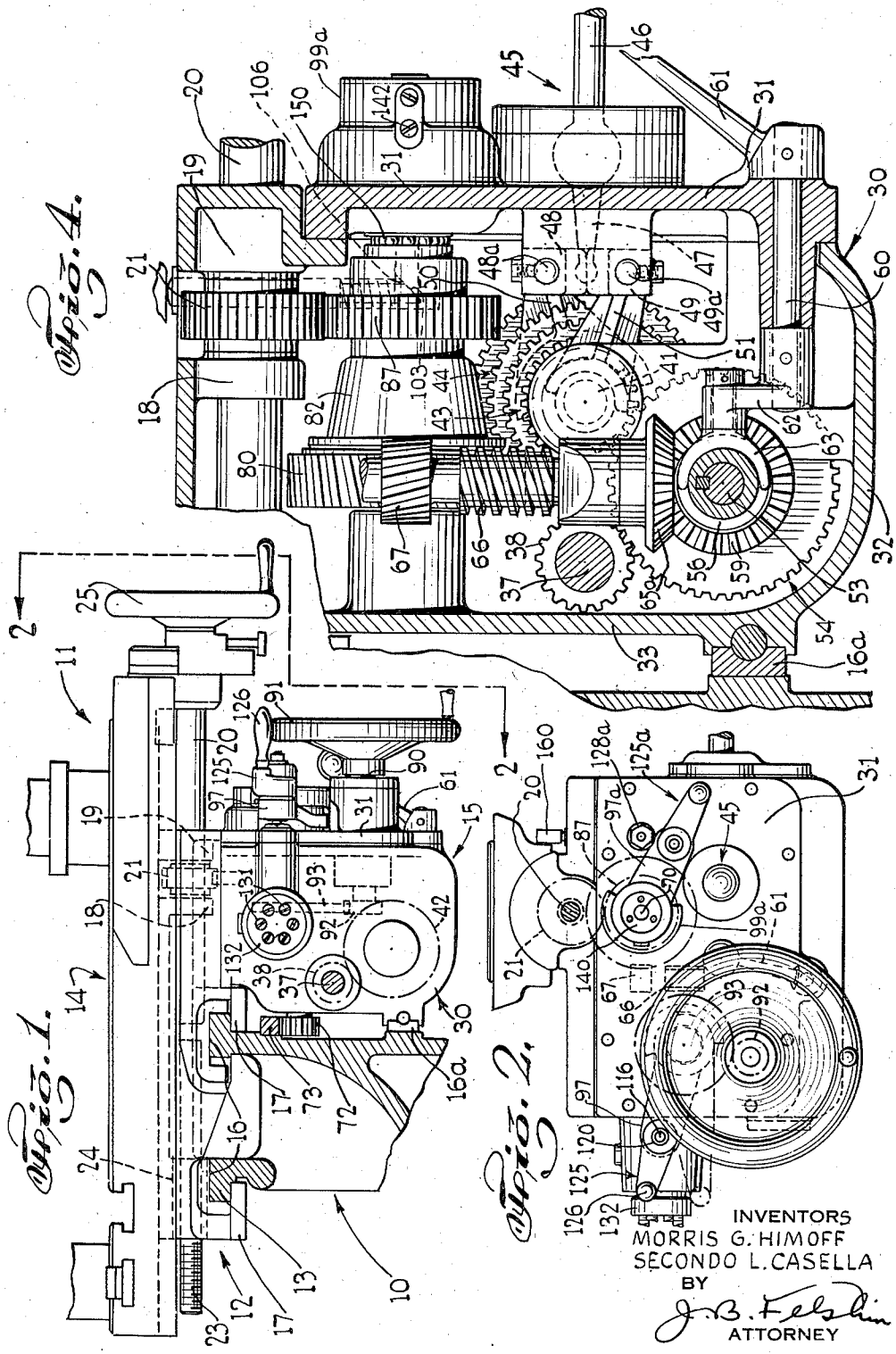


Fig. 4.

Fig. 1.

Fig. 2.

