M. F. SMITH.

PROFILING MACHINE.

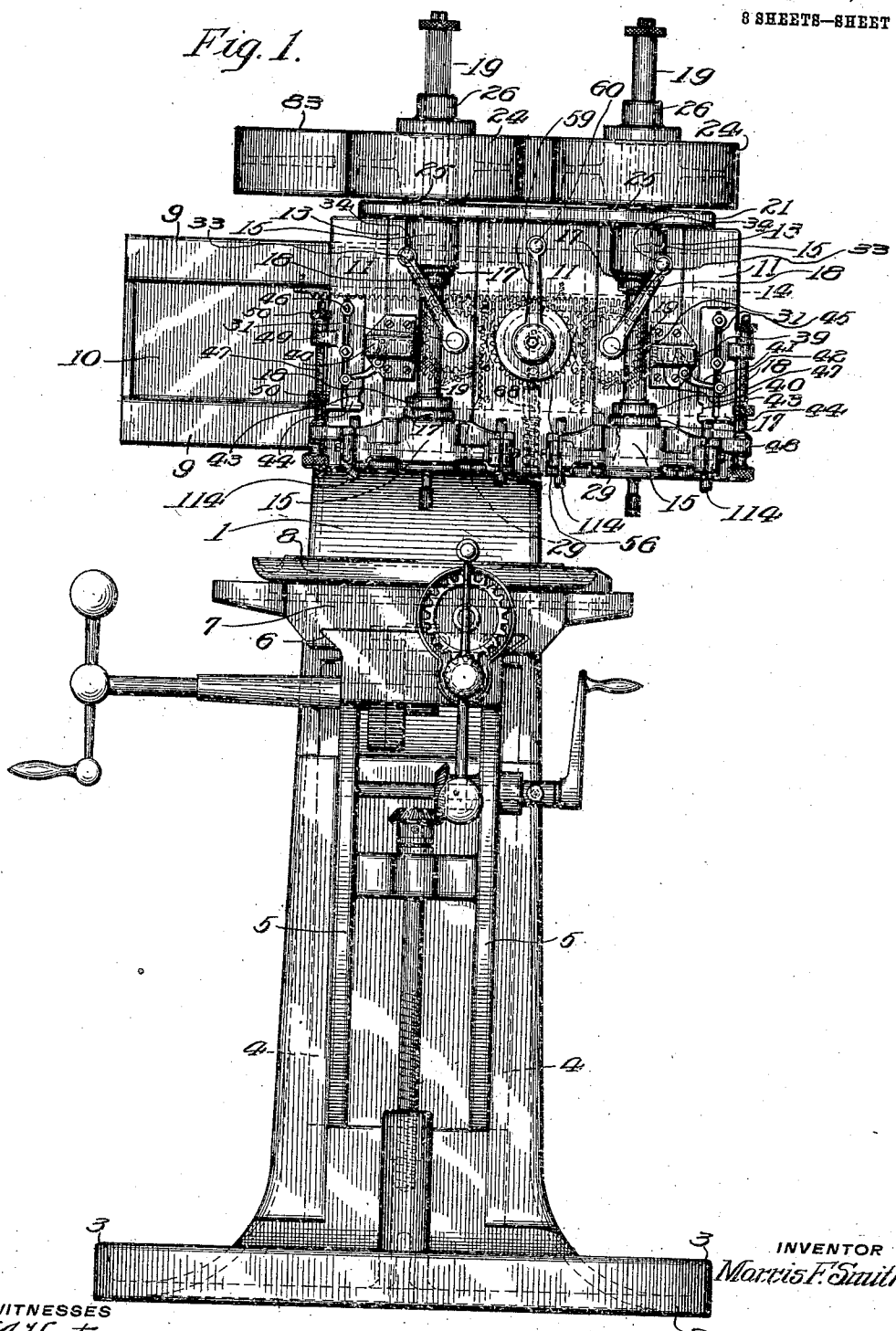
APPLICATION FILED SEPT. 30, 1907.

956,209.

Patented Apr. 26, 1910.

8 SHEETS—SHEET 1.

Fig. 1.



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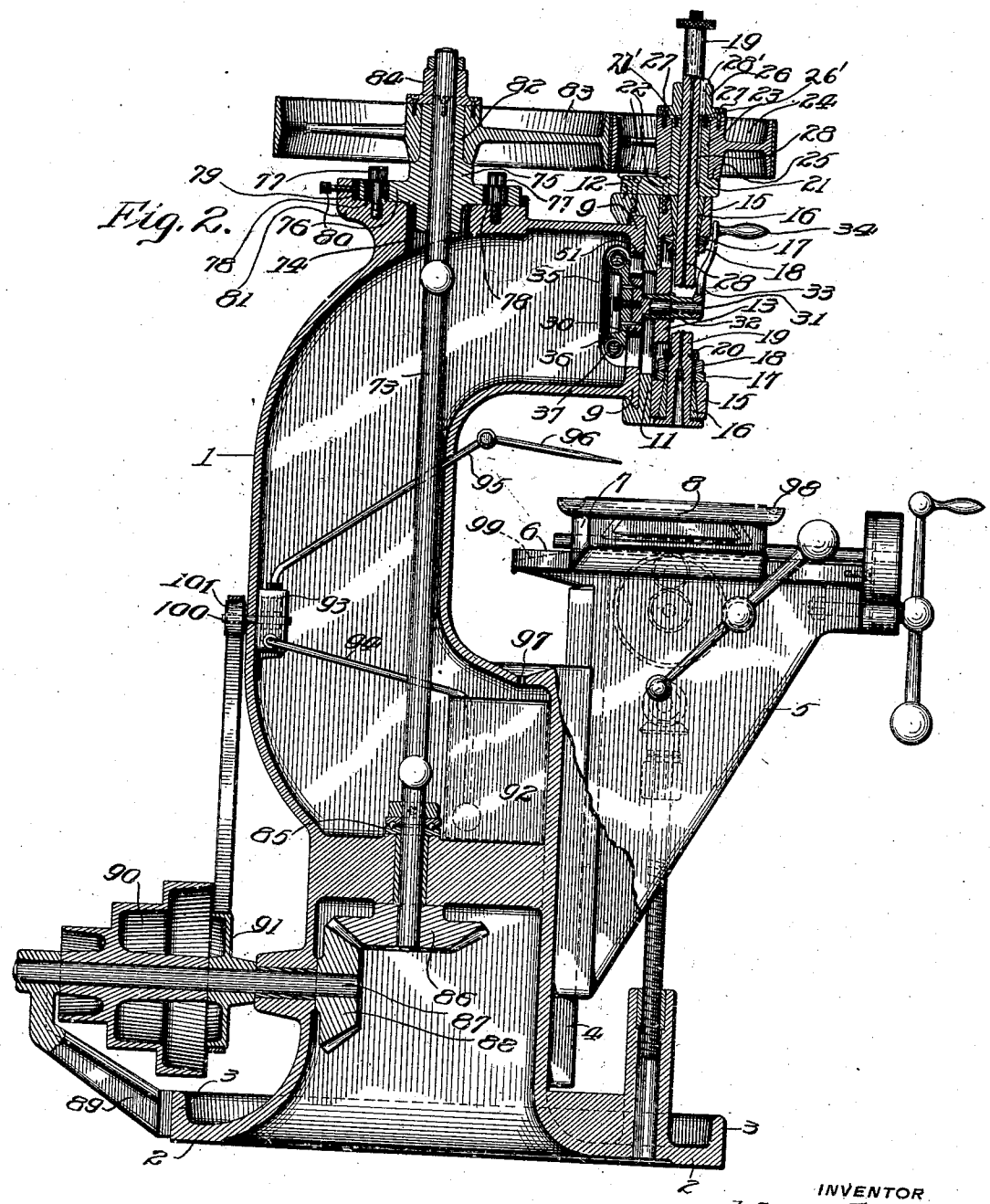
8 SHEETS—SHEET 2.

Fig. 2.



