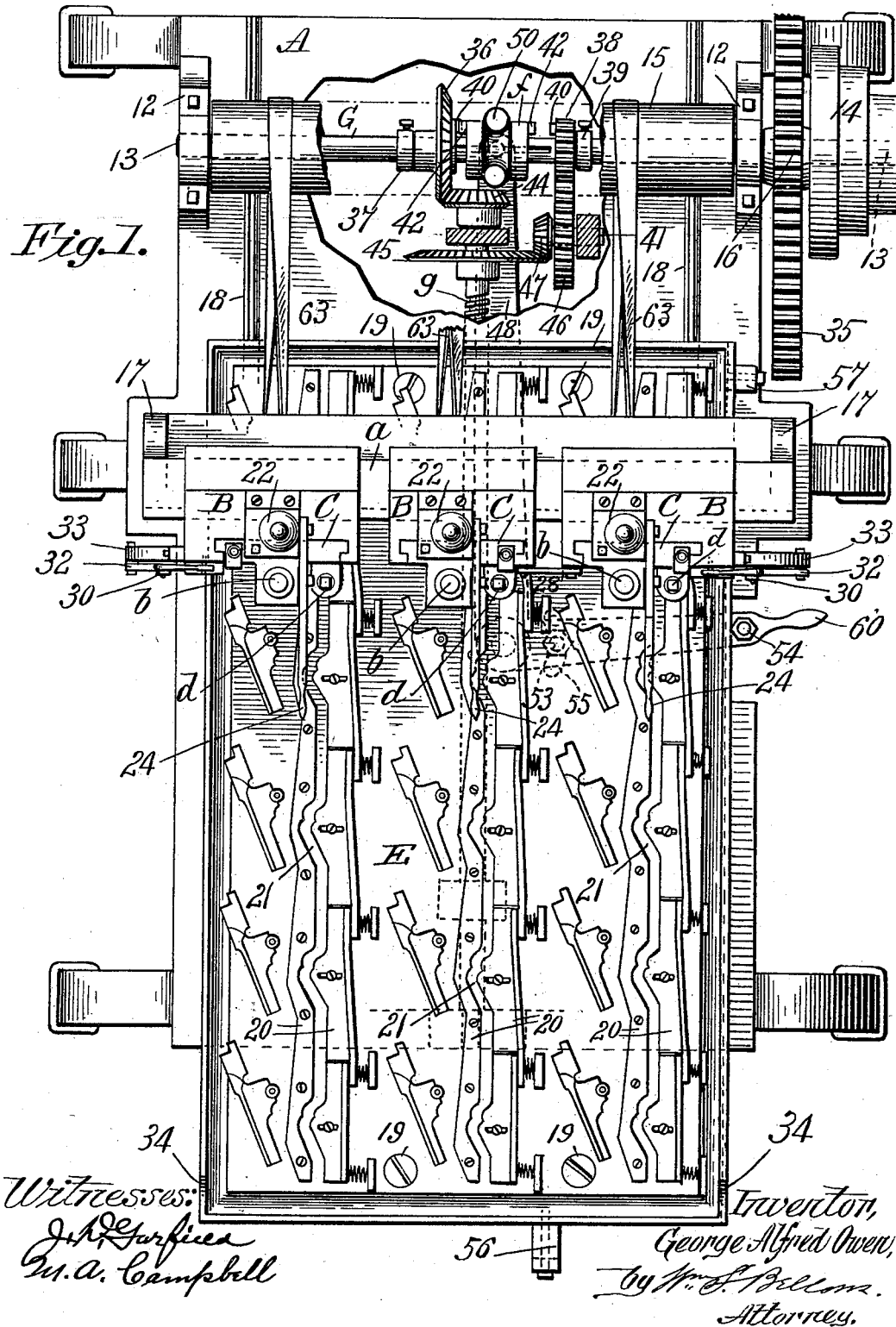


G. A. OWEN.
 PROFILING MACHINE.
 (Application filed Nov. 5, 1898.)

(No Model.)