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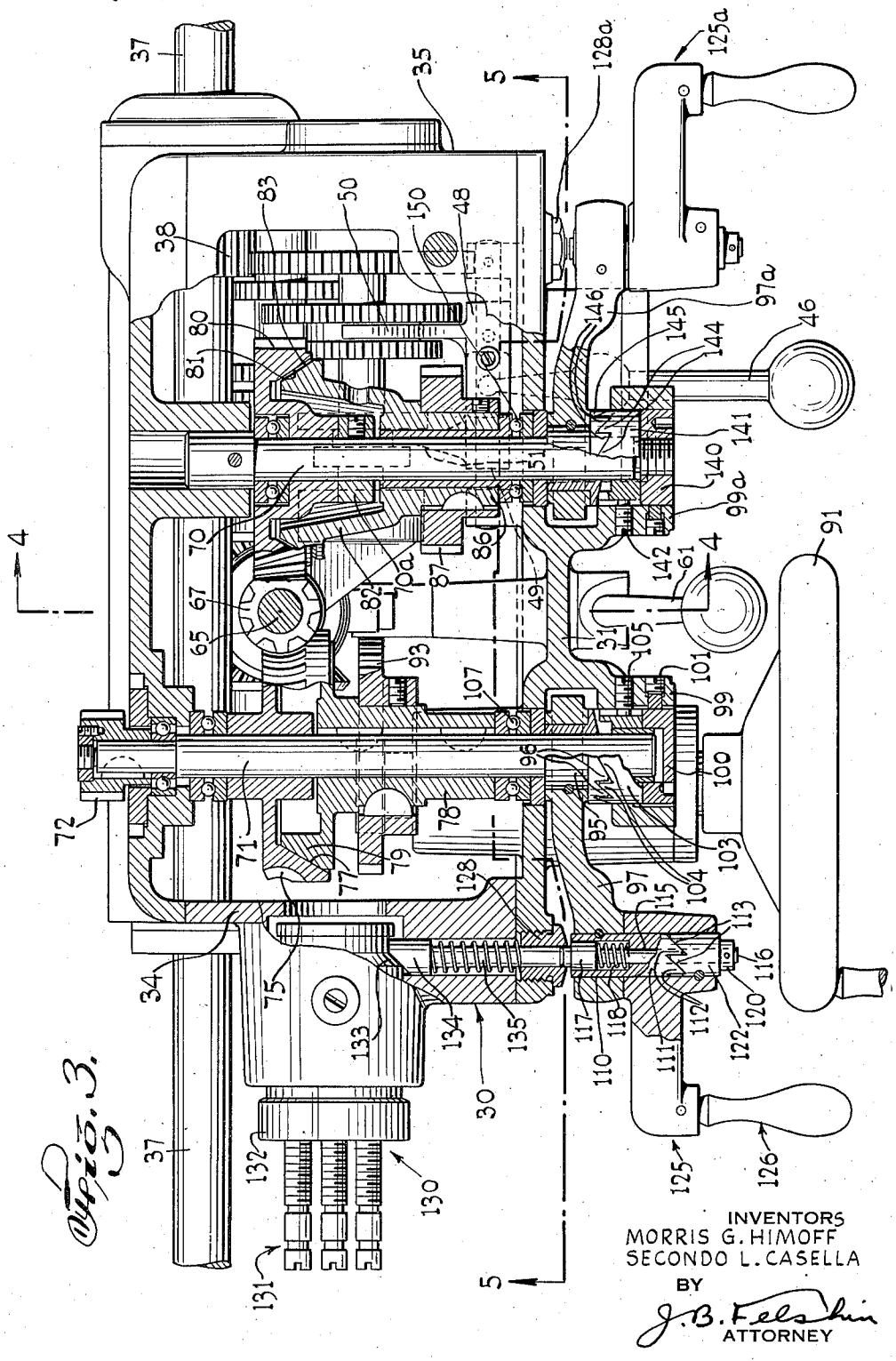


Fig. 3.

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Filed July 16, 1943 3 Sheets-Sheet 3