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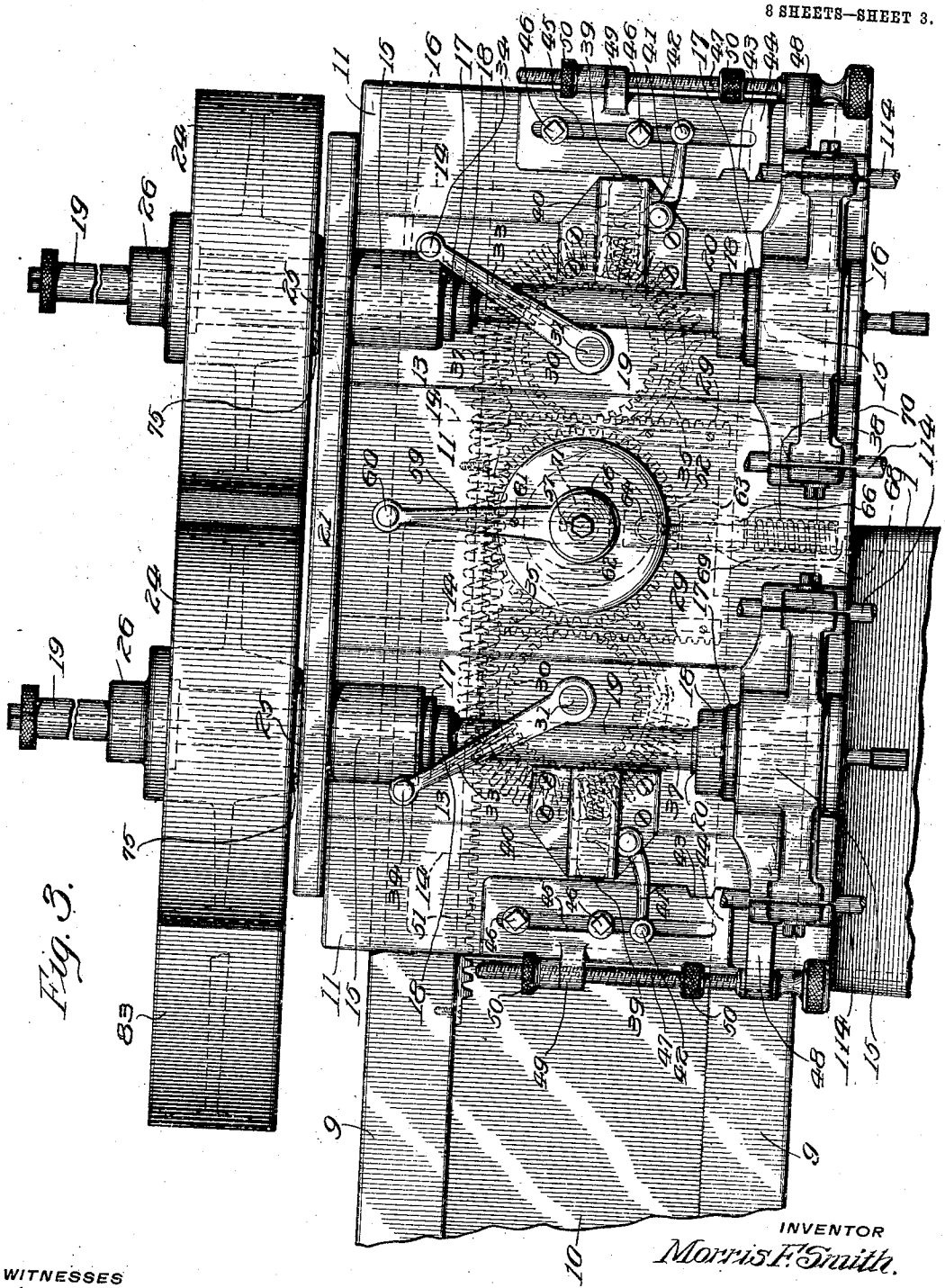

Fig. 3.

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8 SHEETS—SHEET 4.

Fig. 5.

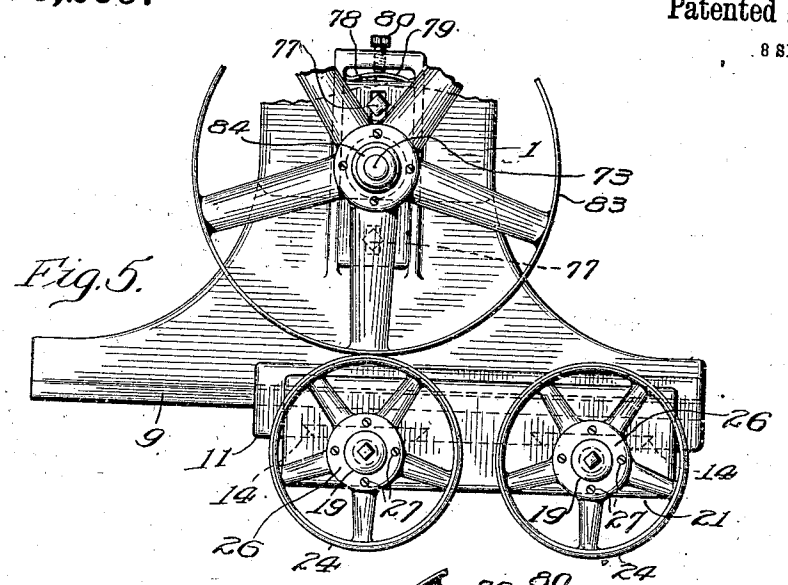


Fig. 6.

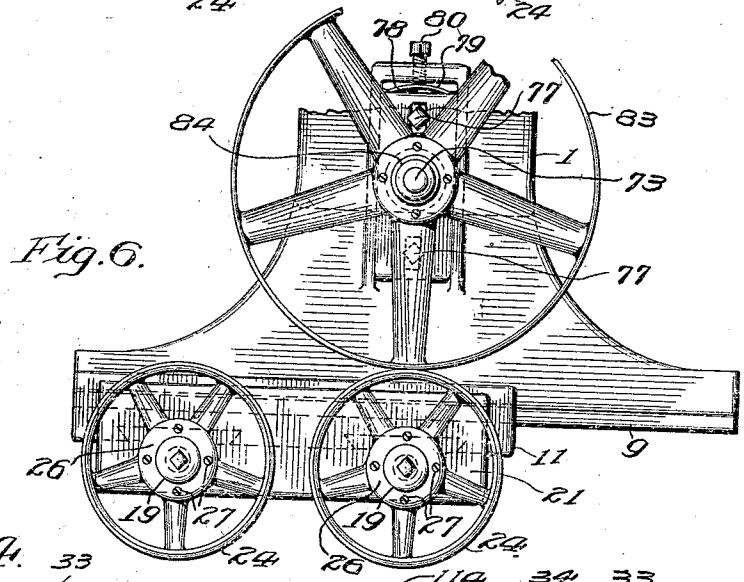
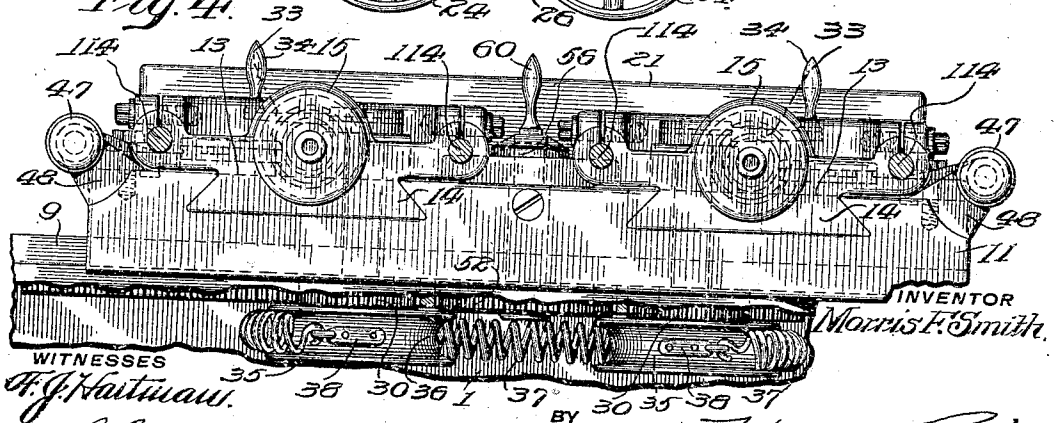


Fig. 4.



