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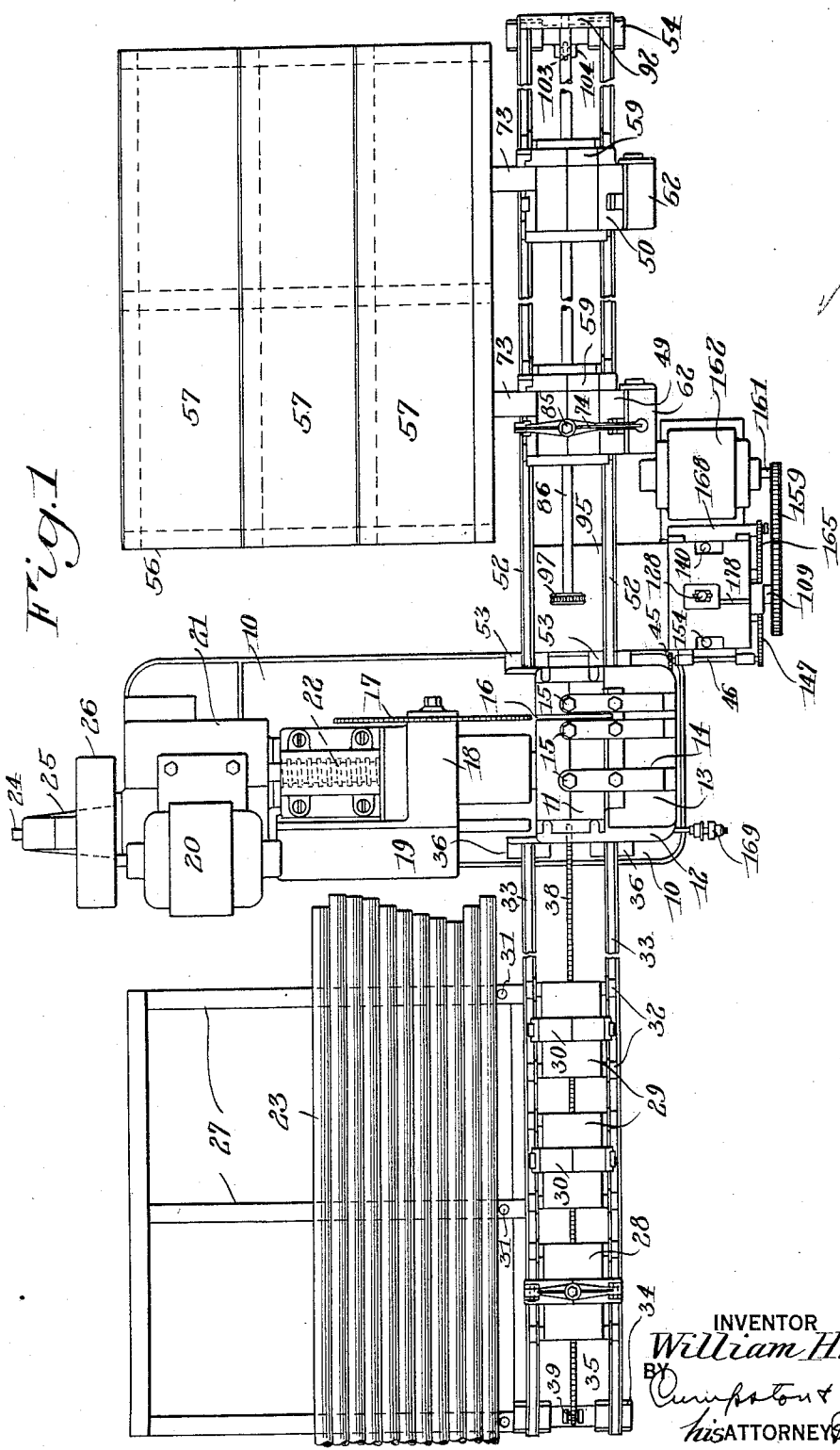
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1,848,288

METAL CUTTING MACHINE

Filed July 5, 1928

8 Sheets-Sheet 1



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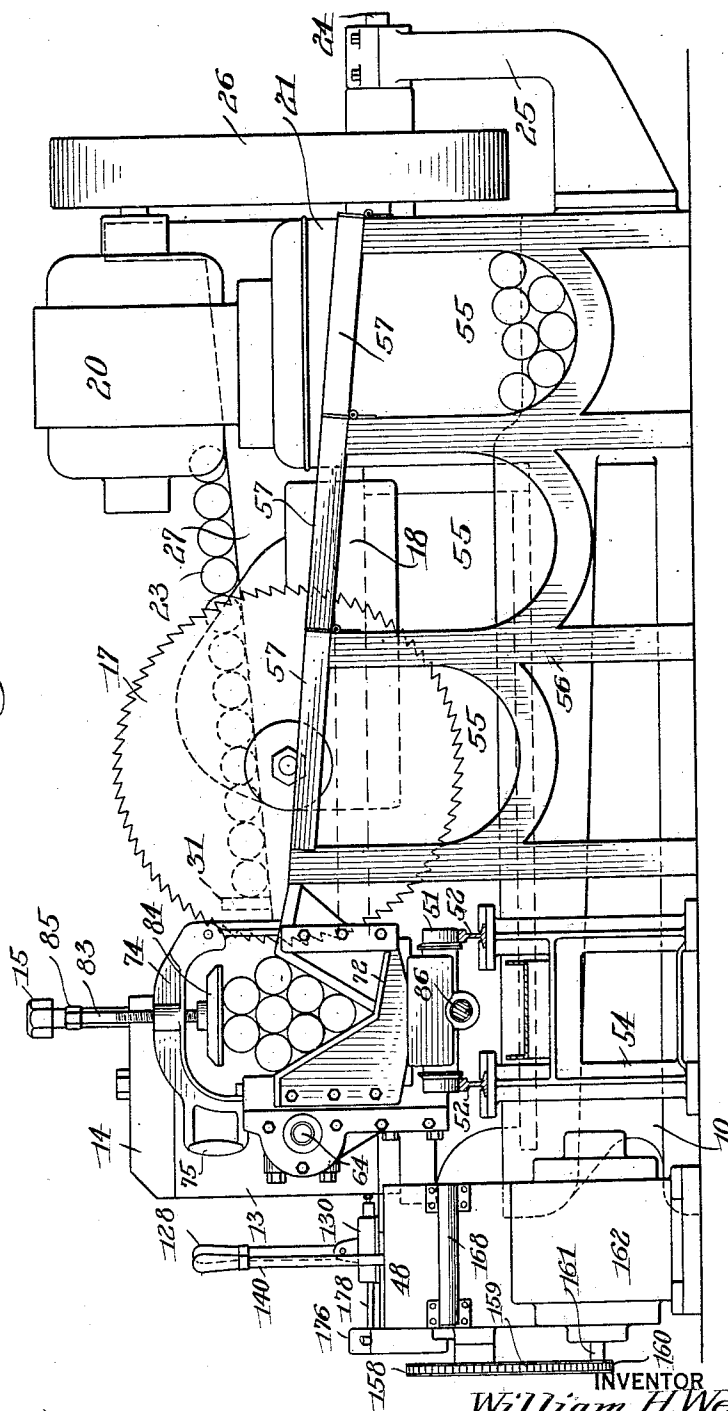
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Fig. 2