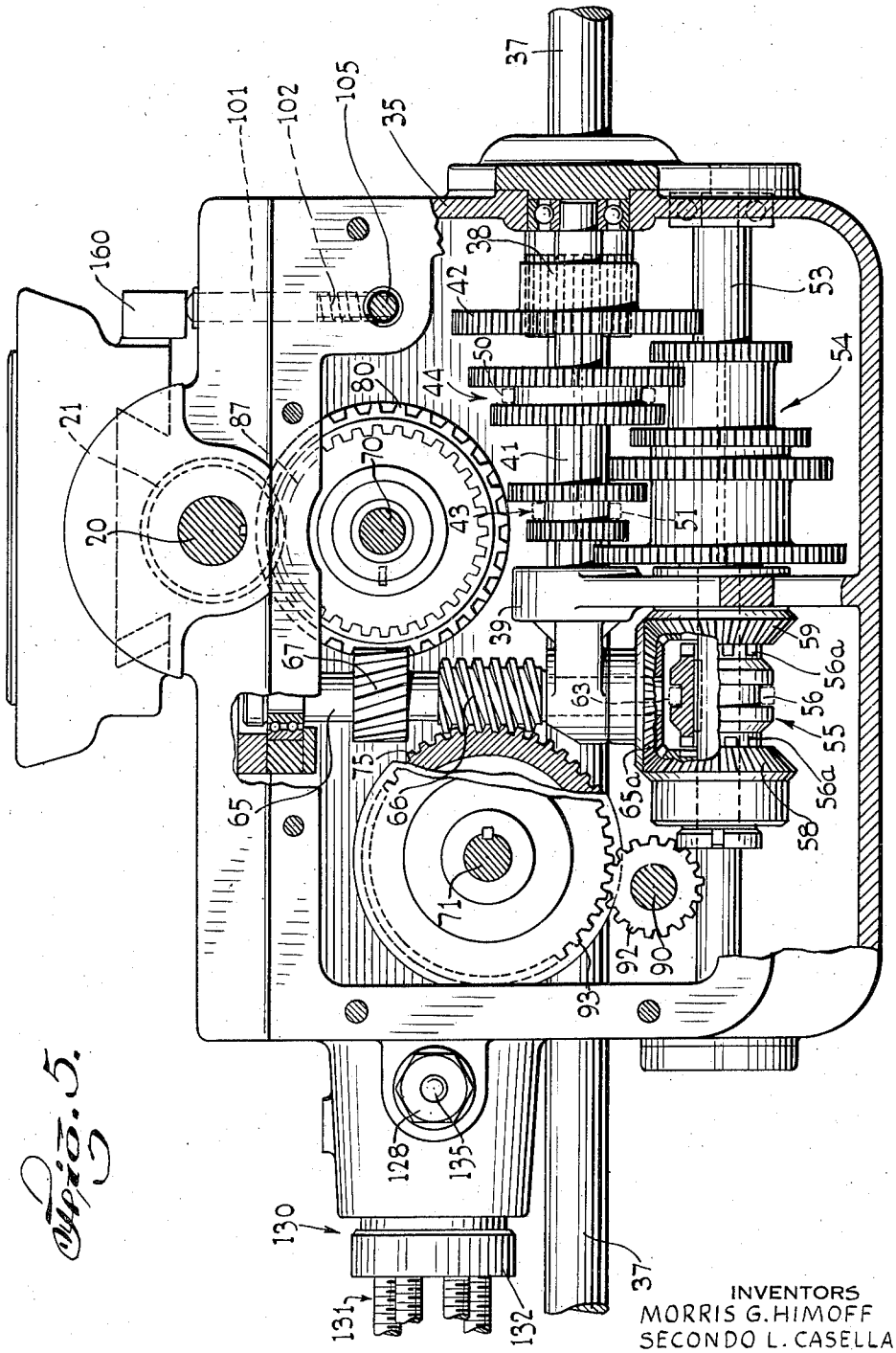


Fig. 5.

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UNITED STATES PATENT OFFICE

2,462,498

CROSS SLIDES AND CONTROL MECHANISM THEREFOR

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6 Claims. (Cl. 192—93)

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This invention relates to cross slides and control mechanism therefor. It is particularly directed to a cross slide of a lathe, having both power and hand feed for its slide and carriage.

An object of this invention is to provide in a cross slide of the character described, highly improved manual means to selectively stop the power feed for either the carriage or the slide, and including levers that may be easily actuated by the operator while the power feed is in operation to release the power feed.

Another object of this invention is to provide a highly improved cross slide operating mechanism including a stop roll to throw out the power feed for the longitudinal drive for the carriage, and means on the slide to throw out the power feed for the transverse drive of the slide, and additional highly simplified and easily operated manual means to selectively stop the power drives for the carriage or the slide.

Another object of this invention is to provide a cross slide of the character described including a single power feed for the carriage and slide, means to vary the speed of said power drive, means to reverse the direction of said drive, manual means to selectively move the carriage or the slide, means to automatically stop the movement of the carriage or slide, and manual means to stop the movement of the carriage or slide.