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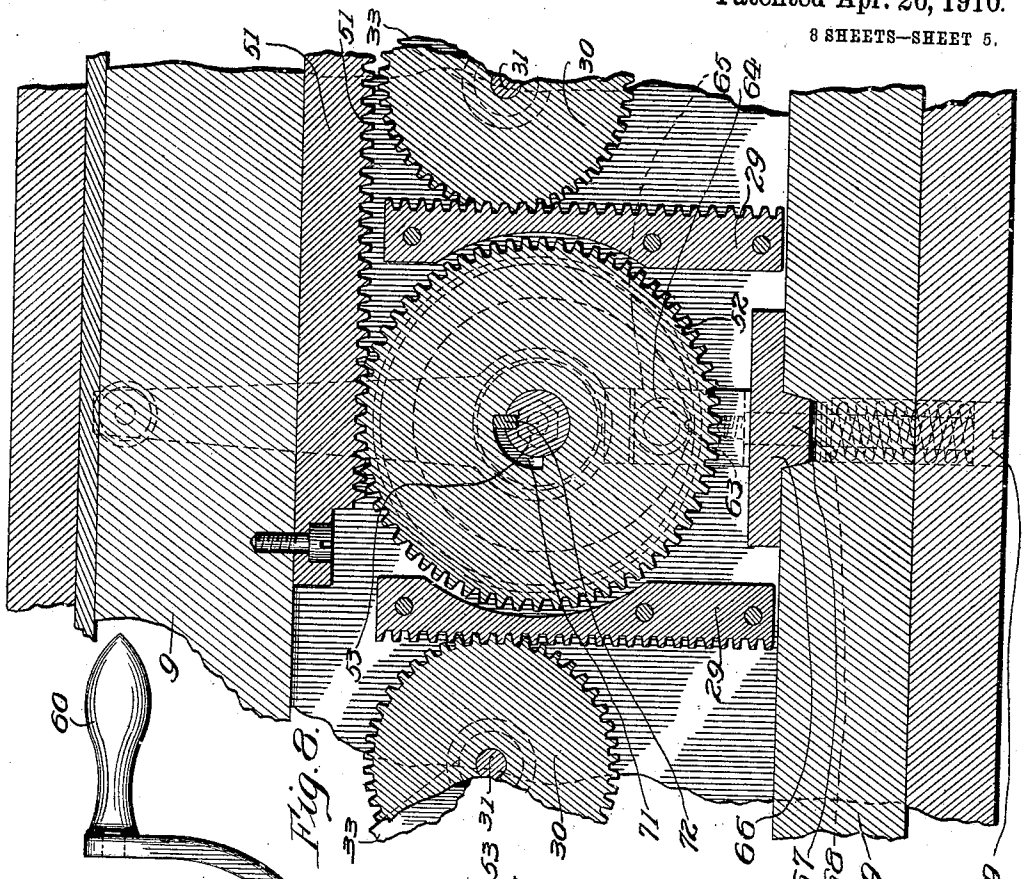

Fig. 8.

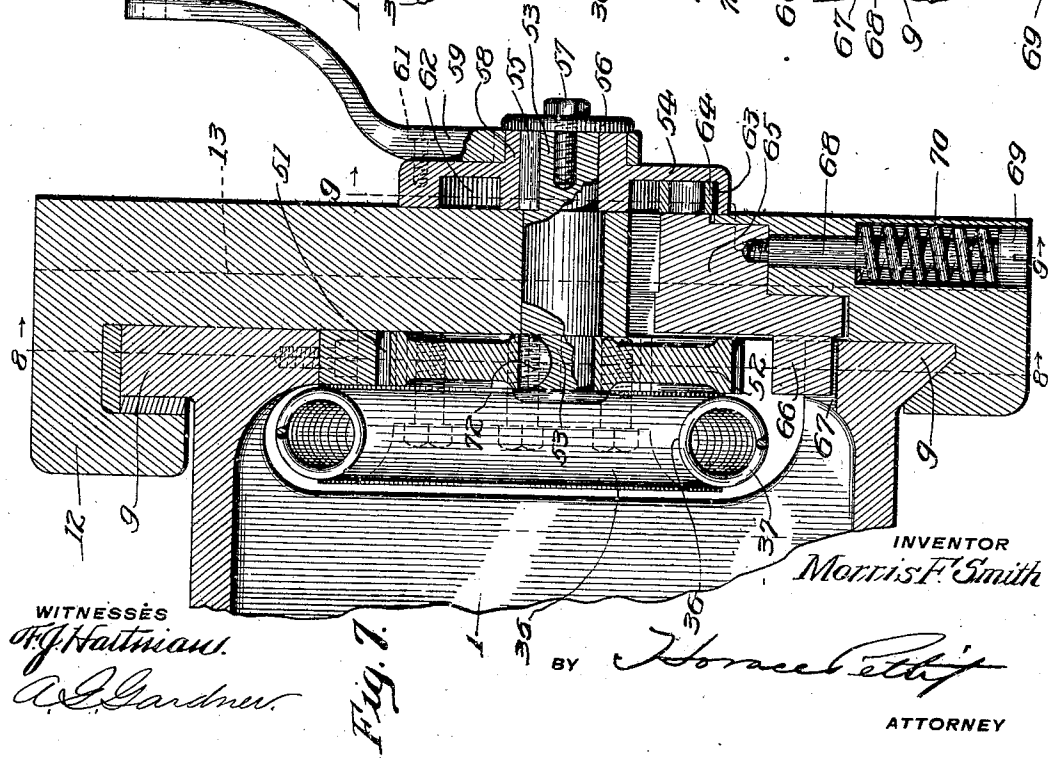

Fig. 7.

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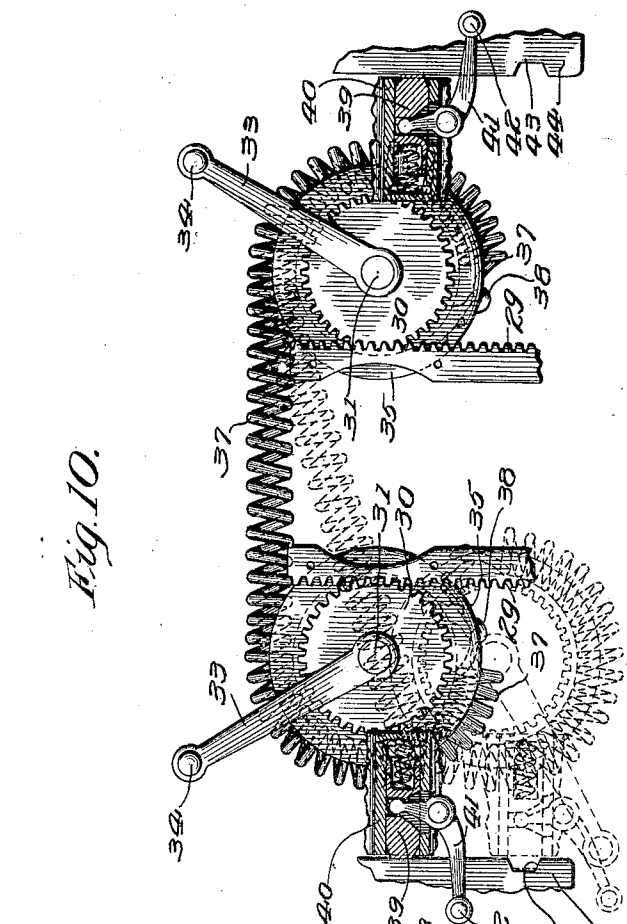

Fig. 10.

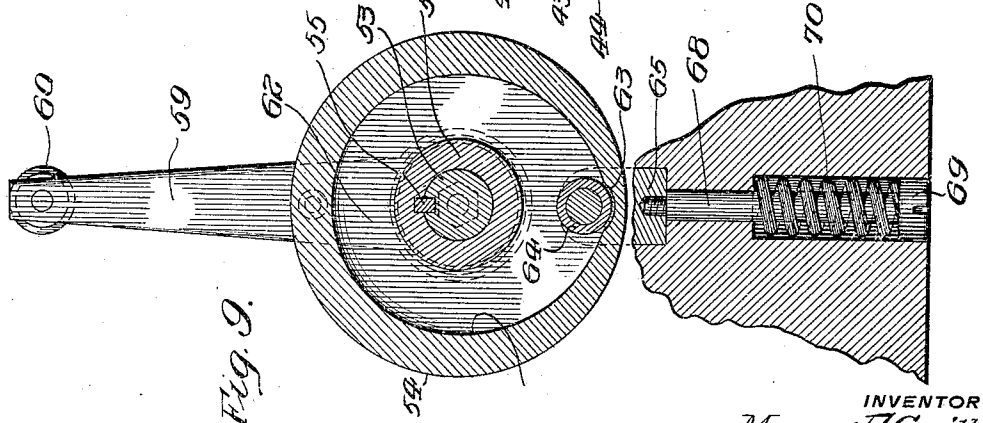

Fig. 9.

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8 SHEETS—SHEET 7.

Fig. 11.