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Fig. 3

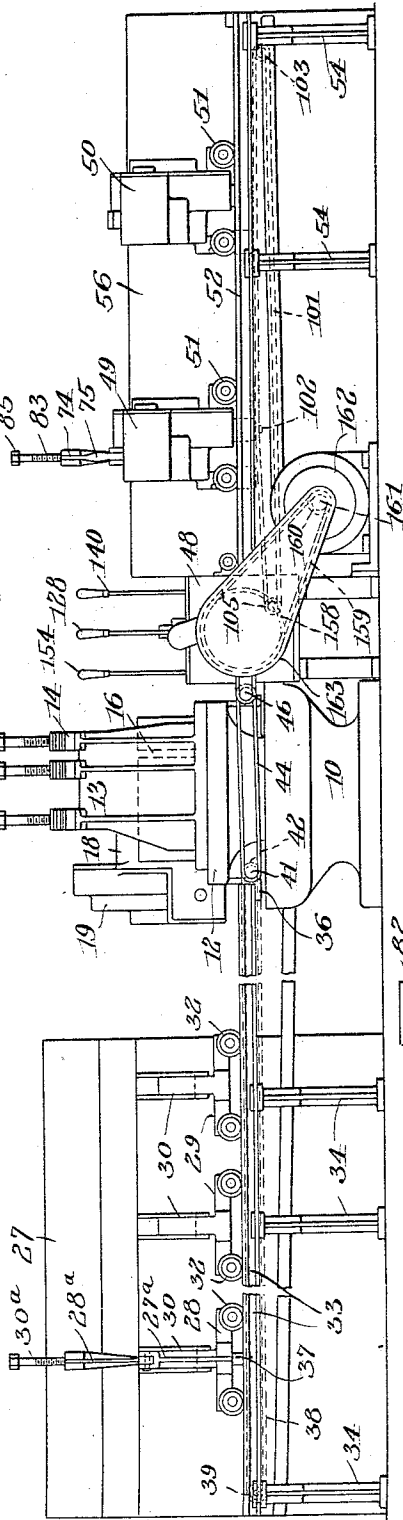


Fig. 5

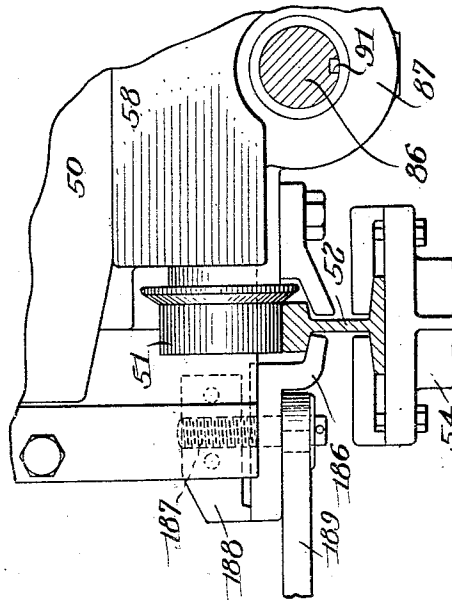
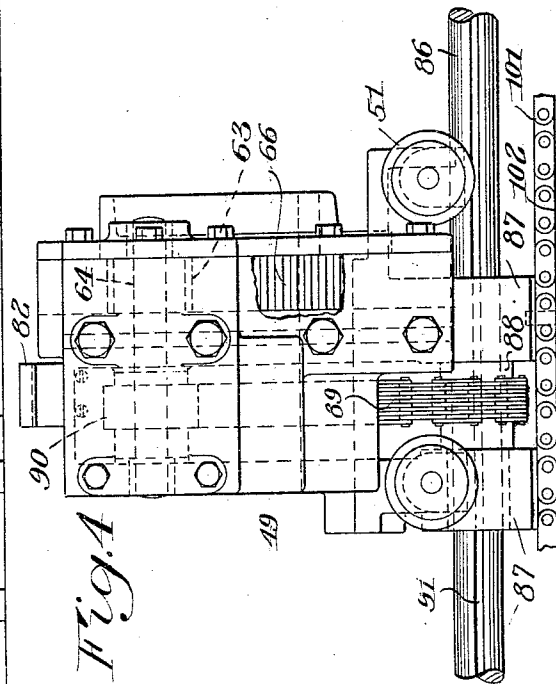


Fig. 4



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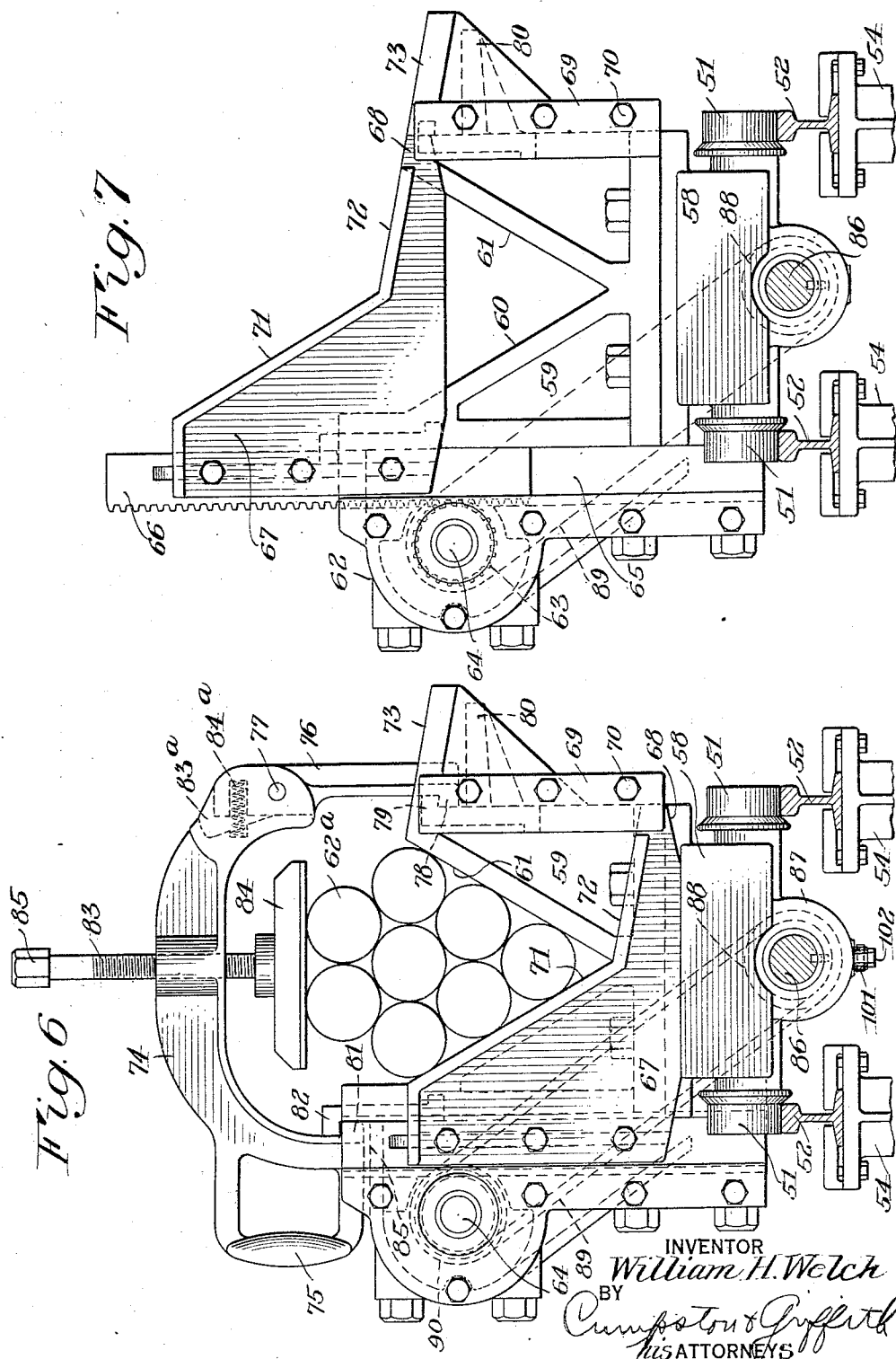
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METAL CUTTING MACHINE

