C. W. DANGLEMEYER.

PORTABLE MILLING MACHINE.

APPLICATION FILED APR. 19, 1906.

900,149.

Patented Oct. 6, 1908.

4 SHEETS—SHEET 1.

Fig. 1.

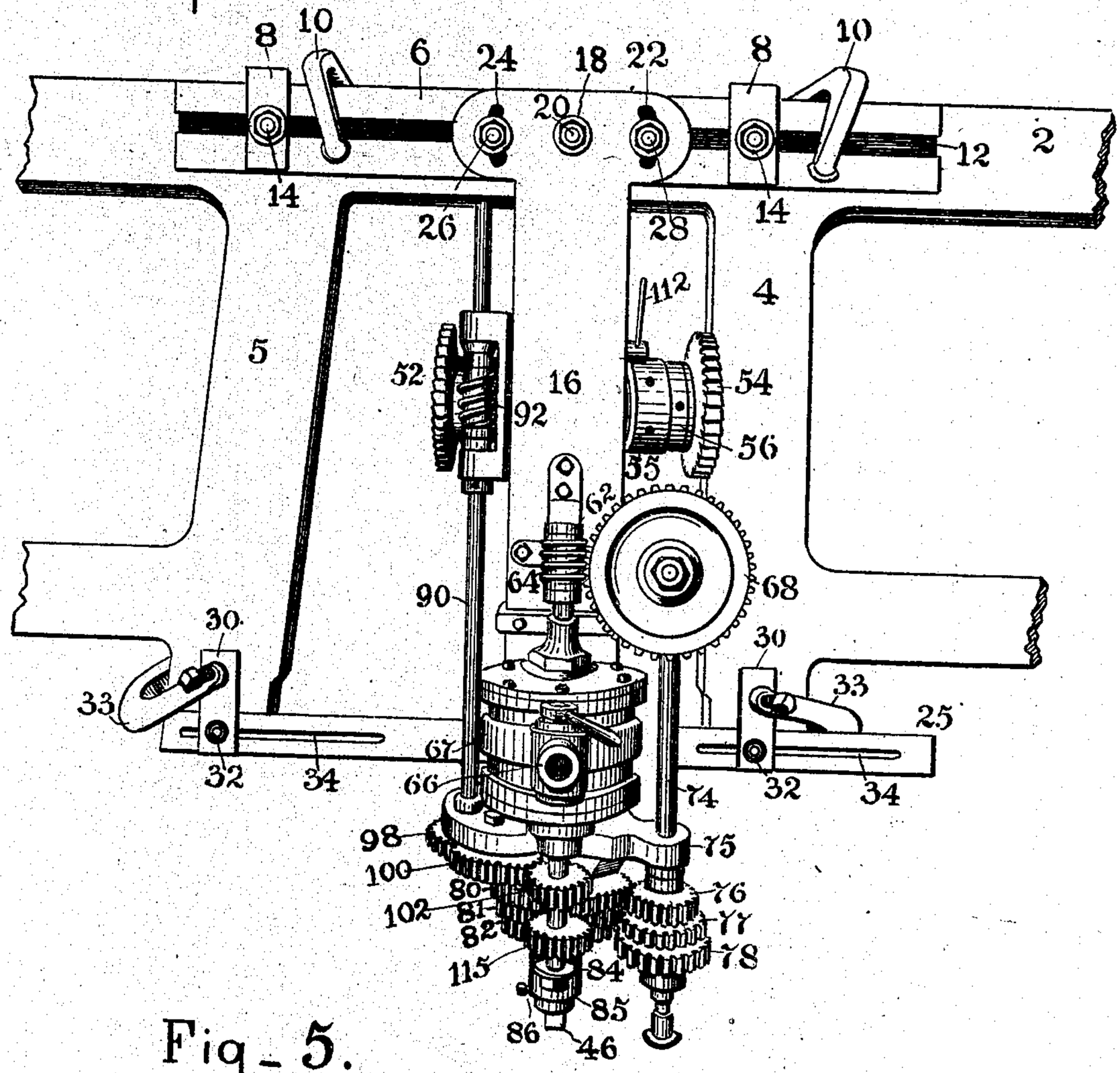
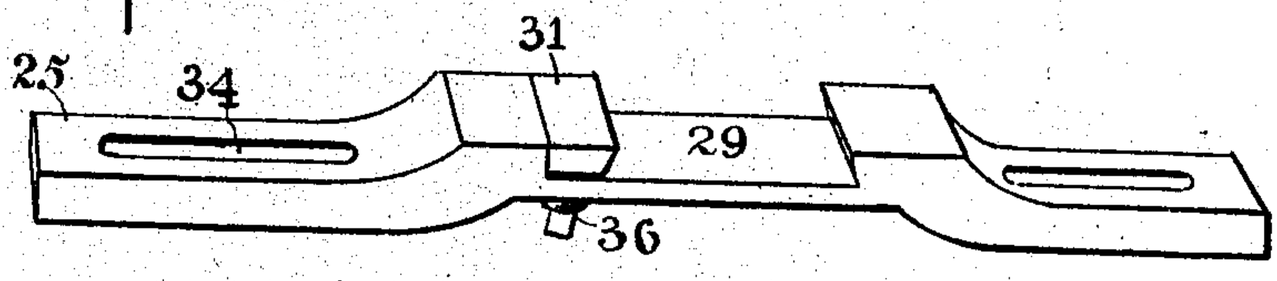


Fig. 5.