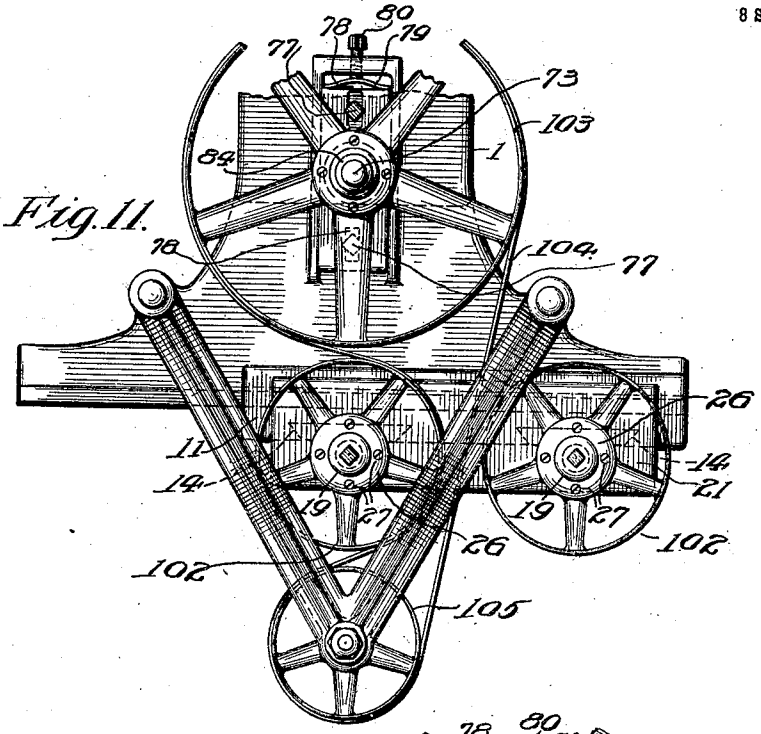
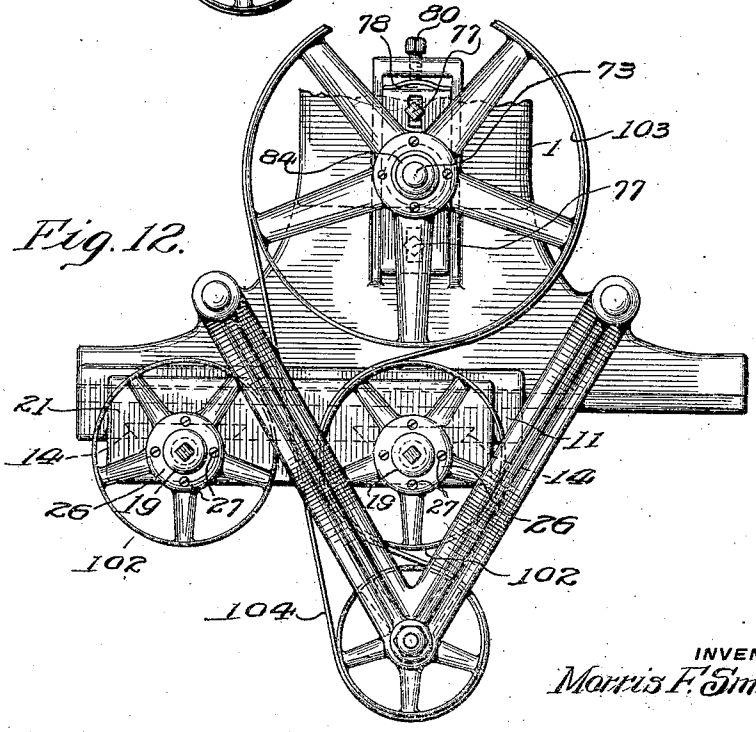


Fig. 12.



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8 SHEETS—SHEET 8.

Fig. 15.

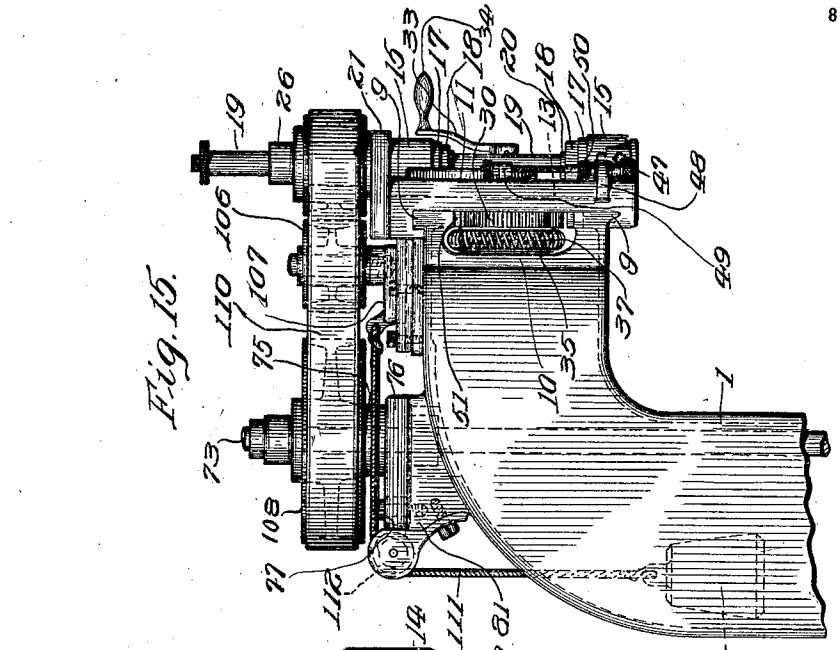


Fig. 13.

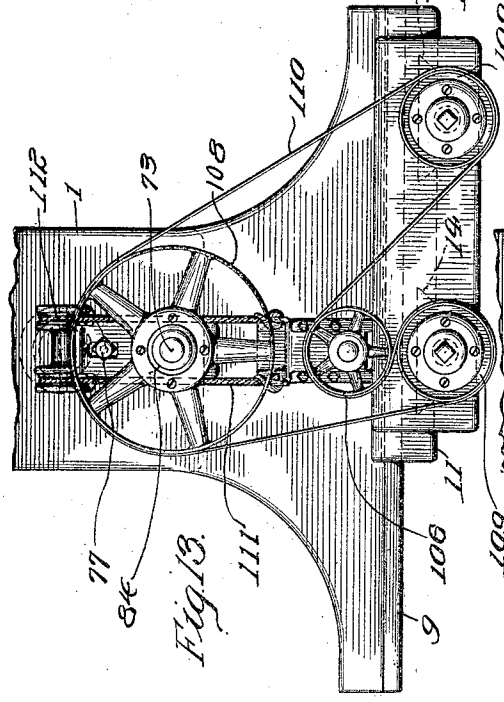
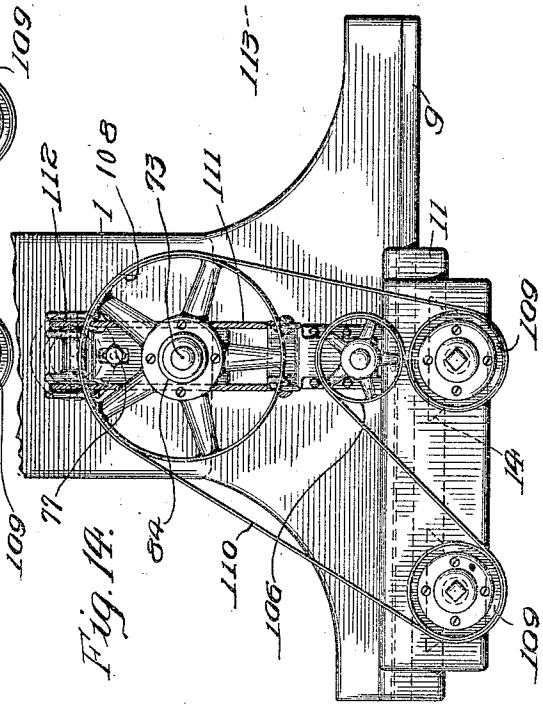


Fig. 14.



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UNITED STATES PATENT OFFICE.

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PROFILING-MACHINE.

956,209. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed September 30, 1907. Serial No. 395,160.

To all whom it may concern:

Be it known that I, MORRIS F. SMITH, a citizen of the United States, and a resident of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Profiling-Machines, of which the following is a full, clear, and exact description.

My invention relates to improvements in profilers, and particularly to that class of profilers in which a cutter is guided through a predetermined path by means of a pin which is moved over a fixed templet.

Profiling machines usually have two or more cutters, including a roughing cutter and a finishing cutter, actuated by separate spindles; the roughing cutter being used first to reduce the work to approximately the desired shape, this cutter then being moved out of position and the finishing cutter being brought into position to complete the operation. Heretofore these cutters have both been driven simultaneously, although only one of the cutters could be used at a time; thus needless power was consumed in driving the idle cutter and there was unnecessary wearing of the parts of the machine not performing any useful function.

The main objects of my invention are to provide a profiler with the following improvements; driving mechanism by which a cutter is driven only when in operative position; mechanism by which a cutter may be quickly and conveniently moved into or out of a predetermined fixed operative position; a counterbalance for each cutter so that when the cutter is released from its lowermost operative position it will be automatically raised to its uppermost inoperative position; means for preventing undue wear and shock upon the cutters; means for raising and lowering the cutters; means for moving the cutters laterally; an automatic system inclosed within the standard of the profiler for lubricating the cutters; and other improvements which will appear in the following specification.