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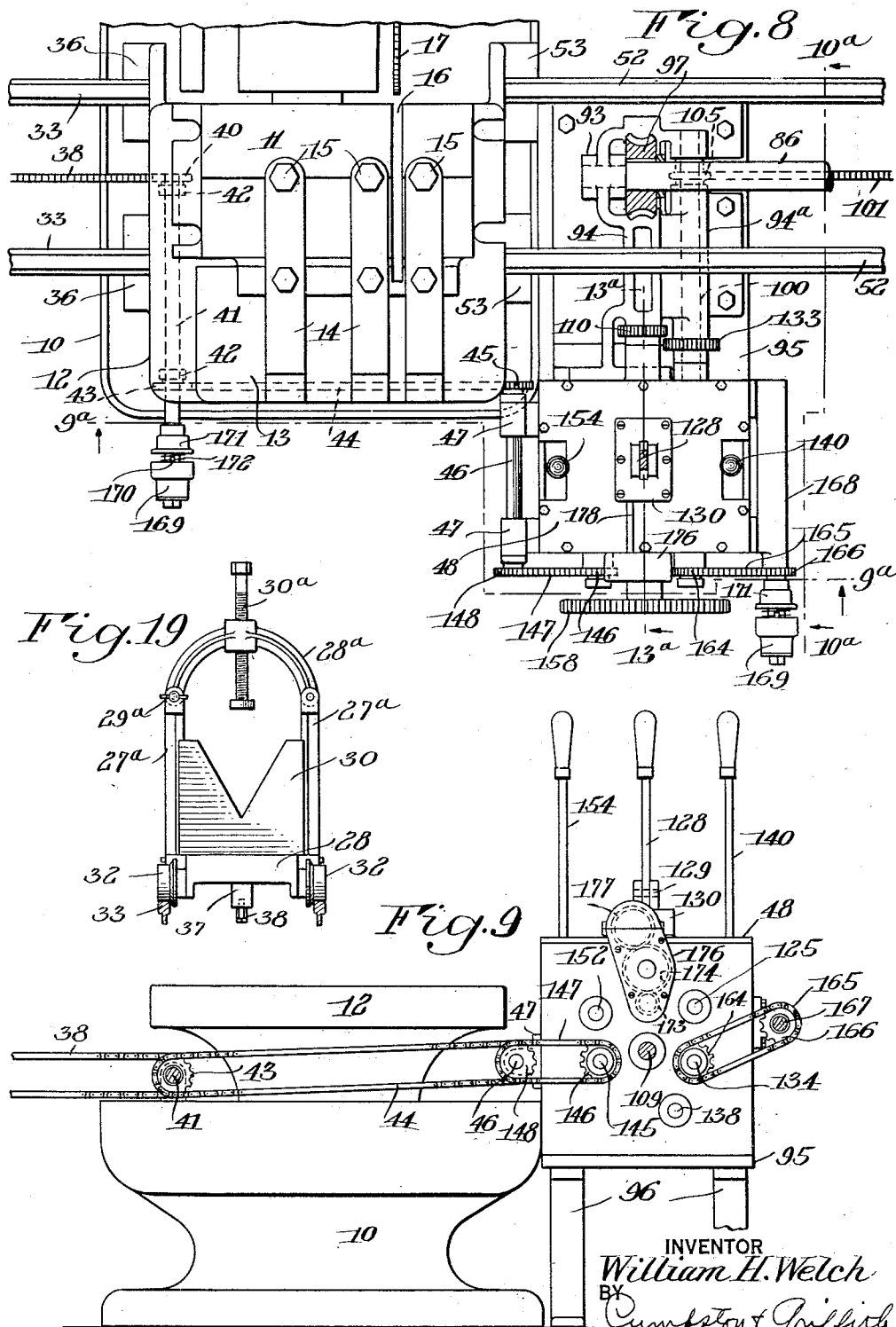
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METAL CUTTING MACHINE

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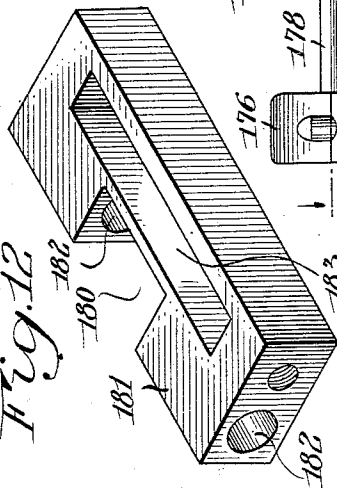
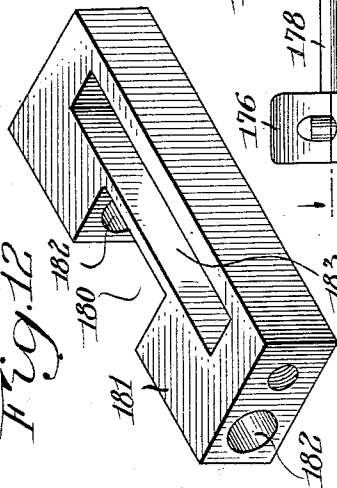
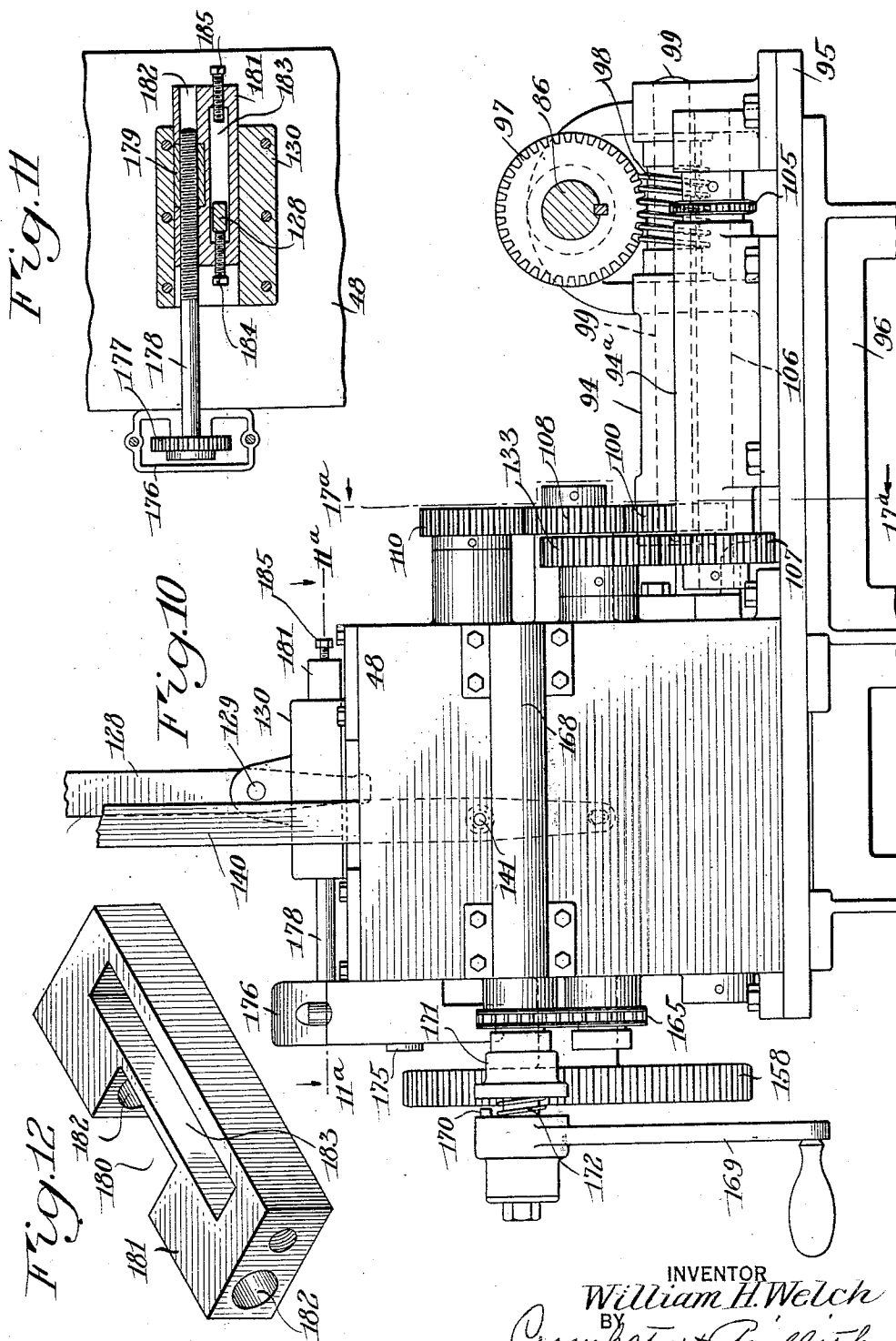
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METAL CUTTING MACHINE