Yet a further object of this invention is to provide a compact, rugged and durable cross slide of the character described which shall be relatively inexpensive to manufacture, smooth and positive in operation, easy to assemble and operate, and which shall yet be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown various possible illustrative embodiments of this invention,

Fig. 1 is a side elevational view of a cross slide embodying the invention on the bed of a lathe;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the cross slide carriage with parts broken away and in cross-section;

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Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 3; and

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 3.

Referring now in detail to the drawing, 10 designates the bed of a lathe such as a turret lathe, and 11 designates a cross slide embodying the invention. The cross slide 11 comprises a saddle 12 slidably mounted on the ways 13 of the bed 10 for longitudinal movement relative thereto, a slide 14 slidably mounted on the saddle 12 for transverse movement relative to the saddle and bed, and a carriage 15 fixed to the saddle and movable therewith longitudinally of the bed.

The saddle 12 has parallel grooves 16 to receive the ways and fixed to the underside thereof are gibs 17 engaging the underside of the ways to serve as guides for the saddle. Said saddle is furthermore formed with a pair of spaced bearings 18 and 19 in which is journalled a horizontal shaft 20, disposed beneath and parallel of the slide 14. Keyed to the shaft and disposed between the bearings 18 and 19 is a pinion 21. The shaft 20 has a screw threaded portion 23 having threaded engagement with an internally threaded nut 24 on the slide 14. At one end of the shaft 20 is a handle 25 whereby to rotate the screw and move the slide transversely of the saddle, manually.

The carriage 15 comprises a feed box 30 fixed to the underside of the saddle and disposed in front of the bed 10. At the front of the feed box 30 is a feed box cover 31. The feed box 30 has a bottom wall 32, a rear wall 33, side walls 34 and 35, and is open at the front, the front of the feed box being closed by the cover 31. The box 30 slidably engages a guide 16a on the bed 10.

Extending horizontally through aligned bearings in the side walls 34 and 35 of the feed box, is a power shaft 37 which obtains power in any suitable manner, as for example from the head stock of the lathe. On shaft 37 and within the feed box is a pinion 38. Within the feed box is an upwardly extending vertical wall 39 disposed between the side walls. Mounted on walls 39 and 35 on suitable bearings carried by said walls, is a horizontal shaft 41. On shaft 41 is a pinion 42 meshing with the pinion 38.

Slidably mounted on shaft 41 are two pair of double gears 43 and 44 of varying diameters, shiftable selectively on the shaft 41 by usual gear shift mechanism. Said mechanism may include a gear shift lever 45 pivoted on the front wall 31 and having a forwardly extending handle 46. The

lever 45 may include an arm 47 adapted to selectively engage shifting blocks 48 and 49 to which are fixed parallel shafts 48a, 49a. Any suitable means such as locking balls, well known in the art, may be provided to prevent shifting of either shaft 48a or 49a when the other is shifted from normal position. One block carries a fork 50 adapted to engage one of the double gears and the other block carries a fork 51 adapted to engage the other of the double gears. The double gears may thus be shifted selectively in either direction.

Journalled in the feed box is another horizontal shaft 53 carying a cluster gear 54 comprising four gears of various sizes adapted to be selectively engaged by the gears 43 or 44 whereby to vary the speed of shaft 53.

Keyed to shaft 53 is a clutch member 55 formed with an annular groove 56. On opposite sides of the clutch member 55 are radial clutch teeth 56a. Rotatably mounted on shaft 53 and disposed on opposite sides of the clutch 55 are beveled gears 58 and 59 selectively engageable by the clutch 55.

Journalled on the front wall 31 is a horizontal shaft 60 extending through said wall. Fixed to the front end of the shaft 60 is a hand lever 61. Fixed to the inner end of said shaft 60 is a crank arm 62 carrying a fork 63 engageable in the groove 56 of clutch 55. Thus as lever 61 is rotated in one direction or another, the clutch 55 is selectively engaged with either one or the other of the gears 58, 59 or is moved to neutral position.

Journalled within the feed box in any suitable manner, is a vertical shaft 65 carrying a worm 66 and a helical gear 67. The shaft 65 also carries a bevel gear 65a meshing with the bevel gears 58, 59.