4 Sheets—Sheet 1.



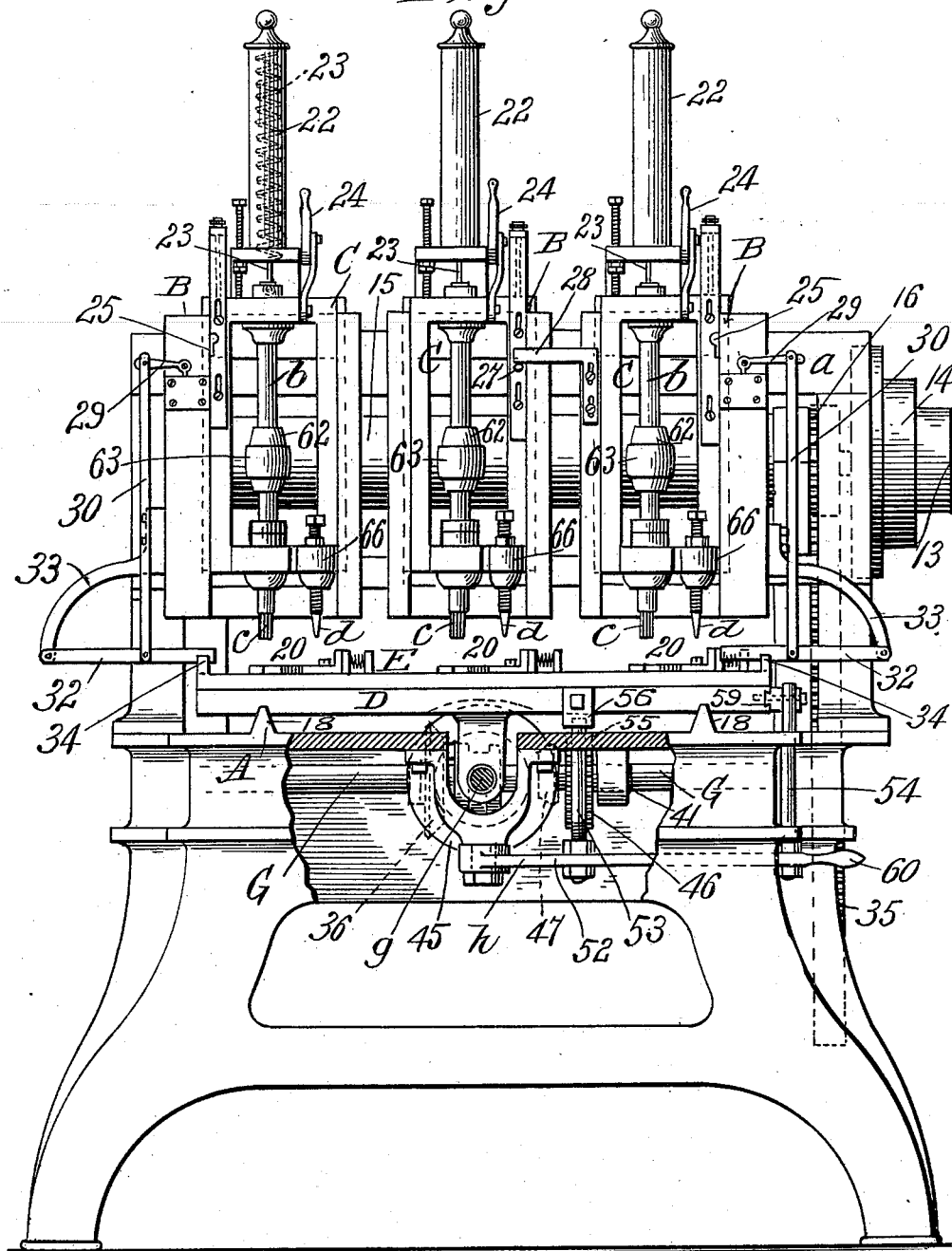
G. A. OWEN.
 PROFILING MACHINE.

(Application filed Nov. 5, 1898.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 2.