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8 Sheets-Sheet 6



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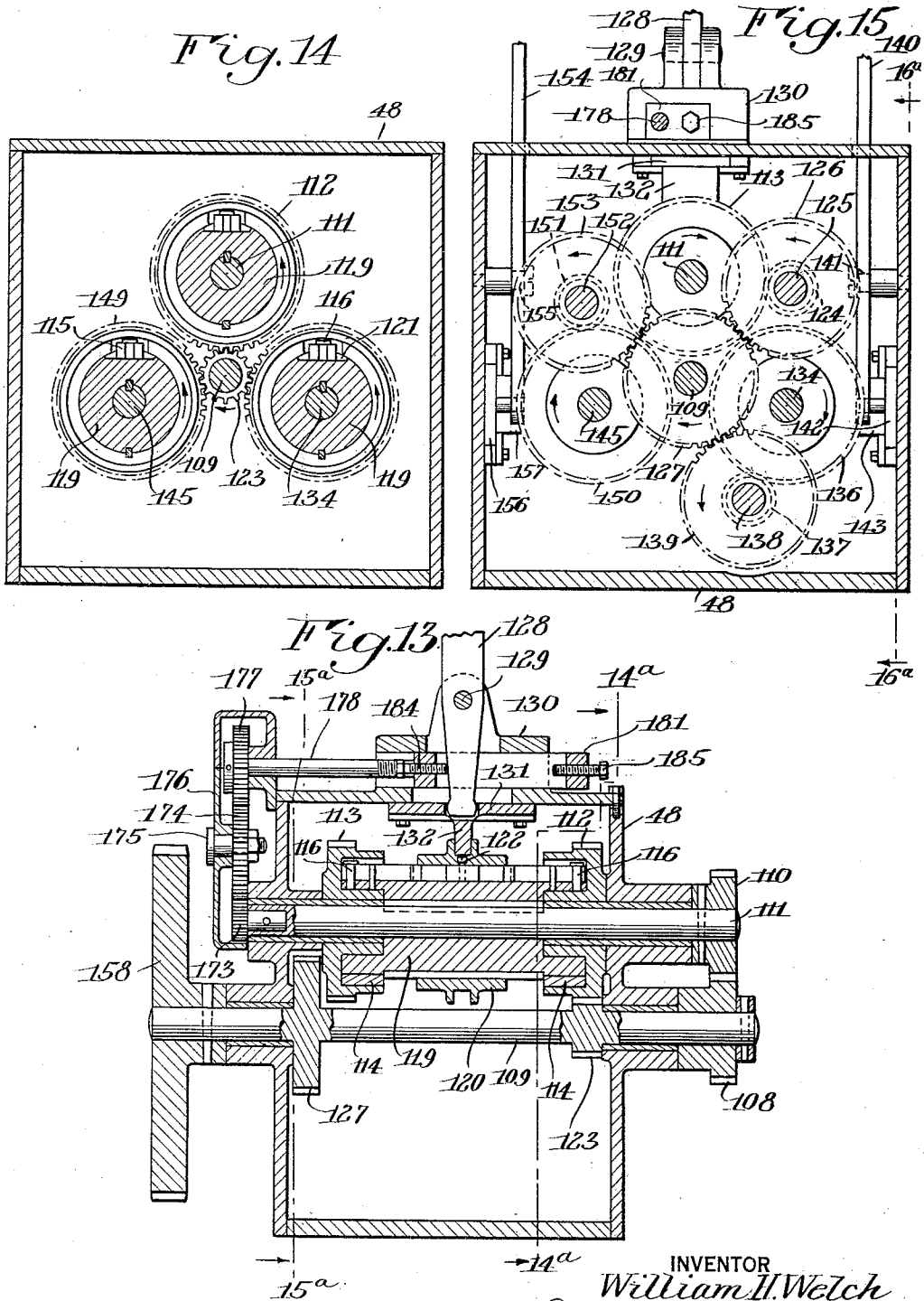
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METAL CUTTING MACHINE

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METAL CUTTING MACHINE

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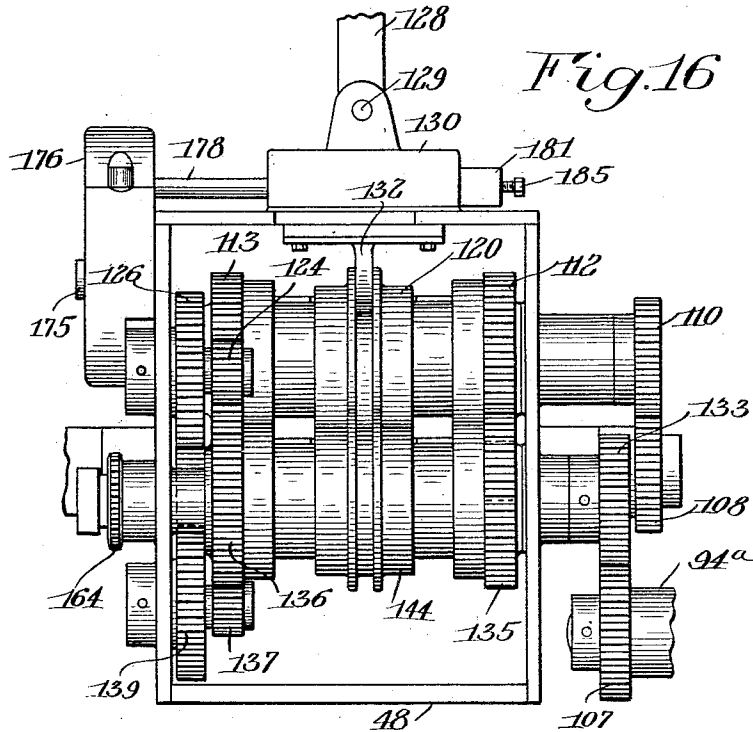
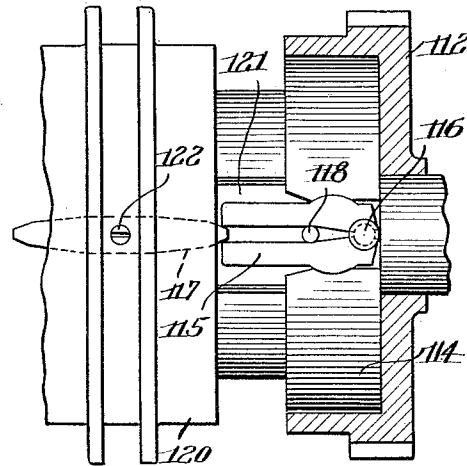
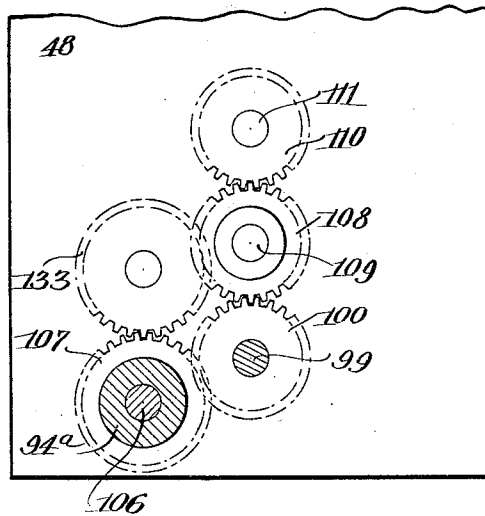


Fig. 17



UNITED STATES PATENT OFFICE

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METAL CUTTING MACHINE

Application filed July 5, 1928. Serial No. 290,537.

The present invention relates to metal cutting machines and has for one object to provide an improved machine of this class designed to facilitate the handling and cutting of bar material or the like into sections of various lengths with rapidity and accuracy and at a minimum cost.

A further object of the invention is to provide an improved machine of the class described embodying means for supporting a plurality of bars, shafts, or the like in assembled position at a loading station for quick delivery to one or more trucks or carriers arranged to feed the bars to the severing means at a cutting station step by step, and further to provide receiving trucks or holders for the severed sections, designed to advance the latter to one or more unloading stations, together with operating devices for the several mechanisms and selective control clutch devices designed to control the operating devices.

A still further object of the invention is to provide improved work receiving, conveying and unloading mechanism designed to quickly facilitate the handling and unloading of the work before and after the cutting operations.

A further object is to provide an improved selective clutch mechanism for controlling the various operating parts provided for handling the work.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a diagrammatic plan illustrating one embodiment of the invention;

Fig. 2 is an end elevation as viewed from the right of Fig. 1;

Fig. 3 is a front elevation of the machine shown in Fig. 1;

Fig. 4 is a fragmentary side elevation of a power operated truck for receiving and discharging the severed sections of the work bars;

Fig. 5 is a fragmentary part sectional ele-

vation of one of the trucks showing the means for locking it in various positions upon the track;

Fig. 6 is an end elevation of the truck shown in Fig. 4 with the clamping means for the work applied thereto;

Fig. 7 is a similar view showing the work elevating means raised to position to effect discharge of the work from the truck;

Fig. 8 is a fragmentary part sectional plan of the work support and the clutch mechanism for controlling the movements of the truck and the work elevating means thereon;

Fig. 9 is a sectional elevation taken on line 9^a—9^a of Fig. 8;

Fig. 10 is an enlarged part sectional elevation taken on line 10^a—10^a of Fig. 8;

Fig. 11 is a sectional plan taken on line 11^a—11^a of Fig. 10 showing the automatic gear driven means for returning the elevator control clutch to normal position;

Fig. 12 is a detailed perspective view of the screw actuated slide block shown in Fig. 11;

Fig. 13 is a sectional elevation through the clutch mechanism for controlling the operation of the elevators on the unloading trucks taken on line 13^a—13^a of Fig. 8;

Fig. 14 is a transverse sectional elevation through the clutch housing taken on line 14^a—14^a of Fig. 13;

Fig. 15 is a sectional elevation taken on the line 15^a—15^a of Fig. 13;

Fig. 16 is a sectional elevation taken on the line 16^a—16^a of Fig. 15;

Fig. 17 is a part sectional elevation taken on the line 17^a—17^a of Fig. 10;

Fig. 18 is a part sectional plan drawn to an enlarged scale showing the expanding means for one of the clutch bands indicated in Fig. 13, and

Fig. 19 is an end elevation of one of the work holding trucks.