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4 SHEETS—SHEET 2.

Fig. 2.

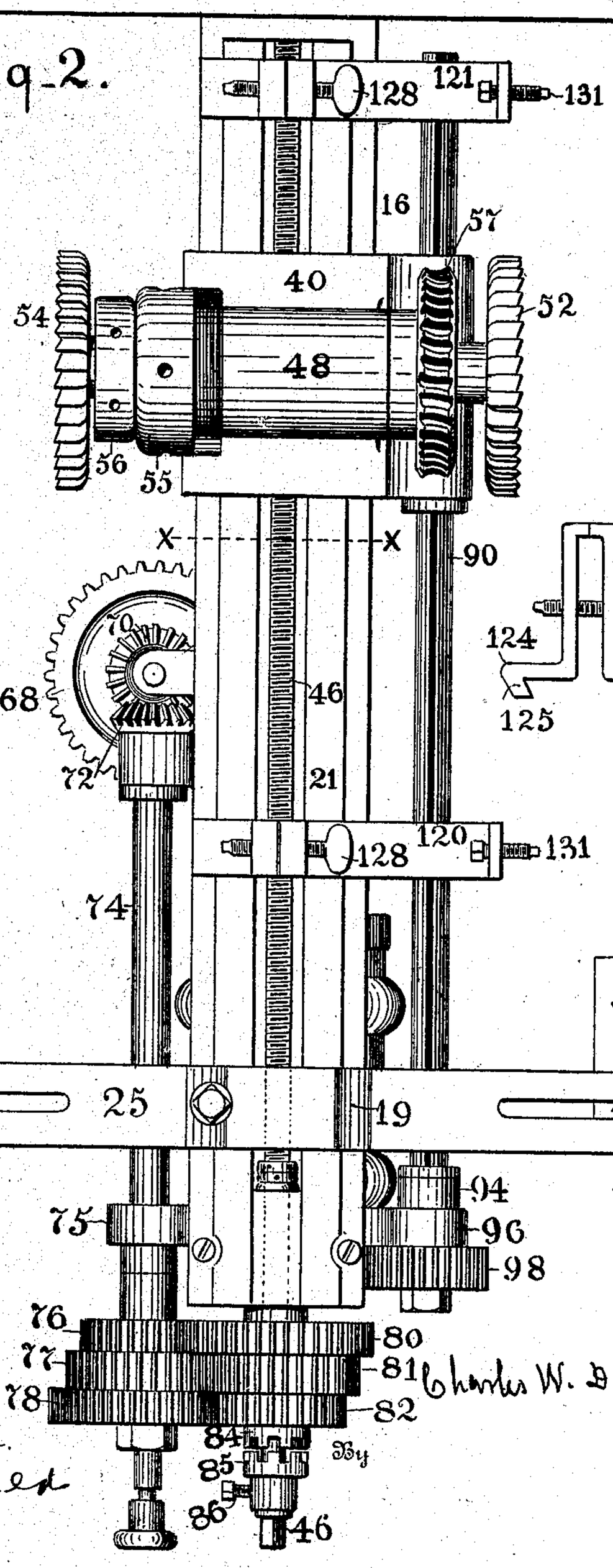
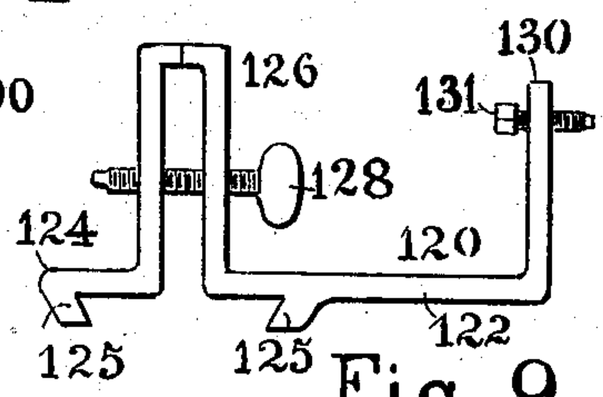


Fig. 9.



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4 SHEETS—SHEET 3.

Fig_3.