In the accompanying drawings: Figure 1 is a front elevation of a profiler constructed in accordance with this invention; Fig. 2 a side elevation partly in section of the same; Fig. 3 a front elevation of the cutter carriage; Fig. 4 a bottom plan view of the cutter carriage; Figs. 5 and 6 top plan views showing the carriage in two positions; Fig. 7 a vertical transverse section of the carriage and support; Fig. 8 a longitudinal section of the carriage and its support on line 8—8 of Fig. 7; Fig. 9 a vertical longitudinal section of the carriage on line 9—9 of Fig. 7; Fig. 10 a diagrammatic front view of the carriage with its bed plate removed showing the means for moving the cutter spindles vertically; Figs. 11 and 12 top plan views showing a modified form of driving mechanism in two positions; Figs. 13 and 14 top plan views showing a second modification of the driving mechanism in two positions; Fig. 15 is a left hand side elevation of the modification shown in Figs. 13 and 14.

The profiler comprises, broadly: a main vertical hollow standard constituting the body or support of the entire machine; a horizontal table for holding the work, movable, longitudinally and laterally, and supported upon a vertically movable bracket mounted upon the lower front portion of the frame; a pair of vertical cutter spindles, vertically movable and carried by a horizontally movable cutter carriage slidably mounted above the table upon the upper front portion of the frame of the machine; a rotary handle, a gear and a rack for moving each spindle vertically; a latch for securing the spindles in fixed positions vertically; a spring for automatically elevating the spindles when released from their locked positions; a rotary handle, a gear and a rack for moving the cutter carriage horizontally; and a latch for locking the carriage in a fixed position.

The preferred driving mechanism of the machine comprises, broadly: a pair of horizontal pulleys carried upon the upper side of the cutter carriage, concentric respectively with the spindles and having splined connections therewith, so that the spindles may be driven by the pulleys without supporting them; a vertical shaft extending centrally through the frame of the machine, journaled in bearings carried thereby, having its upper end projecting through the upper side of the frame and having a driving pulley secured thereto and adapted to engage alternately against the pulleys upon the spindles; and a horizontal counter-shaft mounted upon the lower portion of one side of the frame and connected to the vertical

drive shaft by intermeshing bevel gears to drive the machine.

Referring to the drawings, particularly to Figs. 1 and 2, it is seen that the vertical standard or body 1 of the profiler is provided at its lower end with laterally extending sides 2, having upturned edges 3, and forming the base of the machine. The lower front portion of the standard is provided with vertical parallel ways 4, upon which is slidably mounted a bracket 5, which is provided upon its upper side with ways 6 extending horizontally in a direction substantially perpendicular to the front plane of the machine, and slidably carrying a table bed 7, supporting upon its upper side the table 8 which is mounted to slide, with respect to the bed, in a direction parallel to the front plane of the machine. The usual mechanism is provided for elevating the table by raising the bracket supporting it, and for moving the table either longitudinally or laterally of the machine. Such mechanism being old, a full detailed description is not necessary, as this feature of the machine will be sufficiently understood from the drawings.

The frame of the machine is curved, from a point at the top of the vertical ways supporting the table, rearwardly away from the inner edge of the table, and then extends vertically and is again turned forwardly and extends horizontally above the table, terminating in a substantially vertical flat surface formed by horizontally extending spaced ways or guides 9 which form the upper and lower edges of the front upper portion of the standard and extend longitudinally of the machine, projecting beyond the sides of the standard in each direction, being suitably connected at their ends by cross bars 10, the space between the bars opening into the interior of the standard.

The cutter carriage, which is slidably mounted upon the horizontal ways of the standard has a vertical bed plate 11, the upper side 12 of which is extended inwardly and provided with a groove fitting over the upper edge of the upper guide 9 to support the carriage, the lower side of the carriage being similarly extended over the lower edge of the lower guide.

Mounted upon the front of the carriage bed are a pair of vertically movable sliders 13, the inner side of each slider being formed in the shape of a dovetail 14, and resting in a corresponding groove in the carriage bed. The upper and lower ends of each slider are provided with forwardly extending lugs 15, provided with taper sockets and carrying split bearings 16 held in the sockets by means of nuts 17 and lock nuts 18. Rotatably supported in these bearings are the vertical cutter spindles 19, the spindles being secured against longitudinal movement with respect to their bearings by collars 20 secured to the spindles, or by any other suitable means. The upper end of each spindle passes slidably through a bearing 21, which projects over the front of the carriage bed and is secured to the upper edge of the bed by means of screws 22. This bearing is formed externally into an upwardly extending cylindrical bearing 23 concentric with the spindle, and supports a pulley 24, the hub of which rests at its lower edge upon the shoulder 25 of the bearing. The upper edge of the hub of the pulley is provided with a collar 26, secured to the hub by means of screws 27, and projecting over the upper end of the pulley and slidably receiving the spindles 19, through the aperture of the collar, the spindles being provided with a longitudinal key-way 28, and the collar being provided with a corresponding spline 28′ whereby motion is transmitted from the pulley to the spindle, the spindle being free to slide vertically and the pulley being fixed in a vertical position and being supported directly upon the bed of the carriage. Loosely surrounding the spindle and between the collar 26 and the upper end of the bearing 23 is a washer 26′ which is rigidly secured to the end of the bearing 23 by means of the screws 27′. The outer edge of this washer 26′ extends outwardly beyond the surface of the bearing 23 and engages loosely in a recess provided therefor in the upper end of the hub of the pulley 24.

Vertical movement is given to the spindles by means of the vertical racks 29 (see Fig. 8) which are rigidly secured to the bed of the carriage, and gears 30, meshing respectively with the racks, each of the gears being mounted upon the inner end of a shaft 31, which extends rotatably through the slider supporting the spindle, in a suitable thimble 32, and has secured to its outer end a crank 33 and a crank handle 34, whereby the gear may be rotated, thus moving the slider vertically and carrying therewith its spindle. Concentric with each gear 30 and rigidly secured to the inner face thereof is a pulley 35 having a grooved face 36. Extending in the grooves of each pulley and connecting the two pulleys together is a spiral spring 37, each end of the spring being secured to its corresponding pulley by means of a plate 38. When either pulley is moved out of the horizontal plane of the other, the length of the spring is increased, and the tension upon the spring is sufficient to rotate the lower pulley vertically along its rack, thus automatically elevating the corresponding spindle.

A horizontally movable latch 39 (see Fig. 10) is mounted in guides 40 upon each slider of the cutter carriage and manually operated by means of a bell crank lever 41 pivoted to the slider and having a handle 42. The

latch is adapted to engage in a recess 43 of the plate 44, which is secured in a vertical position to the carriage bed adjacent the end of the latch. This plate is provided with a vertical groove 45, and secured to the bed plate by means of screws 46 passing through this recess. To conveniently adjust the latch plate 44, a vertical screw 47 is mounted to rotate on a lug 48 upon the bed and to engage in a lug 49 upon the plate, lock nuts 50 upon the screw being provided to engage against the sides of the lug upon the plate to lock it in any desired position with respect to the screw, the lower end of the screw being retained against longitudinal movement in the lug upon the bed. By this arrangement the spindles may be locked in a predetermined position vertically by means of the latch, and the latch plate may be adjusted to change this position according to the requirements of the work.

Horizontal movement is given to the carriage by means of a horizontal rack 51 (see Figs. 7 and 8) secured to the lower edge of the upper horizontal guide of the standard, and a gear 52 rotatably mounted on the inner side of the carriage, upon the inner end of a shaft 53 extending through the bed plate of the carriage. Upon the outer end of the shaft 53 is secured a disk 54 by means of the key 55, the washer 56, and bolt 57 in the end of the shaft. The disk is provided with an outwardly extending hub 58 upon which is secured the crank 59 carrying the crank handle 60, the crank being fastened rigidly to the disk by means of the screw 61. The inner face of the disk is provided with an annular groove 62, the outer surface 63 of which forms an internal cam over which rolls the cam follower 64 fixed to the upper end of a vertically movable latch 65, which is slidably mounted in a vertical slot of the bed plate and projects through the bed plate, the inner lower end 66 of the latch projecting over the upper edge of the lower horizontal guide of the standard, and being adapted to engage in a recess 67 in this edge. The cam follower actuating the latch is held downwardly against its cam by means of a bolt 68 extending downwardly from the latch through an aperture in the bed plate of the carriage, the upper end of the bolt being fixed into the latch and the lower end of the bolt being provided with a head 69 having a spiral spring 70 surrounding the bolt between the head thereof and the upper shoulder of the enlarged portion of the recess in which the lower end of the bolt and spring are contained. By this arrangement when the crank is turned to move the carriage horizontally the latch locking the carriage will be automatically withdrawn from engagement with the standard during the first part of the turn of the crank, to permit the carriage to be moved, and during the last part of the turn of the crank the latch will be permitted to be drawn by its spring into engagement against the edge of the guide along which it will slide until it drops into a second recess provided to lock the carriage in its second position.