Similar reference numerals throughout the several views indicate the same parts.

The present invention embodies generally a power driven saw or cutter, moved to and from operating position to sever sections of the desired lengths from the bar material,

held temporarily by suitable supporting means, to which they are presented by trucks or carriers arranged to be advanced step by step on a track located at one side of the work support. At the opposite side of the work support is a second track having mounted thereon one or more work receiving and unloading trucks or carriers, normally occupying a position at which they will receive the projecting ends of the bars to be severed. The trucks are adapted, after each cutting operation is completed, to be advanced preferably by power means associated with the trucks to a position from which the sections will be discharged by gravity to an inclined platform. The platform preferably comprises a plurality of hinged sections or closures overlying receiving compartments for the sections, into any one of which the sections can be directed by raising the closure therefor. One of the unloading trucks is power operated and is under the control of the selective clutch mechanism. The same is true of one of the work advancing or delivery trucks, to which the bars are fed by gravity from an inclined support disposed adjacent the track on which the trucks are arranged to travel. As shown, only one of the delivery trucks is power operated, the others being moved by the weight of the work thereon, which is sufficiently heavy to effect advancement of the same during movement of the power truck. The bars are clamped on the power truck and when the latter is advanced the ends of the bars are projected through the work support to a position at which the portions to be severed project within the V-openings of the receiving and unloading trucks. The severed sections are preferably clamped within one of the receiving trucks, after which said trucks are advanced to the unloading station, one by the power means provided and the other by the weight of the severed sections thereon. The clamping means is then removed and the elevating means operated to raise or lift the sections to a point at which they will be discharged for movement by gravity on the inclined platform into one of the compartments provided therebeneath.

Referring to the drawings, 10 represents a base having thereon at one end a V-shaped work holding block or support 11. Secured on the base at one side of the block is a support 12 for an upstanding bracket 13 having a plurality of rearwardly extending arms 14 overlying the V-shaped work support. The arms are each provided with a clamping screw 15 and the lower ends of the screws are provided with enlarged work engaging members, not shown, which overlie the V-shaped work support and serve to firmly clamp the work in position when the screws are properly adjusted. Between two of the clamping screws the support 11 is provided with a transverse

slot 16 for the reception of the saw or cutter 17 as shown in Fig. 1.

The saw is rotatably mounted on a slide 18 and is arranged to be driven by suitable gearing in a housing 19 carried by the slide. The gearing is preferably driven by an electric motor 20 having suitable driving connections therewith located in a gear box or housing 21 upon which the motor is mounted. A feed screw 22 is provided for reciprocating the slide to advance and retract the saw or cutter whereby to effect severing of the desired number of sections from the bars 23, which preferably constitute relatively long lengths of shafting to be cut up in equal or varying relatively short lengths as desired. However, the bars whether of metal or other material may be of varying shapes in cross section and may be cut in various lengths. The feed screw 22 is also driven by the motor 20 through suitable driving means, not shown. The main operating shaft for the driving mechanism within the housing is indicated at 24 (Fig. 2), its outer end being journaled in an upstanding arm 25 suitably secured to the base 10. The shaft 24 is preferably driven by a chain and sprocket drive connected with the motor shaft and enclosed in a housing 26.

At the left side of the cutting mechanism as viewed in Figs. 1 and 2 is an inclined stand or platform 27 upon which the shafting or bars 23 are placed, ready for discharge by gravity to the trucks or carriers 28 and 29 shown at the left of Fig. 3, each of which has an upstanding V-shaped work receiving block 30. The power operated truck 28 is provided with detachable side members 27^a which are designed to be interchangeably secured to the trucks 29. A yoke 28^a is pivoted to one of the side members and is connected with the other by a removable pin 29^a. A clamping screw 30^a is threaded through the yoke for clamping the work within the V-shaped block 30. The shafts are held upon the inclined platform 27 by detachable pins 31, which when removed permit the shafts to roll downwardly into the upstanding V-shaped portions of the trucks. The trucks at this time are positioned at suitable points opposite the inclined platform and at such distances apart as to insure an approximate equalization of the load thereon. The trucks are preferably of the four-wheel type, the wheels being indicated at 32 and arranged to travel upon a suitable track, preferably comprising a pair of rails 33 supported at the desired height by a plurality of standards 34, which are preferably connected by cross-tie members, one of which is indicated at 35 in Fig. 1. The inner ends of the rails are carried by suitable supports 36 on the base 10 as shown in Fig. 1. The work advancing trucks 28 and 29 are similar in construction, the only difference being that the power operated truck 28 has a downwardly extending portion 37 with which is

suitably connected the upper flight of a sprocket chain 38 disposed centrally of and between the rails 33. The chain at the outer end of the track travels on a sprocket 39 supported by suitable means carried by the cross-tie member 35 of the outer standard 34. The chain at its inner end engages a sprocket 40 on a shaft 41 journaled in suitable bearings 42. The shaft adjacent its forward end carries a sprocket 43 on which travels a driving chain 44 driven by a sprocket 45 on a shaft 46 journaled in suitable bearings 47 on the gear box 48 which houses the clutch mechanism hereinafter described.

The unloading trucks or carriers for receiving and unloading the severed sections of the bars are indicated generally at 49 and 50, the former preferably comprising the power operated truck and the latter being moved therewith simultaneously by the weight thereon of the severed sections of the bars. The trucks 49 and 50 are also of the four-wheel type, the wheels 51 of which are mounted on a suitable track preferably comprising a pair of rails 52, the inner ends of which are carried by suitable supports 53 on the base 10. A number of H-shaped standards or frames 54 serve to support said rails at different points as indicated in Figs. 2 and 3. The truck 49, as stated above, is preferably power operated between the unloading station and the point which it occupies when in position to receive the overhanging ends of the bars projecting through the work support 11 in position to be severed by the cutter. The truck 50 may be manually or otherwise adjusted to the correct position upon the track with respect to the power truck, whereby it will be at the proper distance from the latter to receive its share of the weight of the several sections severed from the bar material at each operation of the cutter. The weight on the truck 50 will be sufficient to advance it to the unloading station when the power truck is shifted from receiving to unloading position. By mounting the unloading trucks for independent movement on the track, one can be adjusted relative to another to properly accommodate sections of different lengths to be cut from the bars.

The trucks 49 and 50 when unloaded, as hereinafter set forth, discharge the severed sections of the bars at the receiving station for movement by gravity to one or another of the several compartments 55 of a stand or platform indicated generally at 56 in Figs. 1 and 2, which may be constructed in any suitable manner. The compartments 55 are each closed by a door 57, hinged at its rear side to the framework of the stand as shown in Fig. 2. Each compartment 55 may be filled by opening the door thereto and allowing the severed bar sections to roll therein when discharged from the unloading trucks.

The trucks 49 and 50 are similar in con-

struction and a description of one will suffice for the other, the power truck 49 differing from the truck 50 only in that it is connected with power operated means for moving it back and forth on the track. It also carries a clamping device for the work which may be applied to the truck 50 if desired, or if preferred, both trucks may be provided with the same type of clamping device.