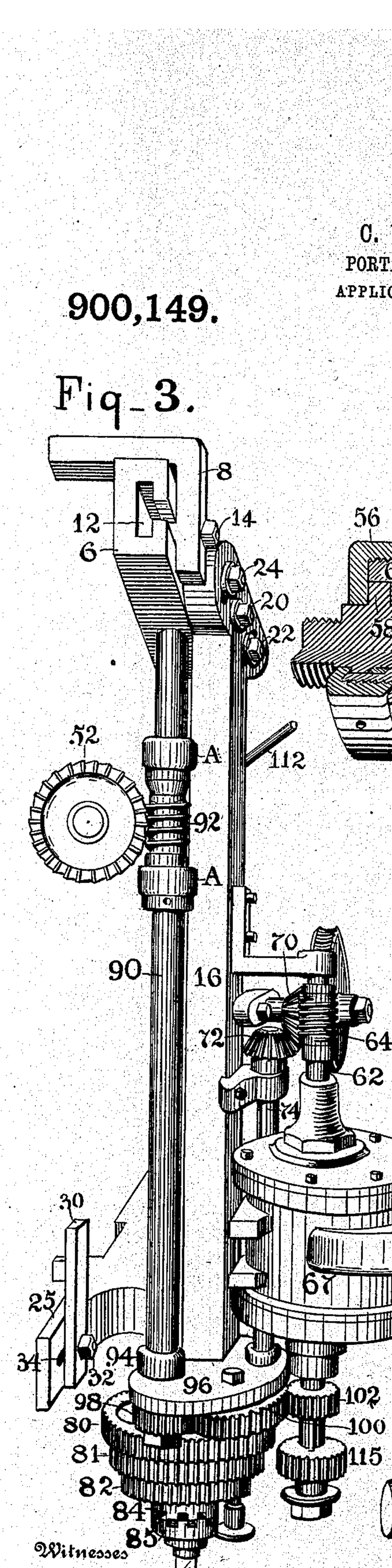


Fig_8.

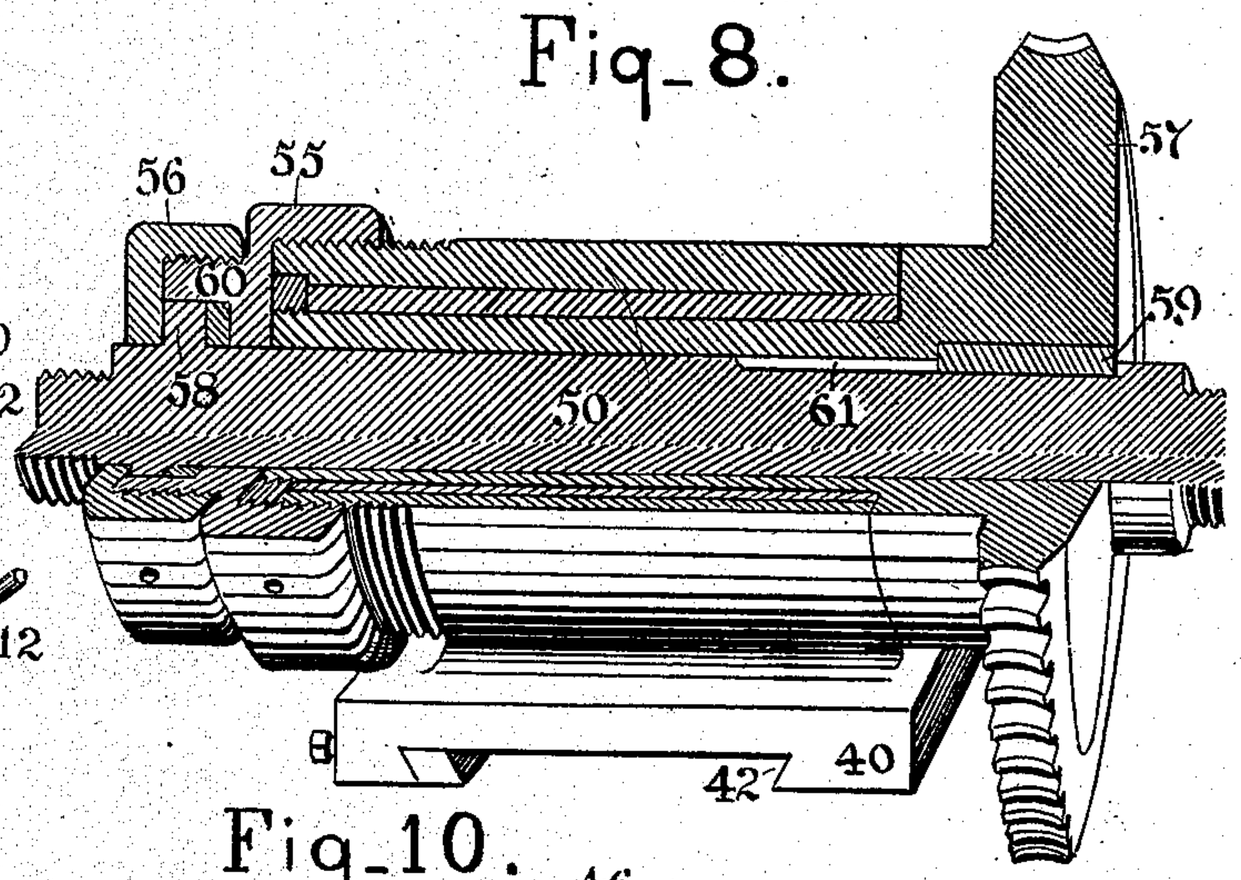


Fig_10.