There is furthermore journalled within said feed box a fixed horizontal shaft 70 running from front to rear, also a second horizontal shaft 71 parallel to shaft 70 and likewise running from front to rear. Shafts 70, 71 are on opposite sides of shaft 65. Fixed to the rear end of shaft 71 is a pinion 72 meshing with the teeth of a rack 73 fixed to the bed 10. Thus when shaft 71 rotates, the carriage will move to the right or to the left depending upon the direction of rotation.

Rotatably mounted on shaft 71 is a worm gear 75 meshing with the worm 66. The worm gear 75 is formed with an internal conical clutch surface 77. Keyed to the shaft 71 is a sleeve 78 carrying a clutch cone 79 adapted to engage said conical surface 77.

It will now be understood that when sleeve 78 is pressed forwardly the clutch cones will engage and the shaft 71 will be driven through worm gear 75 and member 78. However, when pressure is released from member 78 the drive for shaft 71 will cease, as the clutch will loosen itself when there is no pressure thereon.

Journalled on shaft 70 is a gear 80 meshing with the gear 67. The gear 80 is formed with an internal conical clutch surface 81. Journalled on shaft 70 is a clutch member 82 having an external clutch cone 83 adapted to engage the internal cone 81. When member 82 is pressed rearwardly toward the cone clutch 81 it will be rotated from the shaft 65. When pressure on member 82 is relaxed the drive for said member will be released. Member 82 is formed with a hub 86 carrying a gear 87 meshing with pinion 21 on screw shaft 20.

Fixed to shaft 70 is a collar 70a contacting the hub or spiral gear 80 so as to prevent cone 81 from moving relative to the shaft and thereby prevent engagement of the cone clutches 81, 83 except when member 82 is pressed rearwardly.

It will now be understood that shaft 20 may be driven by power in either direction and with a variety of speeds, power being obtained through the power shaft 37. The drive is from shaft 37, pinion 38, gear 42, shift gears 43 or 44, cluster gear 54, shaft 53, bevel gears 58 or 59, bevel gear 65a, shaft 65, gears 67 and 80, clutch 81, 83, gear 87, and pinion 21.

It will be observed that the clutch lever may be moved to neutral position when it is desired to stop the drive for either the carriage or slide, and that the direction of rotation may be changed by shifting the clutch lever 61, and also that the speed may be varied by operating the gear shift lever 46.

Shaft 20 may be rotated manually as stated above, by turning the handle 35.

The carriage may also be moved longitudinally manually. To this end there is journalled in the front wall 31 a horizontal shaft 90 carrying a hand wheel 91. On the inner end of shaft 90 is a gear 92 meshing with a gear 93 on sleeve 78.

Releasable means is provided to press member 78 rearwardly to engage the cone clutch 77, 79. To this end there is journalled on shaft 71 a sleeve 95 carrying a series of cam teeth 96. Fixed to the sleeve 95 is a lever 97 for the purpose hereinafter appearing.

Wall 31 is formed with a fixed sleeve or hub portion 99 into which projects the forward end of shaft 71. Screwed to the outer end of sleeve 97 is a cap 100 adapted to be fixed by a set screw 101. Slidably, but non-rotatably mounted within sleeve 99 is a cam 103 having cam teeth 104 complementary to the cam teeth 96. Cam 103 is retained against rotation by set screw 105.

It will be observed that the lever 97 is formed with an opening through which the sleeve 95 passes, said sleeve being fixed to the lever by a taper pin or in any other suitable manner.

Interposed between the lever and sleeve 78 is a thrust bearing 107. As lever 97 is lifted, looking at Fig. 3 of the drawing, it will be pressed forwardly due to engagement of teeth 96 with teeth 104 causing a thrust rearwardly on member 78 to cause engagement of clutch members 77, 79. When lever 97 drops, the clearance between the teeth 96 and 104 causes the thrust on member 78 to be relaxed sufficiently to disengage the clutch members 77, 79. Said clutch cones are at such an angle so as to be self-releasing when there is no pressure thereon.

Releasable means is provided to retain lever 97 in raised or in clutching position. To this end said lever arm is formed at its outer end with an opening 110. Extending through the opening is a cam sleeve 111 fixed to the lever by a taper pin or in any other suitable manner. Sleeve 111 has cam teeth 112 at its forward end. It is furthermore formed at its forward end with a socket 113 and with a through opening 115 of reduced diameter. Extending through the opening 115 is a stem 116 carrying a head 117 at its forward end. Interposed between the head 117 and the inside of the socket, and disposed about the stem, is a compression spring 118 urging the head 117 forward. On the front end of stem 116 is a collar 120. Rotatably mounted on the stem and held thereon by the collar 120 is a cam sleeve 122 having cam teeth 123 complementary to the teeth 112 of cam sleeve 111.