To prevent the movement of the carriage until the latch is withdrawn, the gear 52 upon the inner end of the shaft carrying the crank is provided with a key-way 71 wider than the corresponding key 72, whereby when the crank is rotated in one direction the shaft is permitted to rotate through a limited arc before the key 72 acts upon the gear 52 to turn it and to move the carriage. Two recesses 67 are provided for the latch to lock the carriage in two positions, and are spaced apart a distance equal to the distance between the cutters, and the gear moving the carriage is so proportioned that one rotation of the gear moves the carriage a distance equal to the space between the cutters, thus giving the cam a complete revolution as the carriage moves over that distance, thus permitting the latch to be drawn by its spring automatically into engagement with each recess consecutively. Thus when the machine is once adjusted either cutter may be automatically brought into a fixed position, with respect to the work, with great exactness.

Power is transmitted to the pulleys connected to the spindles by means of a vertically jointed shaft 73 housed within the standard of the machine. The upper end of this vertical shaft projects through an aperture 74 in the upper side of the standard and is carried in a bearing 75 provided intermediate of its ends with a horizontal flange 76 resting upon the upper side of the standard and being movably secured thereto by means of the bolts 77 passing through slots 78 in the flange, the bearing being yieldingly pressed toward the front of the machine by means of a curved spring 79 held against the rear edge of the flange by means of a set screw 80 in an upwardly projecting lug 81 upon the standard. The upper end of this cylindrical bearing 75 is reduced to form a bearing 82 for a driving pulley 83 concentric with the vertical drive shaft 73 which projects above the upper edge of the pulley, and is rigidly connected thereto by means of a collor 84, the weight of the pulley and of the shaft being supported by the standard. This pulley is so arranged with respect to the pulleys connected to the vertical spindles that as the cutter carriage is moved horizontally it brings the faces of the pulleys consecutively in contact with the driving pulley, and the yielding bearing of the driving pulley prevents any sudden shock or undue stress being brought to bear upon the cutter spindles.

The lower end of the vertical drive shaft

73 is supported upon an end thrust roller bearing 85 carried within the frame of the standard, and is provided at its lower end with a bevel gear 86.

The counter-shaft 87 for driving the machine is mounted on one side of the standard adjacent the base thereof, the inner end of the counter-shaft being journaled in the side of the standard and being provided within the standard with a bevel gear 88 meshing with the bevel gear upon the vertical drive shaft 73 of the machine. The outer end of the counter-shaft is journaled at the upper end of a bracket 89, the lower end of which is fastened to the outer edge of the base of the machine. The counter-shaft carries the usual cone pulley 90, to be connected to a main driving shaft, and also a pulley 91 to drive the oiling pump.

Means for keeping the cutters constantly lubricated is provided within the standard and comprises an oil tank 92, a rotary pump 93, a pipe 94 between the tank and the pump and a pipe 95 leading from the pump to the front side of the standard and having a jointed end 96 to direct the flow of oil against the cutter. The oil tank is located in the front lower side of the standard just beneath the shoulder below the table, the upper surface of the shoulder being dished and provided with an aperture 97 leading from the bottom of the depressed portion of the surface into the top of the oil tank. The table also is provided with a groove 98 extending around the upper surface thereof to catch the oil as it flows from the cutter and to return the same through the groove and over the inclined surface 99 of the bed of the table into the basin and through the aperture 97 of the standard and into the oil tank 92. Thus a steady circulation of the oil is maintained from the tank to the cutter and back again to the tank. The oil pump has its spindle 100, projecting through the side of the standard and carries a pulley 101 vertically in alinement with the pulley 91 upon the counter-shaft by which it is driven.

In Figs. 11 and 12 are shown two positions of a modified form of mechanism for driving this machine. This construction comprises pulleys, 102, as already described, connected to the upper ends of the vertical cutter spindles, and also a driving pulley 103 as already described connected to the upper end of a vertical drive shaft carried by the standard, but the pulley 103 is spaced from the pulleys 102 so as not to be brought into contact with the rims of either of these pulleys through the motion of the carriage, and a belt 104 passing around pulley 103 and between pulleys 102 and over an idler 104 supported upon arms 105 rigid with the standard is used to drive the pulleys 102. By a comparative inspection of Figs. 11 and 12 it will be seen that as the carriage is moved from right to left the pulleys 102 driving the cutter spindles are successively engaged and driven by opposite portions of the belt 104.

In the modified driving mechanism shown in Figs. 13, 14 and 15, an idler, 106, is mounted upon a sliding bearing 107 between the main driving pulley 108 and the pulleys 109 connected to the spindles, and the belt 110 in this case passing over the main driving pulley 108 and around the outer sides of the pulleys driving the spindles being brought inwardly between these latter pulleys and carried around the idler. The idler is drawn rearwardly to maintain the belt always in tight condition by means of a rope 111 connected to the sliding bearing of the pulley and extending rearwardly over a pulley 112 and then downwardly and having a weight 113 connected to its lower end.

In the operation of this profiler, the work is clamped to the table of the machine to which is also attached the pattern or model to be duplicated and the cutters are adjusted and the carriage is moved to bring the roughing cutter and the finishing cutter consecutively into locked operative position with respect to the table. The sliders carrying the cutters are each provided with pins, 114, arranged upon opposite sides of the cutter and adapted to serve as guides for manipulating the table to bring the various portions of the pattern beneath the point of one of the pins, thereby moving the work correspondingly beneath the cutter to reproduce the contour of the pattern.

Having thus fully described my invention, what I claim and desire to protect by Letters Patent of the United States is:

1. In a profiler, the combination with a standard, of a movable cutter carriage carried thereby, a rack rigid with said standard, a gear rotatably carried by said carriage, and means for rotating said gear to move said carriage.

2. In a profiler, the combination with a standard, of a movable cutter carriage, a rack rigid with said standard, a gear rotatably carried by said carriage, and means for rotating said gear to move said carriage.

3. In a profiler, the combination with a standard, of a movable cutter carriage carried thereby, a rack rigid with said standard, a gear rotatably supported by said carriage meshing with said rack, means to rotate said gear to move said carriage, and means actuated by said rotating means to lock said carriage in a predetermined position.

4. In a profiler, the combination with a standard, of a movable cutter carriage carried thereby, a rack rigid with said standard, a gear rotatably supported by said carriage meshing with said rack, means to rotate said gear to move said carriage, and a

latch mounted upon said carriage and actuated by said rotating means to lock said carriage in a predetermined position.

5. In a profiler, the combination with a standard, of a movable cutter carriage carried thereby, a rack rigid with said standard, a gear rotatably supported by said carriage meshing with said rack, means to rotate said gear to move said carriage, and a latch slidably mounted upon said carriage and actuated by said rotating means, and arranged and adapted to engage in a recess provided therefor in said standard to lock said carriage in a predetermined position.

6. In a profiler, the combination with a standard, provided with a way, of a cutter carriage slidably mounted upon said way, a rack secured to said way, a gear rotatably carried by said carriage and meshing with said rack, and means to rotate said gear to move said carriage.

7. In a profiler, the combination with a standard, provided with spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the inner edge of one of said ways, a gear rotatably carried by said carriage and meshing with said rack, and means to rotate said gear to move said carriage.

8. In a profiler, the combination with a standard, provided with spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the inner edge of one of said ways, a gear rotatably carried by said carriage upon the inner side thereof and meshing with said rack, and means to rotate said gear to move said carriage.

9. In a profiler, the combination with a standard, provided with spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the inner edge of one of said ways, a gear rotatably carried by said carriage and meshing with said rack, means to rotate said gear to move said carriage, and means actuated by said rotating means to lock said carriage in a predetermined position.

10. In a profiler, the combination with a standard provided with spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the inner edge of one of said ways, a gear rotatably carried by said carriage and meshing with said rack, means to rotate said gear to move said carriage, and a latch upon said carriage and actuated by said rotating means to engage a recess provided therefor in said standard to lock said carriage in a predetermined position.

11. In a profiler, the combination with a standard provided with spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the inner edge of one of said ways, a shaft extending through said carriage and rotatably carried thereby, a gear fixed upon the inner edge of said shaft meshing with said rack, a cam fixed upon said shaft, a latch actuated by said cam to engage said standard to lock said carriage in a predetermined position, and means to rotate said shaft to move and to lock said carriage.

12. In a profiler, the combination with a standard, provided with spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the edge of one of said ways, a shaft extending through said carriage and rotatably carried thereby, a gear fixed upon the inner end of said shaft and meshing with said rack, a cam fixed upon said shaft, a latch actuated by said cam and adapted to engage a recess provided therefor in said standard to lock said carriage in a predetermined position, and means to turn said gear to move and to lock said carriage.