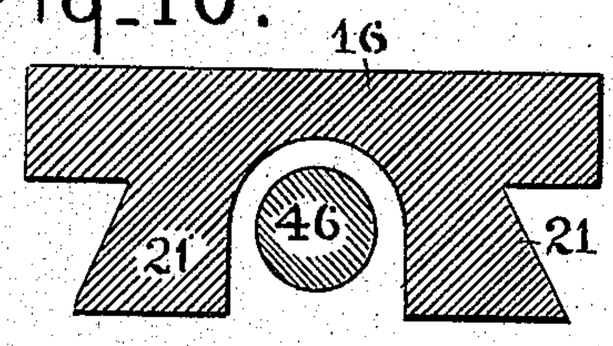


Fig_6.

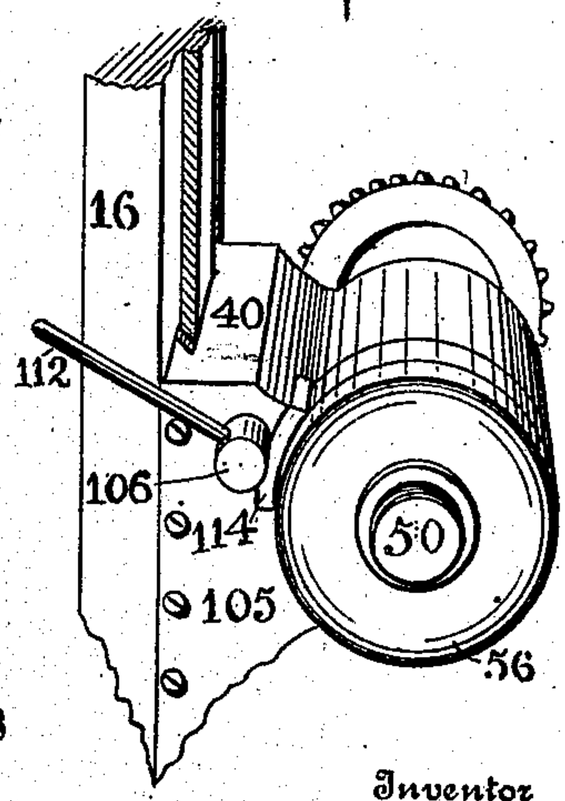
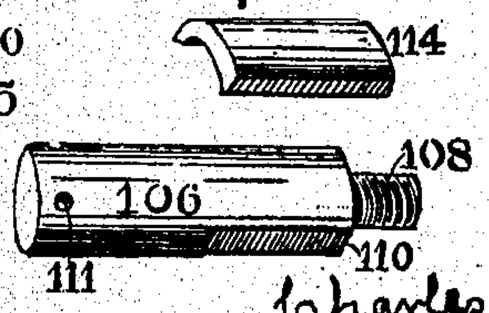


Fig_7.



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4 SHEETS—SHEET 4.