The truck 49 comprises a base 58 having trunnions at its opposite sides on which the wheels 51 are journaled for travel on the rails 52 as shown in Figs. 6 and 7. Mounted on the base 58 is a V-shaped block or body 59 having opposed inclined portions 60 and 61 for receiving the severed bar sections 62a as shown in Fig. 6. The block or body 59 carries at one side thereof a housing 62 for a gear 63 on a shaft 64 journaled in the walls of the housing. A guideway 65 is formed in the block for the reception of a rack bar 66, the teeth of which mesh with those of the gear 63. An elevator or ejector 67 is bolted to one side of the rack bar for movement thereby from the normal position shown in Fig. 6 to the unloading position shown in Fig. 7. The elevator has a projecting portion 68 arranged to travel in a guideway formed between the side wall of the block 59 and a plate 69 secured thereto by bolts 70. The elevator 67 has an inclined portion 71 substantially parallel to the inclined portion 60 of the block 59. The elevator also has an inclined portion 72 which when the elevator is in the position shown in Fig. 7 is substantially flush with a correspondingly inclined flange or plate portion 73 rigid on and projecting rearwardly from the block 59 into substantial alinement with the doors of the platform shown in Fig. 2, so that in raising the elevator to the position shown in Fig. 7 the severed sections 62 will roll down the incline 73 for delivery into one or the other of the compartments 55 depending on which of the doors 57 is in raised position. It will be understood that while the elevator is being raised the inclined portion 71 thereof will cause the severed sections 62 which lie on the inclined face 61, to travel upwardly thereon while at the same time the remaining sections will also be elevated and all will be brought to the position at which they can be discharged by gravity down the incline 73 to the receiving stand or platform.

The ends of the bars 23 are clamped upon the power truck or holder 49 when both trucks or holders are in position to receive said ends, which are projected through the work support 11 to the right of the saw or cutter indicated in Fig. 1. The bars will at the same time be clamped within the V-shaped work support 11 on both sides of the slot 16 by the clamping screws 15. After said ends have been severed the power operated truck or holder 49 is moved to the

position shown in Fig. 1 during which time the truck or holder 50 will be moved by the weight of the load thereon and upon removing the clamping yoke 74 of the power operated truck 49 the elevators can be operated to raise the severed sections which will be discharged from the unloading trucks as stated above.

The work holding trucks 28 and 29 will then be advanced another step to project the bars through the V-shaped support 11 into the V-blocks of the trucks 49 and 50, and the saw is then advanced to again sever sections of the desired lengths from the bars. It will be understood that the bars 23 will be held upon the trucks 28 and 29 by one or more of the clamping devices shown in Fig. 19. However, only one is provided and this is carried by the power truck 28.

The work clamping device shown in Fig. 6 is of the quick detachable type and comprises a yoke-shaped member 74, having an operating handle 75 at its front end and being forked at its rear end to receive a supporting member 76 to which it is pivoted at 77 for a limited rocking movement about the axis of the pivot. The lower end of the member 76 is provided with an inwardly projecting lug 78 adapted to interlock with a correspondingly shaped lug 79 on the truck body 59 as shown in Fig. 6. A shelf-like member 80 projects rearwardly from the block 59 and forms a rest for the lower end of the member 76 when positioning it for engagement with the lug 79. The forward end of the pivoted member 74 is provided with an inwardly projecting lug 81 adapted to engage under a lug 82 on the block 59 when the clamping device is in the position shown in Fig. 6. A screw 83 is threaded through the yoke 74 and carries on its lower end a work engaging member 84 for clamping the work within the V-shaped block. The head 85 of the screw is adapted to receive a suitable wrench for turning the screw which tends to elevate the yoke 74 thereby tightly drawing the lugs 78 and 81 into engagement with the lugs 79 and 82 respectively. The yoke 74 is recessed at 83a to permit the upper end of the member 76 to swing into the recess against the action of a spring 84a which tends to hold the parts in the position shown. In detaching the clamping device, the clamping member 84 is first loosened by turning the screw 83 a slight amount after which the member 76 is free to drop to the shelf 80 and the lug 81 into lowered position to a seat 85 on the top of the gear housing 62. By gripping the handle 75 the operator can at the same time pull the yoke forwardly and swing it upwardly to effect its release from the body of the truck.

The elevators are raised by means of the power shaft 86 extending longitudinally be-

tween the rails 52 and journaled in a pair of bearings 87 depending from the base block 58 of each unloading truck. A sprocket 88 is keyed on the shaft between the lugs 87 and carries a sprocket chain 89, which drives the sprocket 90 on the shaft 64, which drives the gear 63 meshing with the teeth of the rack 66 whereby the elevators 67 are raised and lowered. The sprocket 88 while being keyed upon the power shaft 86 for rotation in opposite directions thereby is free to slide longitudinally of the shaft since the key or spline is free to travel within the groove 91 of the shaft. The shaft at its outer end is journaled in a suitable bearing member 92 extending transversely of the rails 52 as shown in Fig. 1. The inner end of the shaft is journaled in a suitable bearing 93 on a bracket 94 bolted to a base plate 95 extending beneath the rails 52 and also the gear box 48. The plate 95 is supported by a pair of frame members 96 as shown in Figs. 9 and 10. The shaft 86 carries a worm wheel 97 meshing with a worm 98 on a transverse shaft 99 journaled in a bearing 94a of the bracket 94 and having on its inner end a gear 100 keyed on the shaft 99, Fig. 10, and driven by means hereinafter described.

The means for moving the power truck 49 between the work receiving and unloading stations comprises preferably a chain 101 connected by a bolt 102 to the bottom of one of the depending bearings 87 for the power shaft 86 as shown in Fig. 4. The chain at the outer end of the track 52 is supported by a sprocket 103 journaled on a bracket 104 supported by the outer standard 54, Figs. 1 and 3. At the inner end of the track the chain engages a driving sprocket 105 on a short transverse shaft 106 journaled in the bearing portion 94a of the bracket 94, Figs. 8 and 10, and having at its front end a gear 107 driven by one of the clutch mechanisms hereinafter described.

The clutch drive for raising and lowering the elevators of the trucks 49 and 50, through operation of the power shaft 86, the worm shaft 99 and the gear 100 thereon will now be described. The gear 100 meshes with an idler 108 on a main drive shaft 109 having its opposite ends journaled in suitable bearings on opposite side walls of the gear box 48 as shown in Fig. 13. The idler 108 is driven by a gear 110 fixed on a shaft 111 having its opposite ends journaled in suitable bearings on said walls. The shaft 111 carries a pair of gears 112 and 113 loosely mounted thereon and adapted to be continuously driven as hereinafter set forth. The clutch for connecting gear 112 with shaft 111 serves to rotate the latter in one direction to effect raising of the elevators through rotation of the idler 108 and gear 100 on the worm shaft 99. The gear 113 when clutched with the shaft 111 will rotate the latter in an

opposite direction to lower the elevators through reverse operation of gears 110, 108 and 100.

Each of the gears 112 and 113 is provided with a clutch band 114 disposed within the gear and split as indicated in Fig. 18 to receive the expanding jaws 115 disposed between the split ends of the band and pivoted at 116 to swing outwardly when the wedge shaped member 117 is forced therebetween, said jaws being held spaced apart by a pin 118 to permit the reduced end of the wedge to enter the opening between the jaws.

It will be understood that the clutch parts associated with the gear 113 are the same as those for the gear 112 shown in Fig. 18, and that the left hand end of the wedge shown in this figure will operate the left hand clutch band in the manner explained above. The pins 116 and 118 are suitably secured in the ends of a driving member 119 keyed on the shaft 11 and having its ends encircling the hubs of the gears 112 and 113 as shown in Fig. 13. A sliding spool or operating member 120 is keyed upon and mounted for back and forth movement on the driving member 119 to effect movement of the wedge 117 whereby to clutch either of the gears to the driving member depending on whether or not it is desired to raise or lower the truck elevators. The wedge 117 and the pivoted jaws 115 rest on a flattened portion 121 of the driving member and the wedge is disposed within the spool 120 and secured thereto by screws 122 as shown in Figs. 13 and 18.

The gear 112 is continuously driven by a pinion 123 on the drive shaft 109, and the gear 113 is continuously driven by a pinion 124 on a shaft 125 having a gear 126 continuously driven by a gear 127 on the drive shaft 109, Figs. 13 and 16. It will be seen, therefore, that movement of the spool 120 to the right as viewed in Fig. 13 will effect rotation of the shaft 111 to raise the elevators and that movement of the spool to the left will clutch the gear 113 to the shaft 111 and cause it to rotate in a reverse direction to effect lowering of the elevators.

The spool is operated by a lever 128 pivoted at 129 to a bracket 130 on the gear box 48. The lower end of the lever engages a slide 131 having a tongue 132 projecting into the groove of the spool 120 to effect back and forth movement thereof when the lever is moved in opposite directions.

The clutch for controlling movement of the work advancing truck 28 back and forth on its track and the one for controlling the back and forth movement of the unloading truck 49 is similar in construction to the clutch above described. A detailed description of these clutch mechanisms will not therefore be required, but a description will be given of the gearing for each and the control levers

therefor. The relative positions of the three separate clutches is best shown in Fig. 14.