13. In a profiler, the combination with a standard provided with horizontal spaced ways, of a cutter carriage slidably mounted upon said ways, a rack secured to the lower edge of the upper of said ways, a shaft extending through said carriage and rotatably carried thereby, a gear fixed upon the inner end of said shaft and meshing with said rack, a cam fixed upon said shaft, a spring latch actuated by said cam and adapted to engage a recess provided therefor in said standard to lock said carriage in a predetermined position, and means to turn said gear to move and to lock said carriage.

14. In a profiler, the combination with a standard, of a cutter carriage movably mounted thereon, a rack secured to said standard, a rotatable shaft mounted upon said carriage, a gear meshing with said rack and fixed upon said shaft, a disk provided with an annular groove forming a cam secured to said shaft, a cam follower engaging said cam, and means actuated by said cam follower to lock said carriage.

15. In a profiler, the combination with a standard, of a cutter carriage movably mounted thereon, a rack secured to said standard, a rotatable shaft mounted upon said carriage, a gear meshing with said rack and fixed upon said shaft, a disk provided with an annular groove forming a cam secured to said shaft, a latch slidably mounted upon said carriage and adapted to engage with said standard, a follower secured to said latch and engaging against said cam, and means to turn said shaft to move and to automatically lock said carriage.

16. In a profiler, the combination with a standard, of a cutter carriage movably mounted thereon, a rack secured to said standard, a rotatable shaft mounted upon said carriage, a gear meshing with said rack and fixed upon said shaft, a disk provided with an annular groove forming a cam fixed

on said shaft, a latch slidably mounted upon said carriage and adapted to engage with said standard, a follower secured to said latch and engaging against said cam, a spring between said latch and said carriage to hold said cam follower in engagement with said cam, and means to turn said shaft to move and to automatically lock said carriage.

17. In a profiler, the combination with a standard, of a movable carriage mounted thereon, means for locking the said carriage in a predetermined position, and a member for moving said carriage into and out of locking engagement with said standard, said member being movable through a predetermined space to unlock the carriage without effecting the movement of the carriage.

18. In a profiler, the combination with a standard, of a movable carriage mounted thereon, a rack secured to said standard, a gear meshing with said rack, a shaft carrying said gear and rotatably mounted upon the carriage, said gear being free to rotate through a limited arc with respect to said shaft, a latch slidably mounted upon said carriage, means upon said shaft for actuating said latch, said latch being adapted to engage in a recess provided therefor in said standard, and means to rotate said shaft to move and to lock said carriage.

19. In a profiler, the combination with a standard, of a movable carriage mounted thereon, a rack secured to said standard, a gear meshing with said rack, a shaft carrying said gear and rotatably mounted upon the carriage, said gear being free to rotate through a limited arc with respect to said shaft, and means actuated by said shaft for locking said carriage.

20. In a profiler, the combination with a standard, of a movable carriage mounted thereon, a rack secured to said standard, a gear meshing with said rack, a shaft carrying said gear and rotatably mounted upon said carriage, a key engaging in a key way provided therefor wider than said key between said shaft and said gear, whereby said gear is restrained to rotate through a limited arc upon said shaft, and means actuated by said shaft to lock said carriage.

21. In a profiler, the combination with a standard provided with spaced ways, of a carriage slidably mounted upon said ways, a rack upon the inner edge of one of said ways, a gear upon the inner side of said bed plate meshing with said rack, a shaft through said bed plate and carrying upon its inner end said gear, said shaft being provided with a key and said gear with a key-way wider than said key, whereby said gear is restrained to rotate through a limited arc upon said shaft, a disk fixed upon the front of said bed plate, said disk being provided with an internal annular groove forming a cam upon the outer surface of the groove, a latch slidably mounted in a slot in said bed plate extending through said plate, the outer end of said latch being provided with a follower engaging against said cam surface, the inner end of said latch being adapted to engage in a recess provided therefor in the edge of one of said ways, and means to rotate said shaft to move and to lock said carriage.

22. In a profiler, the combination with a standard, provided with horizontal spaced ways, of a carriage having a substantially flat vertical bed plate slidably mounted upon said ways, a rack upon the lower edge of the upper of said ways, a gear upon the inner side of said bed plate meshing with said rack, a shaft extending through said bed plate and carrying upon its inner end said gear, said shaft being provided with a key and said gear with a key-way wider than said key, whereby said gear is restrained to rotate through a limited arc upon said shaft, a disk fixed upon the front side of said bed plate, said disk being provided with an internal annular groove forming upon the outer surface of said groove a cam, a spring retained latch slidably mounted in a vertical slot in said bed plate beneath said shaft and extending through said plate, the outer and upper end of said latch being provided with a follower engaging against said cam surface, the inner and lower end of said latch being arranged above the lower of said ways and adapted to engage in a recess provided therefor in the upper edge thereof, and means to rotate said shaft to move and to lock said carriage.

23. In a profiler, a carriage, means to lock said carriage in one position, a crank and means operated by one revolution of said crank to unlock said carriage and to move it to a second position, and to then lock the carriage in said second position.

24. In a profiler, a cutter carriage, a pair of spaced cutter spindles and rotatable means for moving said carriage by a single rotation of said means a distance equal to the space between the axes of said spindles.

25. In a profiler, the combination with a standard, of a cutter carriage horizontally movable thereon, a slider vertically movable upon said carriage, a cutter spindle rotatably mounted upon said slider, a latch mounted upon said slider to lock said slider in a fixed position vertically, a plate mounted upon said carriage and provided with a recess adapted to engage one end of said latch, and means to adjust said plate vertically, said means comprising a vertical screw between said carriage and said plate.

26. In a profiler, the combination with a standard, of a cutter carriage horizontally movable upon said standard, a vertical cutter spindle rotatably mounted upon said

carriage and vertically movable thereon, a vertical rack secured to said standard, a gear meshing with said rack, and means to rotate said gear along said rack to move said spindle vertically.

27. In a profiler, the combination with a standard, of a cutter carriage horizontally movable upon said standard, a slider vertically movable upon said carriage, a vertical spindle rotatably mounted upon said slider, a vertical rack upon said standard, a gear meshing with said rack and rotatably carried by said slider, and means to rotate said gear to move said spindle vertically.

28. In a profiler, the combination with a cutter carriage, of a longitudinally movable cutter spindle rotatably mounted thereon, a rack upon said carriage adjacent said spindle, a gear meshing with said rack and rotated by the longitudinal movement of said spindle, a pulley actuated by said gear, and a spring carried on the face of said pulley to retract said spindle when moved longitudinally.

29. In a profiler, the combination with a cutter carriage, of a series of longitudinally movable cutter spindles rotatably mounted upon said carriage, a rack upon said carriage adjacent each spindle, a gear meshing with each rack and rotated by the longitudinal movement of each spindle respectively, and means between said gears to retract said spindles when moved longitudinally.

30. In a profiler, the combination with a standard, of a movable cutter carriage mounted thereon, a pair of cutter spindles rotatably mounted upon said carriage and longitudinally movable thereon, a rack upon said carriage adjacent each spindle, a gear meshing with each rack and rotated by the longitudinal movement of each spindle respectively, a pulley with a grooved face concentric with each of said gears, and a spring carried in the grooves of and connecting said pulleys to retract said spindles after said spindles have been moved longitudinally.

31. In a profiler, the combination with a standard, of a cutter carriage horizontally movable thereon, a pair of vertically movable sliders supported upon said carriage, a series of vertical cutter spindles mounted upon said sliders, a vertical rack upon said carriage adjacent each slider, a gear meshing with each rack and rotatably carried by each of said sliders, a pulley with a grooved face concentric with each of said gears, and a spiral spring carried in the grooves of and connected to said pulleys to retract said spindles when moved downwardly.

32. In a profiler, the combination with a standard, of a carriage, a series of cutter spindles rotatably mounted upon said carriage, a series of pulleys concentric with said spindles for driving the same, and a pulley mounted upon said standard adapted to engage successively against the first mentioned pulleys to drive said spindles.

33. In a profiler, the combination with a standard, of a movable carriage mounted thereon, a series of cutter spindles rotatably mounted upon said carriage, a series of pulleys concentric respectively with said spindles, and a pulley yieldingly mounted upon said standard and adapted to engage successively against the first mentioned pulleys to drive said spindles.

34. In a profiler, the combination with a standard, of a movable carriage mounted thereon, a series of cutter spindles rotatably mounted upon said carriage, a series of pulleys mounted upon said carriage for driving said spindles, and a pulley mounted upon said standard adapted and arranged to engage successively against the pulleys upon said carriage to drive said spindles.

35. In a profiler, the combination with a standard, of a cutter carriage mounted to slide horizontally upon said standard, a series of vertical spindles rotatably mounted upon said carriage, a series of horizontal pulleys connected to said spindles to drive the same, a vertical shaft rotatably carried by said standard, a pulley secured to the upper end of said standard and adapted to engage successively the pulleys driving said spindles as said carriage is moved horizontally, and a horizontal counter-shaft mounted upon the base of said standard for driving said vertical shaft.