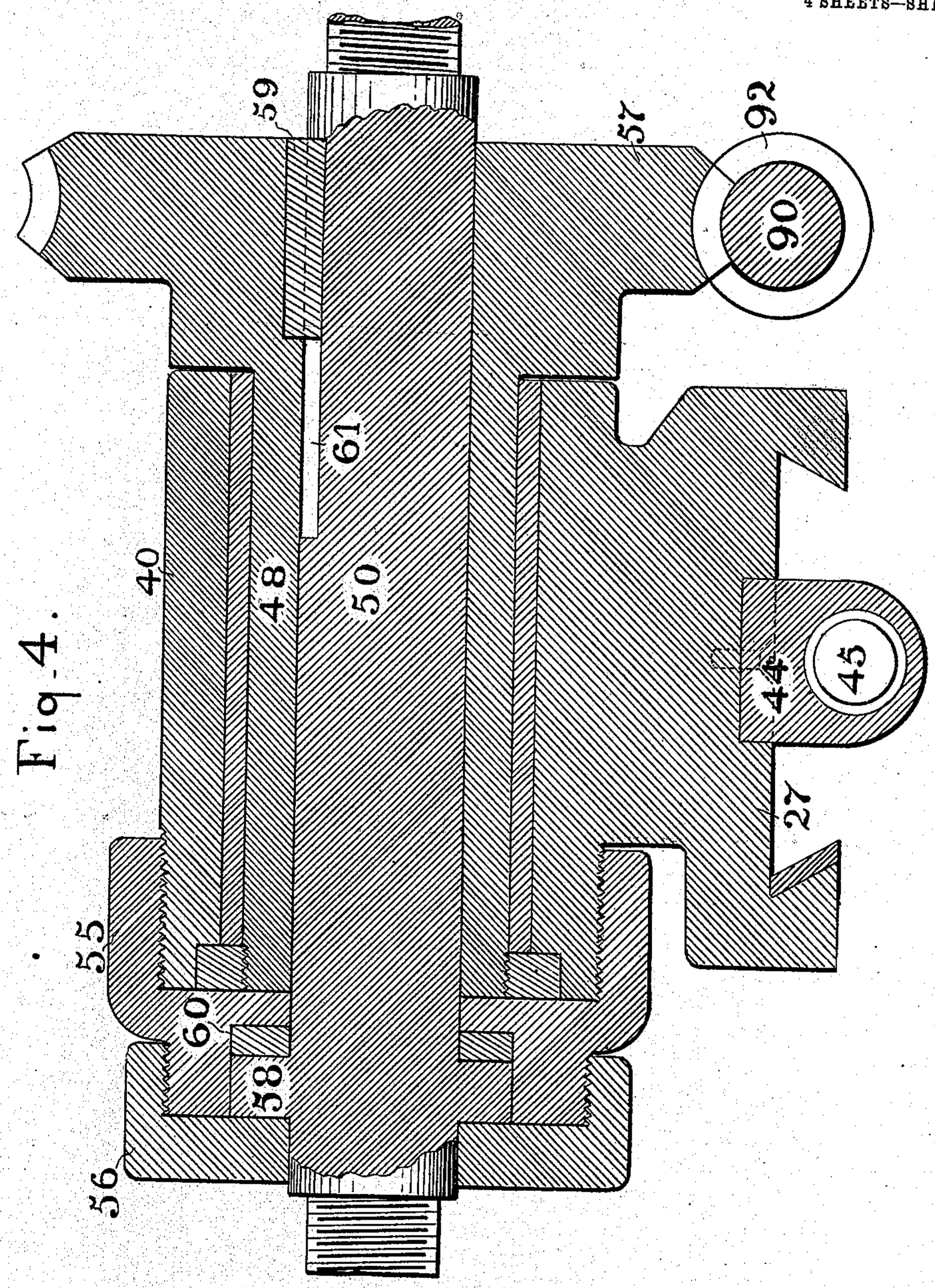

Fig. 4.

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UNITED STATES PATENT OFFICE.

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PORTABLE MILLING-MACHINE.

No. 900,149. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed April 19, 1906. Serial No. 312,708.

To all whom it may concern:

Be it known that I, CHARLES W. DANGLEMEYER, a citizen of the United States, and resident of Dubuque, in the county of Dubuque and State of Iowa, have invented new and useful Improvements in Portable Milling-Machines, of which the following is a specification.

My device relates to portable milling machines with special reference to such as are used in facing the jaws of the frames of locomotive engines, where it is necessary to change the angle of the machine to face or mill the jaws set at different angles to the frame of the engine; and the object is to provide a power machine which may be removably attached to the frame and jaws of the engine and, without removal therefrom, be adjusted in such a manner that the cutters will mill the face of the jaws at whatever angle they may be set with relation to the frame of the engine and make this adjustment accurately and without the aid of an expert mechanic.

The following specification will set out in detail the manner of construction and the mode of operation when taken in connection with the drawings accompanying the same and forming a part hereof.

Figure 1 is a plan view taken from the front of the device, when attached to the frame of an engine and jaws. Fig. 2 is a back view of the device removed from the engine frame. Fig. 3 is a side elevation of the device. Fig. 4 is a longitudinal section of the head together with the shaft that carries the cutters and its attachments. Fig. 5 is a perspective view of a cross-bar. Fig. 6 is a perspective view of a detail locking device. Fig. 7 is a perspective view of an attachment used with Fig. 6. Fig. 8 is a part perspective and part sectional view of the head with the shaft that carries the cutters and attachments for feeding the cutters. Fig. 9 is an end view of the device for setting the cutters parallel with the jaws. Fig. 10 is a cross section through line X—X of Fig. 2.

Like characters of reference denote corresponding parts in each of the figures.