Rotatably mounted on sleeve 111 and receiving the sleeve 122 is a hand lever arm 125. It

will be observed that the sleeves 111 and 122 are of substantially the same diameter. Lever arm 125 has a through opening to receive said sleeves. At the outer end of lever arm 125 is a handle 126.

Fixed to the front wall 31 is a button 128 formed with a central opening receiving a projection on the head 117 to retain the lever 97 in raised or clutch engaging position. Upon depressing the handle 126, lever arm 125 causes rotation of sleeve 122 and due to the engagement of the cam teeth 112, 123, sleeve 122, together with the lever arm 125 and stem 116 are moved forwardly, compressing the spring 118 but disengaging the head 117 from the button 128. As soon as disengagement is effected lever 97 will drop by gravity to release the thrust on the clutch cone 77, 79 and thereby stop the power drive for the shaft 71. In this manner the power drive for the carriage, longitudinally of the bed, is stopped manually by merely depressing the lever 125.

A usual stop roll 130 such as described in co-pending application, Serial No. 485,967, filed May 7, 1943, now Patent Number 2,361,453 for Stop rolls, by applicant Secondo L. Casella, may be provided to disengage the lever 97 automatically when the carriage reaches predetermined, selected positions in its movement to the left, looking at Fig. 3 of the drawing.

The releasing of the lever is effected when a stop strikes one of the screws 131 causing movement of a member 132 mounted on the feed box, to the right. Member 132 is formed with a cammed surface 133 engaging the cam 134 on a plunger 135. Said plunger extends through the central opening of the button 128 to push the projection 117 out of said opening whereby to permit the lever 97 to drop.

Means is also provided to manually disengage the cone clutches 81, 83 so as to manually stop the power drive for the slide transversely of the saddle. To this end wall 31 is formed with a sleeve or hub 99a concentric with the forward end of the shaft 70. Screwed to the forward end of shaft 70 is a nut 140. On the shaft 70 is a cam sleeve 141 contacting the nut 140 and held against rotation by means of a set screw 142 on sleeve 99a. Cam sleeve 141 is formed with cam teeth 144.

Rotatably mounted on shaft 70 is a second cam sleeve 145 having cam teeth 146 complementary to the cam teeth 144. Mounted on sleeve 145 is a lever 97a having an opening receiving said sleeve and fixed thereto by a taper pin or in any other suitable manner.

Interposed between the lever 97a and hub 86 is a thrust bearing 150. When lever 97a is raised said lever will be moved forwardly due to engagement of teeth 146 with teeth 144 causing a thrust to be imposed, through the thrust bearing 150, on hub 86. Such a thrust causes cones 83, 81 to be engaged whereupon gear 87 is driven by power.

Means is provided to manually release the power drive to the gear 87. To this end there is mounted on the front wall 31 of the feed box, a second button 128a formed with a central opening and similar to button 128. Mounted on the lever 97a is a lever arm 125a similar to lever arm 125 and having means to engage the button 128a similar to that described previously, engaging button 128. Upon depressing the lever arm 125a, lever 97a is released and drops by gravity causing disengagement of the clutch cones 81, 83.

Means is provided to automatically disengage the lever 97a at predetermined points in the movement of the slide forwardly or rearwardly. To this end there is fixed to one side of the slide a pair of spaced adjustable stops 160. Slidably mounted within the feed box is a vertical pin 161 normally raised by a spring 162 and having a cammed surface 163 at its lower end. Slidably mounted in the feed box is a horizontal pin 165 having a cammed surface 166 at its rear end engageable with the cammed surface 163. When the stops 160 depress the pins 161, horizontal pin 165 will be moved forwardly to disengage the lever 97a.

It will now be understood that depression of the levers 125, 125a is all that is necessary to release the power drives for either the longitudinal or the cross feed, and it is not necessary to grasp and pull the pins 116 to disengage them from the buttons 128, 128a.

It will further be understood that the cross slide can be moved either by power manually, longitudinally and transversely of the bed and that the power drive may be stopped either automatically or manually, and that furthermore the power drive for the cross slide may be had in various selected speeds. The whole unit is carried in the one feed box and is smooth and positive in operation and easy to manipulate.