The unloading truck drive will first be described, it being remembered that this truck is moved back and forth by the chain 101 on sprocket 105 which is keyed to shaft 106 having a gear 107 thereon. The gear 107 meshes with the gear 133 on a shaft 134 paralleling shaft 111. This shaft carries gears 135 and 136 corresponding respectively to gears 112 and 113 shown in Fig. 13. Gear 135 is driven by the pinion 123 on shaft 109 and gear 136 by a pinion 137 on a shaft 138 having fixed thereon a gear 139 meshing with and driven by gear 127 on drive shaft 109.

Operation of the clutch for controlling the movement of the power truck is effected by a lever 140 pivoted at 141 and having pivotal connection at its lower end with a slide 142 carrying a laterally projecting tongue 143 extending into the groove of the clutch operating spool 144 which is of similar construction to the spool 120 shown in Fig. 13.

The clutch for driving the chain 38 which moves the work advancing truck 28 back and forth on the rails 23, as previously stated, is similar to the clutch described above. This clutch is mounted on a shaft 145 having on its front end a sprocket 146 for driving a chain 147 which in turn drives a sprocket 148 on shaft 43, Figs. 8 and 9. Shaft 46 carries a sprocket 45 serving to drive chain 44 engaging the sprocket 43 on shaft 41 which carries the sprocket 40 for driving the chain 38. The shaft 145 has loosely mounted thereon two gears corresponding to gears 112 and 113, one of which is indicated at 149 in Fig. 14, this gear being in mesh with and driven by pinion 123 on shaft 109. The other gear is indicated at 150 in Fig. 15 and is driven by a pinion 151 on a shaft 152 on which is fixed a gear 153 driven by gear 127 on the drive shaft 109. Gears 149 and 150 are rotated continuously on shaft 145 and are alternately coupled therewith by a clutch similar to that shown in Figs. 13 and 18 which is operated by a lever 154 pivoted at 155 and having its lower end pivotally connected with a slide 156 carrying an inwardly projecting tongue 157 engaging in the groove of a clutch operating spool similar to that shown at 120 in Fig. 13.

The drive shaft 109 has secured thereon a sprocket 158 driven by a chain 159 which in turn is driven by a sprocket 160 on the shaft 161 of an electric motor 162 shown in Figs. 1 and 3. A housing 163 is provided for enclosing said chain and sprockets as shown in Fig. 3 but is omitted in Fig. 1.

In order to permit of the shifting of the unloading truck 49 by manually operated means when desired the clutch driven shaft 134 is provided with a sprocket 164 on its front end to be driven by a chain 165 which in turn is driven by a sprocket 166 on a shaft 167 journalled in a sleeve bearing 168 on the

gear box 48, Fig. 10. The shaft 167 has on its end a crank 169 carrying a pin 170 arranged to take into any one of a series of holes, not shown, formed in the outer face of the head 171 which is rigid on the shaft. A spring 172 serves to normally hold the crank in the position shown in Fig. 10 but when it is desired to rotate shaft 167, the crank will be forced inwardly to move the pin 170 into one of the holes in the head 171 and the operator will then turn the crank to effect rotation of the shaft 134 to rotate gear 133 on its rear end which in turn will rotate gear 107, shaft 106 and sprocket 105 for driving chain 101.

For effecting manual operation of the chain 38 which is connected with the work advancing truck 28, shaft 41 is provided with the same operating parts shown for effecting rotation of the shaft 167, namely, the crank 169, pin 170, head 171 and spring 172.

A safety stop mechanism is provided for limiting the up and down movement of the elevator 67 on the trucks 49 and 50 which automatically effects reversal of the shaft 86 when the elevators reach their extreme positions as shown in Figs. 6 and 7. The automatic clutch releasing mechanism is shown in Figs. 11 and 13 and comprises a pinion 173 on the front end of shaft 111 which meshes with an idler 174 on a bearing 175 carried by a bracket 176 suitably connected with the gear box 48. The idler 174 meshes with a gear 177 on a feed screw 178 journaled at its outer end in a bearing carried by the bracket 176 and having its inner end threaded into a nut 179 disposed in a pocket 180 of a slide 181 guided by the bracket 130 on which the lever 128 is pivoted, as shown in Figs. 10 and 11. The slide is provided with openings 182 at the opposite ends of the nut 179 for the reception of the screw. The slide has a longitudinally extending slot 183 through which the lever 128 projects. At the opposite ends of the slot are adjustable set screws 184 and 185 which are adapted to engage the opposite edges of the lever 128 to return the same to normal clutch release position. In the operation of this device, if the lower end of the lever 128 is moved to the right from the position shown in Fig. 13 to couple gear 112 with shaft 111, the latter will rotate pinion 173 idler 174 and gear 177 to turn screw 178 in a direction to move the slide 181 to the left. While the operator is holding the lever to maintain the clutch in coupled position with respect to gear 112, the set screw 185 will be advancing toward the lever and by the time the elevator reaches its uppermost position, the screw will have engaged and returned the lever to normal position, thus effecting release of the clutch. The slide 181 will then be in reverse position from that shown in Fig. 13. If the lever is then moved in the opposite direction

to effect lowering of the elevator, the clutch will couple gear 113 with shaft 111 to reverse the operation of the same whereby to lower the elevator to the position shown in Fig. 6. Reverse rotation of the shaft 111 will drive the pinion 173 in a direction to effect reversal of the screw 178 and the set screw 184 will then be advanced by the slide 181 to automatically return the lever to normal clutch releasing position. In this way the elevator is prevented from passing or moving beyond predetermined limits in its up and down movement.

Means is provided for clamping the work advancing trucks 29 and the unloading truck 50 to their respective tracks when they are adjusted to the desired positions. This means is indicated in Fig. 5 and comprises a clamp 186 adapted to engage the under side of the head of the rail as shown. A clamping screw 187 extends through the member 186 and is threaded into a member 188 suitably secured to the lower portion of the truck 50 at one side thereof as shown. The head of the screw 187 is preferably squared to receive a wrench 189 for tightening and loosening the screw when desired. Similar clamping devices may be readily applied to the work advancing trucks 29 shown at the left of Fig. 3.

In the operation of the machine, the trucks 28 and 29 are spaced a suitable distance apart to receive the bars or shafting 23, the desired number of which are allowed to roll into the V-shaped holders on the trucks upon removal of the pins 31 from the platform 27, Fig. 1. The yoke 28^a is then swung into position and the screw 30^a is turned to clamp the bars within the V-holders 30. The trucks 49 and 50 are moved to position to receive the ends of the bars which project through the V-shaped work support 11 when the trucks 28 and 29 are advanced to the proper position on the rails 33. Operation of truck is effected upon moving clutch lever 154 to connect the shaft 145 with the driving means for the chain 38 whereby the power truck 28 is advanced and likewise the trucks 29 by the weight of the load thereon as explained above. When the bars have been advanced to project the proper distance through the support 11 the clamping screws 15 are turned to clamp the bars within the support and at the same time operation of the screw 83 may be effected to clamp the projecting portions of the bars within the power truck 49. The motor 20 is then started and the slide 18 advanced to move the motor driven saw into engagement with the bars. As soon as the cutting operation is completed and the power truck 49 moved to its destination the clamping means on the power truck 49 is released to free the severed sections within the V-shaped holder thereon. Lever 140 is then operated to connect the clutch on shaft 134

with the latter whereby to operate the driving means for the chain 101 which is connected with and serves to move the power truck 49 back and forth between receiving and discharging positions. In moving the truck 49 to unloading position truck 50 will be advanced by the weight of the load thereon as explained above. When the trucks have traveled to a position opposite the platform 56 the clutch is released to discontinue operation of the chain 101. One of the closures 57 is then raised so that the severed sections 62 may roll into the compartment 55 beneath said closure. In operating the elevators on trucks 49 and 50 to unload the sections, lever 128 is moved to couple the clutch on shaft 111 which serves to operate the driving mechanism for shaft 86, which will move the elevators to the unloading position shown in Fig. 7. The clamping means on truck 49 has previously been released and the sections are free to be discharged onto the platform 56. By the time the elevator reaches its uppermost position the clutch on shaft 111 will be automatically moved to neutral position by the mechanism shown in Figs. 11 and 13 and described above. The clutch on shaft 111 is then moved to reverse position and the elevators are lowered to the position shown in Fig. 6. On reaching this position the safety means will again operate automatically to move the clutch to neutral position as described above.