Referring to the drawings 2 designates the frame of the engine, 4 one of the jaws set at right angles to the frame and 5 the other jaw set at a different angle. Upon the top of the frame 2 is hung a plate 6 by hangers 8 resting upon the frame and rigidly held to the frame 2 by the clamps 10. These clamps preferably consist of a bar of steel bent at each end, thus providing two arms, one of the arms of the clamp engages one side of the plate 6, and the other arm extends over on the opposite side of the engine frame and is held more rigidly by a screw (not shown) engaging the engine frame. The plate is provided with a T shaped or dove-tailed groove 12, in which the enlarged heads of bolts 14, for adjustably securing the hangers 8 to the plate 6, are adapted to slide and hold the plate upon the frame in any adjusted position. This is important as the adjustment must be exceedingly accurate and ofttimes the variation of a hundredth part of an inch is fatal to the facing, and in order to be quickly adjusted so that the cost of facing shall be materially reduced over the same work by hand, these accurate adjustments must be made quickly, and by means of the plate 6 being secured to the side of the engine frame the parallel adjustment is always maintained and the cutters always at right angles to the jaws of the engine frame to be milled, and then by the gages the accuracy of the engine adjustment is perfected and can be accomplished in a few minutes, and without the removal of the engine from the frame.

The milling device with the machinery for operating the same is attached to a frame 16, widened at the top and provided with an opening in the center through which a bolt 20, having its head in the groove 12 of the plate 6, firmly and adjustably holds the frame on the plate. Upon the opposite sides of the bolt 20 in the plate 6 are two oblong holes 22 and 24 in which are bolts 26 and 28 with the heads of said bolts in the groove 12.

The lower end of the frame 16 is bolted to a plate or cross-bar 25 to which are adjustably secured hangers 30 by bolts 32 in slots 34 in plate 25. This plate 25 is secured to the end of the jaws 4 and 5 by clamps 33 engaging the jaws and also the hangers 30. The rear of the frame 16 is increased in thickness at its center and beveled inward forming the male portion of a dove-tail 21. The plate 25 is bent at 19 and provided with the female dove-tail 29 which is adapted to slide over the dove-tail 21. It is also secured from any movement by a set screw 36 passing through the plate 25 into a block 31 in the dove-tail and in this manner it is securely held and can be adjusted by the set screw 36.

A head 40 with a dove-tail 42 correspond-

ing to the dove-tail of the plate 25 engages the dove-tail 21 in the frame 16 and slides thereon. In one side of the head 40 is secured a block 44 provided with a screw threaded opening 45, through which a screw 46, subsequently to be described, engages and operates to raise and lower the head. The head also consists of a sleeve 48 through which runs a shaft 50 which carries the cutters 52 and 54. Around the outer end of the head is a collar 55 which is screwed upon the head. The outer end of this collar is screw threaded and upon it is screwed a cap 56. One end of the shaft 50 is provided with a shoulder 58 and the collar 55 is provided with a shoulder 60 and by means of the collar 55 with its shoulder 60 contacting with the shoulder 58 on the shaft 50 and the cap 56 also contacting with the shoulder 58, the endwise adjustment of the shaft 50 and cutters carried thereon is accomplished. The other end of the sleeve is a worm gear; this gear may be a part of the sleeve or keyed on the sleeve. In the shaft 50 is a slot or key-way 61 and in the worm is also a slot and in these two slots is inserted a key 59, and when the cutters are adjusted horizontally with the shaft the key 59 travels in the slot 61. The outer edges of the cutters 52 and 54 are provided with cutting teeth whereby they engage the inner face of the jaws of the frame.

Against the frame 16 is secured a shaft 62 provided with a worm 64. Around this shaft is secured the power box 67 in which is located the turbine or power machinery (not shown). The preferable power is air and it is introduced by a flexible tube attached to the nozzle 66 of the box and adapted to rotate the shaft 62. The worm 64 meshes in with a gear 68. The back of the gear 68 is provided with a beveled gear 70 which meshes in with a beveled gear 72 secured to a shaft 74. This shaft extends down through or back of the plate 25 and through a collar 75 secured to the frame 16 and there is set on the lower part of the shaft 74 gears 76, 77 and 78 which mesh in with gears 80, 81 and 82 upon the screw 46. These gears 80, 81 and 82 are secured to a sleeve around the screw 46, terminating in a clutch 84 adapted to engage a similar clutch 85 upon the screw 46. The clutch is secured upon a screw shaft 46 by a set screw 86. Gears 76, 77, and 78, are speed changing gears, and are loosely mounted upon the shaft 74 and are independent of each other, the gear 76 meshes in with gear 80, gear 77 with 81 and 78 with 82, not all at the same time but according as it is desired to change the speed of the screw 46. The mode of bringing these different gears into action, is the usual mode of changing the speed by gears.

The cutters are operated by a shaft 90 provided with a worm 92 which meshes in with the worm gear 57, upon the shaft 50. The lower end of the shaft 90 is provided with a collar 94 which rests upon a box 96 and below the box the shaft is provided with a gear 98 which meshes into a gear 100 and this into a gear 102 on the shaft 62. The worm 92, is splined upon the shaft 90. The shaft has a longitudinal key-way on the back side, (not shown) the traveling length of the head 40 on the shaft. In the worm is fixed a key which slides in the key-way in the shaft. On both ends of the worm 92 are bearings which run in boxes A on the head 40.