36. In a profiler, the combination with a standard, of a cutter carriage horizontally movable upon said standard, a series of vertical spindles rotatably mounted upon said carriage, a series of pulleys for driving said spindles mounted upon said carriage, a vertical shaft rotatably carried by the upper end of said vertical shaft, a yielding bearing supporting the upper end of said shaft and resting upon the said standard, a pulley rotatably mounted upon said yielding bearing concentric with said yielding shaft and adapted to engage successively with said pulleys mounted upon said carriage to drive said spindles.

37. In a profiler, the combination with a hollow standard, of a table supported thereby, a pump and a tank within said standard, a pipe leading from said tank to said pump and from said pump over said table to deliver a liquid upon said table, a spindle extending through the side of said standard for driving said pump and means upon the outside of said standard to drive said spindle.

38. In a profiler, the combination with a standard, of a horizontal table mounted upon a vertically adjustable bracket slidably mounted upon the front lower side of

said standard, said table being longitudinally and laterally movable, said standard being recessed to receive the inner edge of said table, a horizontally movable cutter carriage slidably mounted upon said standard above said table, vertical spindles rotatably mounted upon said carriage and vertically movable thereon, pulleys mounted upon said carriage and splined to said spindles for driving the same, means to move said carriage horizontally, means to move said spindles vertically, a shaft having its lower end mounted in a bearing within said standard, a bearing for the upper end of said vertical shaft slidably mounted upon the upper side of said standard over an aperture provided therein, said shaft extending upwardly through said bearing and being provided at its upper end with a collar rigid therewith, a pulley rotatably mounted upon said movable bearing and secured to said collar and adapted to engage successively against the pulleys driving said spindles, a spring to force said movable bearing toward said spindles, and means to drive said vertical shaft to actuate said machine.

39. In a profiler, the combination with a standard, of a movable cutter carriage mounted thereon, a cutter spindle rotatably mounted upon said carriage, a yielding bearing upon said standard and means rotatably mounted in said bearing to drive said spindle.

40. In a profiler, the combination with a cutter spindle of a yielding bearing and means rotatably mounted in said bearing to drive said spindle.

41. In a profiler, a carriage, a pair of parallel spaced cutter spindles carried thereby, and rotatable means for moving said carriage by a single rotation of said means, a distance equal to the distance between the axes of said spindles.

42. In a profiler, the combination with a hollow standard, of a table supported thereby, a pump and an oil tank within said standard, a tube leading from said tank to said pump and from said pump through the side of said standard, and terminating over said table to deliver oil thereon, said standard being provided with an apertured recess over said tank, and said table being provided with inclined surfaces leading toward said recess to turn the oil from said table to said tank, a counter-shaft for supplying power for said profiler, a spindle extending through the side of said standard for driving said pump, and means upon the outside of said standard between said standard and said counter-shaft to drive said spindle.

43. In a profiler, the combination with a movable cutter carriage, of a slider movable upon said carriage, spindles rotatably mounted upon said slider, a latch mounted upon said slider to lock said slider in a fixed position, a plate mounted upon said carriage and provided with a recess adapted to engage one end of said latch, and a screw between said carriage and said plate to adjust the position of said plate.

44. In a profiler, the combination with a standard, of a cutter carriage movable upon said standard, a slider movable upon said carriage, a spindle rotatably mounted upon said slider, a rack upon said standard, a gear meshing with said rack and rotatably carried by said slider, and means to rotate said gear to move said spindle longitudinally.

45. In a profiler, the combination with a standard, of a cutter carriage movable thereon, a pair of sliders supported upon said carriage, spindles mounted upon said sliders, a rack upon said carriage adjacent to each slider, a gear meshing with each rack and rotatably carried by each of said sliders, a pulley with a grooved face concentric with each of said pulleys, and a yielding member carried in the said grooves and connecting said pulleys to retract said spindles after said spindles have been displaced.

46. In a profiler, the combination with a standard, of a carriage, a series of cutter spindles rotatably mounted upon said carriage, a series of pulleys connected to said spindles, and a pulley mounted upon said standard and arranged to engage successively against the first mentioned pulleys to drive said pulleys.

47. In a profiler, the combination with a series of rotatably mounted cutter spindles, of a series of pulleys connected respectively with said spindles, a yieldingly mounted pulley, and means to bring said yieldingly mounted pulley successively into engagement against said first mentioned pulleys to drive said spindles.

48. In a profiler, the combination with a standard, of a movable carriage mounted thereon, a series of cutter spindles rotatably mounted upon said carriage, a series of pulleys connected respectively to said spindles, and a pulley mounted upon said standard and arranged to engage successively said first mentioned pulleys to drive said spindles.

49. In a profiler, the combination with a standard, of a carriage movable in a straight line thereon, a series of cutter spindles rotatably mounted upon said carriage, a series of pulleys mounted upon said carriage for driving said spindles, and a pulley mounted upon said standard adapted and arranged to engage successively against the pulleys upon said carriage to drive said spindles.

50. In a profiler, the combination with a hollow standard, of a table supported thereby, a pump and a tank within said standard, a pipe leading from said tank to said pump

and from said pump over said table to deliver a liquid upon said table, a spindle extending through the side of said standard for driving said pump and means upon the outside of said standard to drive said spindle, said table being grooved to return the liquid to said tank.

51. In a profiler, the combination with a hollow standard, of a table supported thereby, a pump and a tank within said standard, a pipe leading from said tank to said pump and from said pump over said table and terminating in a jointed end adapted to deliver a liquid upon said table, and means carried by said standard for driving said pump.

52. In a profiler, the combination with an upwardly projecting bearing having concentric external and internal cylindrical bearing surfaces arranged about a vertical axis, of a spindle extending through said bearing and projecting above the same, a driving pulley rotatably mounted on the external cylindrical surface of the bearing, and a collar slidingly connected to said spindle and secured to the upper end of said pulley to rotate said spindle.

53. In a profiler, the combination with a bearing having concentric external and internal bearing surfaces, of a spindle rotatably mounted within said bearing and projecting upon opposite sides thereof, a pulley rotatably mounted upon the external surface of said bearing and a collar slidingly splined upon said spindle and secured to the end of said pulley to rotate said spindle.

54. In a profiler, the combination with a bearing having concentric external and internal bearing surfaces, of a spindle rotatably mounted within said bearing and projecting therefrom, a pulley rotatably mounted upon the external surface of said bearing and a collar slidingly splined to said spindle and connected to the end of said pulley, said bearing being fixed at one end and extending freely therefrom, and said pulley being removable over the free end of said bearing.

55. In a profiler, the combination with a cutter spindle, of yielding means for rotating said spindle.

56. In a profiler, the combination with a cutter spindle, of a pulley yieldingly mounted for rotating said spindle.

57. In a profiler, the combination with a cutter spindle, of a pulley slidably splined thereto, and a pulley yieldingly mounted to drive said first mentioned pulley.

58. In a profiler, the combination with a hollow vertical standard, having a recess in the front thereof, of a table supported by said standard and having its inner edge within said recess, the surface upon the under side of said recess beneath said table, being inclined toward an aperture through said standard and a tank within said standard beneath said aperture.

59. In a profiler, the combination with a vertical standard, of a counter shaft journaled upon the outside of said standard and adjacent the lower end thereof, a lubricating pump within said standard and above said counter shaft, a spindle for driving said pump extending through said standard and means between the outer end of said spindle and the said counter shaft for driving said pump.

60. In a profiler, the combination with a vertical standard having its front portion recessed intermediate of the ends of the standard to receive a table, of means for supporting the tool carriage extending laterally in opposite directions from the upper front portion of said standard.

61. In a profiler, the combination with a cutter spindle, of a laterally yielding bearing and means rotatably mounted in said bearing to drive said spindle.

62. The combination with a bearing having concentric external and internal bearing surfaces, of a spindle rotatably mounted within said bearing and projecting therefrom, a pulley rotatably mounted upon the external surface of said bearing, and means to hold said pulley from movement longitudinally of said bearing.

63. In a profiler, the combination with a bearing, having concentric external and internal bearing surfaces, of a spindle rotatably mounted within said bearing and projecting therefrom, a pulley rotatably mounted upon the external surface of said bearing, a collar slidingly splined to said spindle and connected to the end of said pulley and a washer removably secured to the end of said bearing and loosely engaging in a recess provided therefor in the end of said pulley to hold said pulley against movement longitudinally of its bearing.

In witness whereof I have hereunto set my hand this 26th day of September, 1907.

MORRIS F. SMITH.

Witnesses:
CHARLES P. COLTON,
WM. BUSH.