It will be noted furthermore that the power drive for both the longitudinal, as well as cross feed is derived from the same shaft 65 which may be rotated in either direction through the clutch 55, and said shaft may be furthermore rotated at various speeds so that the one speed changer controls the speed of drive for both the longitudinal and transverse drives.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In combination, a shaft, a member mounted thereon and provided with a clutch means, a second member on the shaft provided with clutch means adapted to engage the first clutch means, a lever on said shaft, means effective upon rotation of the lever in one direction of rotation to cause the clutch means of said members to be engaged and in an opposite direction of rotation to permit said clutch means to declutch, releasable means to retain the lever in clutching position, a lever arm rotatably mounted on the lever about an axis parallel to said shaft, and cam means effective upon movement of the lever arm in said opposite direction of rotation to disengage the retaining means.

2. In combination, a shaft, a gear rotatably mounted thereon, means to rotate said gear, said gear being provided with clutch means, a member keyed to the shaft and having clutch means engageable with the first clutch means, a cam member rotatably and slidably mounted on the shaft, a lever fixed to the cam and adapted to rotate the same, a second cam disposed about said shaft, means to fix the second cam against rotation, stop means engaging the second cam to prevent sliding movement thereof relative to the shaft, a thrust bearing interposed between

the lever and the member keyed to the shaft, whereby rotation of the lever in one direction of rotation will cause the first cam to engage the second cam and impose a thrust through the thrust bearing to press the clutch means on the keyed member into engagement with the clutch means on the gear, and rotation of said lever in an opposite direction of rotation will release said thrust, a cam at the outer end of said lever, a spring pressed plunger within said last cam, means adapted to be engaged by the spring pressed plunger to retain said lever against rotation, a lever arm rotatably mounted on the cam at the outer end of said lever, and a cam fixed to said lever arm and engageable with the cam at the outer end of said lever and engaging said plunger, whereby to retract the same and release the same from the retaining means upon rotating said lever arm in said opposite direction of rotation, whereby to permit rotation of the lever upon continued urging of said lever arm in said opposite direction after release of said lever.

3. In combination, a pivoted lever, a cam fixed to said lever, a spring-pressed member in said lever, means adapted to be engaged by the spring-pressed member to retain the lever against rotation, a lever arm rotatably mounted on said lever about an axis parallel to the pivotal axis of said lever, a second cam fixed to the lever arm and engaging the first cam, said second cam having means to engage the spring-pressed member, whereby to retract and release the same from the retaining means, upon rotating said lever arm relative to said lever, whereby to permit rotation of said lever.

4. In combination, a lever rotatably mounted about a fulcrum, said lever being formed with an opening, a sleeve within said opening and fixed to the lever, a spring-pressed plunger slidably mounted in said sleeve, a lever arm rotatably mounted on said sleeve, a second sleeve fixed to said lever arm, said plunger passing through said second sleeve, interengaging cam means on said first and second sleeves, and

means on the plunger and engaging the second sleeve whereby rotation of said lever arm will cause the second sleeve to be retracted.

5. In combination, a wall, stop means on said wall, a lever pivoted about an axis perpendicular to said wall, means movable on said lever in a direction parallel to the pivotal axis of said lever, and spaced from said pivotal axis, and engageable with said stop means to retain said lever against rotation, a lever arm rotatably mounted on said lever about an axis parallel to the pivotal axis of said lever, and means effective upon rotation of said lever arm relative to said lever to disengage said retaining means from said stop means, whereby to permit rotation of said lever.

6. In combination, a wall, stop means on said wall, a lever pivoted to said wall about an axis perpendicular to said wall, a spring pressed plunger on said lever offset from the pivotal axis of said lever, the axis of said plunger being parallel to the pivotal axis of said lever, and engageable with said stop means to retain the lever against rotation, a lever arm pivoted to said lever about an axis of said plunger, and means effective upon rotation of said lever arm relative to said lever to release the spring pressed plunger from said stop means whereby to permit rotation of the lever about its pivotal axis.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
373,455	Gould	Nov. 22, 1887
1,685,310	Burrell	Sept. 25, 1928
1,709,118	Class	Apr. 16, 1929
1,898,869	Dadd	Feb. 21, 1933
2,094,994	Lovely	Oct. 5, 1937
2,354,266	Kemper	July 25, 1944
2,361,453	Casella	Oct. 31, 1944