For the purpose of lowering the head at a rapid speed after it has finished the milling, near the top of the jaws there is placed at the lower end of the shaft 62 a gear 115 which is movable longitudinally on the shaft and when raised it engages the gear 81 on the screw 46 and as the shaft 62 is rotated at a great speed it will rotate the screw 46 rapidly and lower the head.

For the purpose of locking the shaft 50 and preventing any endwise movement there is attached a lock 105 shown in Figs. 6 and 7 which consists of a cam shaped shaft 106 threaded on the end 108 by which it is screwed into and held in the cutter head. One side 110 is flattened and in the outer end is a hole 111 in which is inserted an operating handle 112. In connection with the foregoing, is a plate 114 curved to fit the outer surface of the collar 55 with which the shaft 106 engages when turned. In this manner when the shaft 106 is turned in one direction it presses the plate 114 upon the collar 55 and prevents it from being turned and thus holds the cutters rigidly in their adjusted position.

For the purpose of quickly and accurately adjusting the cutters 52 and 54 so that they will attack the jaws 4 and 5 of the frame, there is secured to the raised portion or dove-tail 21 of the frame 16 a gage 120 shown in Fig. 9. The gage is composed of two members 122 and 124 and each provided with a bevel or hook 125 adapted to engage the dove-tail 21 of the frame 16. Each member is bent and forms the rectangularly arranged arms 126. Through these arms passes a bolt or set screw 128 and holds them together and the hooks 125 rigidly in engagement with the dove-tail 21. The member 122 is further bent forming the arm 130. Through the arm 130 is a gage screw 131. There may be two of these gages 120 and 121.

It will be seen by this mode of constructing and associating the various parts of my device, that the cutters can be quickly and easily adjusted to attack and mill the jaws of the frame at any angle desired, and they can be adjusted without disturbing the cutters or moving the frame from the frame of the engine.

The manner of operating my device is substantially as follows: The hangers 8 are rig-

idly secured to a plate 6 by the screw bolts 14 and the machine is then hung on the frame 2 and clamps 10 secure the plate 6 to the frame 2 then the frame 16 with the machinery thereon is adjusted by moving the frame to one side till the screws 131 on the gages 120 and 121 come in contact with the jaw to be milled. When adjusted the bolts 20, 26 and 28 are tightened rigidly holding the frame 16 parallel with the jaw with one set of cutters nearly in engagement with the face of the jaw. The plate 25 is then adjusted and the clamps 33 are brought into engagement with the jaws and with the hangers 30, thus securing the lower end of the frame 16 to the jaws at the same angle as the jaw to be milled, then the collar 55 is operated which forces the shaft 50 with the cutter against the jaw to be milled by the cap 56 and the shoulder 60 upon the collar 55 engaging with the shoulder 58 on the shaft 50, and the operator grasps the handle 112 of the lock and partially rotates it which engages the plate 114 and forces it down upon the collar 55 and prevents any further movement of the collar. As the shaft 74 is rotated the gears 76, 77 and 78 mesh in with the gears 80, 81 and 82 and rotate the screw 46 which raises and lowers the head 40 upon the screw, and with it the cutters 52 and 54. The same rotation of the shaft 62 rotates the gear 102 which meshes in with the gear 100 and this with the gear 98 and rotates the shaft 90 and the worm 92 upon the shaft 90 engages with the worm gear 57 upon the shaft 50 and rotates said shaft and with it the cutters 52 and 54. Power then applied to the power box 67 through the nozzle 66 rotates the worm 64 upon the shaft 62 and also rotates the gear 70 and the gear 72 and with it the shaft 74. The clutch 85 is then brought into engagement with the clutch 84 and is held by a set screw 86 and the rotation of the gear 57 rotates the shaft 50 and with it the cutters. When it is desired to mill the jaw 5 which sets at an angle to the frame, after having milled the jaw 4, the bolts 20, 26 and 28 are loosened and the frame 16 with the machinery thereon, is adjusted to the other side till the face of the cutter 52 is in a plane parallel with the face of the jaw to be milled, and the gages 120 and 121 are in contact with the jaw 5 and the frame parallel with the jaw 5; then the bolts 20, 26 and 28 and the clamps 33 are tightened rigidly holding the frame with the cutters thereon in position to attack and mill the face of the angled jaw. The lock is then reversed, and the cutter 52 is adjusted the same manner as above described, and the collar is again locked. After one jaw has been milled and the cutters are at the top, then they may be lowered quickly by raising the gear 115 on the shaft 62 till it comes into engagement with the gear 80 on the screw 46 and as the shaft 62 rotates rapidly it will rotate the screw 46 rapidly and lower the head and with it the cutters at the same rate of speed. It will be observed, that in this manner the cutters may be adjusted to mill the jaws at whatever angle the jaws may be set and also that the machine can be quickly and accurately adjusted and need not be removed from the frame of the engine, at any time during the entire facing of both of the jaws.