It will be understood that the term, bar material and the like, employed in the claims is used in a broad sense and is intended to apply to any and all kinds of material from which sections can be cut with a machine of the present type.

The power truck 28 is usually placed on the outside of the auxiliary support trucks 29 at or near the end of the track so that the bars can be clamped near their extreme ends. The power truck 28 being outside of the auxiliary trucks will be limited in its movement toward the work support 11. However when it approaches its limits of travel the work can then be clamped in the power truck 49 and the latter employed to convey the work through the machine for severing by the cutting means.

The clutch mechanism described herein serves to control the movements both of the power trucks 28 and 49 on the opposite tracks and the movement of the elevators, the raising and lowering operations of which are automatically discontinued at the proper time by a portion of the clutch mechanism itself as described herein. It will be seen, therefore, that all of the operations relating to the movement of the work between the different stations by the different power units are afforded by the single operating motor 162 and that the control is afforded by unitary clutch mechanism which is auto-

matic with respect to certain of the operations.

One particular advantage of a machine of this type is that the operations can be effected without having to wait for the service of a loading crane which may be engaged in delivering materials at other points at the time it is desired to perform the operations of severing the sections from the stock. In other words, the platform can be stocked up from time to time when the crane is not being used for other purposes and the machine operated when desired to complete the severing and delivering operations, the latter taking place at any point desired along the track 52, as for example, at the station 56 where the severed sections are discharged by the elevators for delivery to any of the several different compartments 55 beneath the adjustable platform 57.

I claim as my invention:

1. In a metal cutting machine, a base, a cutter thereon for severing sections from bars or the like, a support for holding the bars during the cutting operations, means for advancing the bars step by step to the support, a track, a truck movable on the track and arranged at one point to receive the portions to be severed from the bars in advance of the severing operations, means for moving the truck to and from said point, a shaft on which the truck is free to slide when moved upon the track, an elevator on the truck for lifting the severed sections to effect discharge of the same from the truck, raising means for the elevator operated by said shaft driving means for said shaft including a reversible clutch, and means operated by a portion of the driving means, adapted to automatically move the clutch from both operating positions to neutral position when the elevator reaches its extreme upper and lower positions.

2. In a metal cutting machine, the combination of a base, a work support thereon, a cutter on the base for severing a plurality of sections from a work piece, means for advancing the work step by step into position upon the support for severance by the cutter, a truck for receiving the bars in advance of the severing operations, a track on which the truck is adapted to travel, a drive shaft paralleling the track, an elevator on the truck, a rack for raising the elevator, a shaft having a gear meshing with the teeth of the rack, a chain and sprocket drive between said shafts whereby the first mentioned shaft is made to drive the second mentioned shaft, means for effecting reverse rotation of the drive shaft to raise and lower the elevator, and means for moving the truck back and forth on the track.

3. In combination, a base, a cutter mounted thereon for severing sections from a work piece, a track at one side of the base, a truck for receiving the portions of the work to be

severed in advance of the severing operations arranged to travel on the track to and from receiving position, an elevator carried by the truck for lifting the sections to effect discharge of the same from the truck, a drive shaft paralleling the track and on which the truck is free to slide when moved back and forth on the track, means arranged to be driven by the shaft in any position of the truck to raise and lower the elevator, driving mechanism for the shaft including a reversible clutch, safety means operated by the driving mechanism adapted to automatically move the clutch to neutral position when the elevator reaches predetermined limits in its up and down movement, means for moving the truck back and forth on the track, and means for feeding the work to the cutter.

4. In a machine for cutting sections from bar material or the like, a work support, cutting means for severing sections from the bars, a track at one side of said cutting means, a work supporting truck comprising a recessed body for receiving the bars in advance of the severing operations and having wheels for supporting the body arranged to travel on the track, a bearing on the body, a rotary drive shaft journaled in the bearing, the latter being free to slide on the shaft when the truck is moved back and forth on the track, a rack bar mounted for vertical movement on the body, a shaft journaled on the body having a gear meshing with the teeth of the rack bar, sprockets on said shafts, a chain connecting said sprockets, the sprocket on the first mentioned shaft being free to slide thereon and arranged to be moved by the truck when traveling on the track, an elevator for the sections connected with the rack bar and arranged to effect discharge of the sections from the truck upon rotation of the shaft in one direction, driving means for the shaft and means for moving the truck upon the track.

5. A machine for severing sections from bar material and the like, comprising a work holder, cutting means for the work, carrying means for the severed sections arranged to advance them to a predetermined point and stationarily supported for holding the material during the severing operations, an ejector on the carrying means for discharging the severed sections therefrom at said point, power driven means, mechanism for moving the carrying means arranged to be actuated by the power driven means, actuating means for the ejector including a clutch arranged to be connected with the power driven means for operation thereby and means responsive to the power driven means for automatically disconnecting the clutch when the ejector is moved to a predetermined position upon the carrying means.

6. A machine for severing sections from bar material and the like, comprising a work

holder, cutting means, reciprocally mounted carrying means for conveying the sections from the cutting mean arranged to receive the portions of the material to be severed in advance of the severing operations, a device for ejecting the sections from the carrying means movable in opposite directions thereon, mechanism for reciprocating the carrying means, power driven means for operating said mechanism and operating means for the ejecting device including reversible driving means arranged to be connected with the power driven means for reverse operation thereby.

7. A machine for severing sections from bar material and the like, comprising a work holder, cutting means, carrying means for conveying the sections from the cutting means arranged to support the portion of the material to be cut during the cutting operations, a reciprocally mounted ejector for the sections movable between predetermined positions on the carrying means, mechanism for moving the carrying means to and from receiving position, power driven means for operating said mechanism, reversible operating means for the ejector including spaced driving elements arranged to be individually connected with said power driven means, a coupling movable from a neutral position to connect either of the driving elements with said power driven means and means operated by said power driven means arranged to return the coupling to neutral position subsequent to movement of the ejector from either of said predetermined positions to the other.

8. A machine for severing sections from bar material and the like, comprising a work holder, means for advancing the material step by step to the holder, cutting means carrying means for conveying the sections from the severing means stationarily supported in position to receive the sections when severed, an ejector for the work movable between predetermined positions upon the carrying means, mechanism for moving the carrying means in opposite directions to and from said receiving position, power driven means, reversible operating means for the ejector including spaced driving elements arranged to be individually connected with said power driven means, a coupling movable from a neutral position to connect either of the driving elements with said power driven means and means operated by said power driven means arranged to return the coupling to neutral position subsequent to movement of the ejector from either of said predetermined positions to the other.

9. A machine for severing sections from bar material and the like, comprising a base including holding means for the work, severing means for the work, means at one side of the holding means for advancing the work thereto for support thereby during the severing operations, a carriage at the opposite

side of the holding means arranged to support that portion of the work to be severed during operation of the severing means, means for moving the carriage in a direction away from the work receiving position to a predetermined position when the sections have been severed, elevating means on the carriage for moving the severed sections to effect their discharge from the carriage when the latter is at said predetermined position, constantly driven power means, reversible operating means for raising and lowering the elevating means arranged to be driven by said power means, and means responsive to a portion of said reversible operating means serving to discontinue operation of said reversible means by said power means when the elevating means approaches the limits of its up and down movements.

10. A machine for severing sections from bar material and the like, comprising supporting means for the work, means for severing the sections from the work, carrying means for the severed sections arranged to support the portions to be severed during operation of the severing means, means for moving the carrying means to and from position to receive and support said portions, an ejector on said carrying means for the severed sections movable back and forth between predetermined limits, constantly driven power means, operating means arranged for connection with said power means to move the ejector back and forth between said limits in a predetermined position of the carrying means, and means arranged to be actuated by a portion of the ejector operating means to discontinue operation of the same when the ejector approaches said limits.

11. A machine for severing sections from bar material and the like comprising supporting means for the work, means for severing the sections from the work, a carrier for the severed sections arranged to receive the portions of the work to be severed in advance of the severing operations, a support for the carrier upon which the latter is movable to and from said work receiving position, means for moving the carrier upon said support, an ejector on the carrier for the severed sections movable back and forth between predetermined limits, a reversible shaft upon which the carrier is free to move longitudinally, means arranged to be actuated by the shaft for moving the ejector between said limits, constantly driven power means, reversible operating means for said shaft arranged for connection with said power means for operation thereby in opposite directions, and means controlled by said reversible operating means arranged to discontinue operation of the latter when the ejector approaches its limits of movement.

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