Having now described my invention, what I claim is:

1. In a device of the character described, a plate provided with a longitudinal T shaped groove therein, means for attaching said plate to the side of the frame of an engine by engagement with the groove, a frame carrying cutters and adapted to be adjustably attached to the plate in the groove, and means secured to the frame for driving the cutters.

2. In a device of the character described, a plate provided with a longitudinal groove and adapted to be adjustably and removably secured to the side of and parallel with the frame of an engine by hangers adjustably secured in the groove and loosely engaging the engine frame, clamps engaging one side of the engine frame and the opposite side of the plate, a frame carrying cutters with machinery rigidly fixed on the frame for operating the same and adjustably attached in the groove of the plate, a head carrying cutters one cutter upon each side of the frame adapted to attack and mill the face of the jaws of the frame, means attached to the frame for rotating the cutters, a screw engaging the head, and means attached to the frame for rotating the screw to raise and lower the head that carries the cutters.

3. In a device of the character described, a plate provided with a T shaped groove therein adapted to be secured to the frame of an engine, means for adjustably securing the plate on one side of the frame of an engine and parallel with the said engine frame, a frame carrying a head and provided with a dovetail along its longitudinal center, a head carrying cutters attached by a dovetail on the head engaging the dovetail on the frame that carries the head, means for adjusting the cutters on the head to attack the jaws of an engine frame in whatever angle the jaws are set to the said frame and means attached to the frame carrying the cutters for operating the cutters when attacking the jaws of an engine frame at an angle.

4. In a device of the character described, a plate provided with a longitudinal T shaped groove, means for adjustably and removably attaching the plate to the side of the engine frame and parallel therewith consisting of hangers secured in said groove and adapted to loosely engage the top of the frame of the engine, and clamps engaging the frame and the plate, in combination with a frame provided with slotted openings therein, bolts for removably and adjustably attaching the

frame to the plate in the longitudinal groove through the slotted openings, cutters attached to the frame, and means carried by the frame for driving and operating the cutters.

5. In a device of the character described, a plate provided with a longitudinal T shaped groove, means for removably and adjustably attaching the plate to the frame of an engine consisting of hangers secured to the groove of the plate and engaging the top of the frame of the engine, and clamps adapted to engage the frame of the engine and the plate and securely clamp them together, in combination with a frame thickened in its longitudinal center and provided with a male dovetail and with slotted openings in its top, means for removably and adjustably attaching said frame to said plate by bolts through said slotted openings and engaging said longitudinal groove in the plate, whereby the frame is adjustably held parallel with the engine frame and the cutters on the frame at right angles to the frame of the engine, a head carrying cutters adapted to slide on the frame in engagement with the dovetail on the frame, and means carried by the frame for driving and operating the cutters.

6. In a device of the character described, a frame means for adjustably attaching the frame to the frame of an engine, a head carrying cutters slidably secured on the frame, means for adjusting the cutters longitudinally, and means for locking the cutters in their adjusted position consisting of a collar on the head, a cap on the head adapted to engage the collar, a cam shaped shaft secured in the cutter head, a plate beneath the cam and resting on and engaging the adjusting collar.

7. In a device of the character described, a plate adjustably attached to the frame of an engine, a frame provided with a dovetail on one side and adjustably attached to the plate, a cutter head secured to the frame, a shaft journaled in the head, a cutter on each end of the shaft, a gage provided with a dove-tail and adapted to be adjusted on the dovetail of the frame for adjusting the frame to correspond with the angle of the jaws to be milled, a screw for raising and lowering the head, and means attached to the frame for rotating the cutters and the screw.

8. In a device of the character described, a frame carrying cutters provided with a longitudinal dovetail, means for adjustably attaching the frame to the frame of an engine, means secured to the frame for operating the cutters, a gage consisting of two members each provided with a hook adapted to engage the opposite edges of the dovetail on the frame, means for holding the two members with their hooks in engagement with the dovetail on the frame at any adjusted position along the frame, and means connected with the members for adjusting the frame and with it the cutters to operative positions relative to the angle of the jaws.

9. In a device of the character described, a plate adapted to be adjustably attached to the side of the frame of an engine and parallel therewith, a frame carrying cutters and provided with a dovetail and adjustably attached to the plate and adapted to be manually shifted at any angle to the jaw to be milled, a second plate provided with a dovetail adapted to engage the dovetail of the frame that carries the cutters and to be adjusted to any position along said frame, means for adjustably holding said second plate in the dovetail of said frame, means for adjustably clamping the second plate to both jaws of the engine, means attached to said second plate for holding said frame in its adjusted position, a head carrying cutters, a shaft through the head, a cutter on each end of the shaft, means connected with the frame that carries the cutters for rotating the cutters, and a screw carried by said frame for raising and lowering the cutters.

In testimony whereof I affix my signature in presence of two subscribing witnesses.

CHARLES W. DANGLEMEYER.

Witnesses:

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