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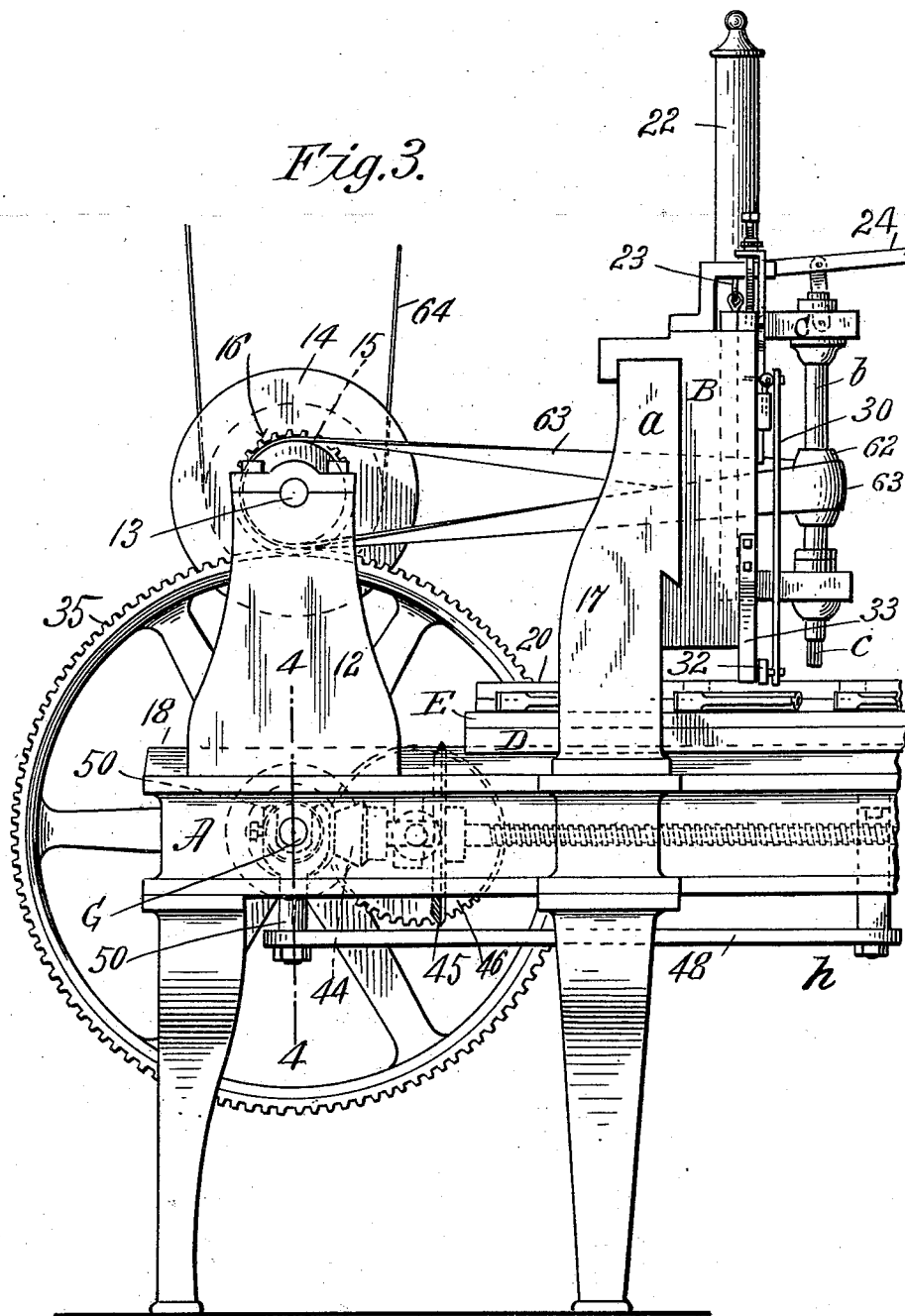
Patented Apr. 24, 1900.

G. A. OWEN.
PROFILING MACHINE.

(Application filed Nov. 5, 1898.)

(No Model.)

4 Sheets—Sheet 3.



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(Application filed Nov. 5, 1898.)

(No Model.)

4 Sheets—Sheet 4.

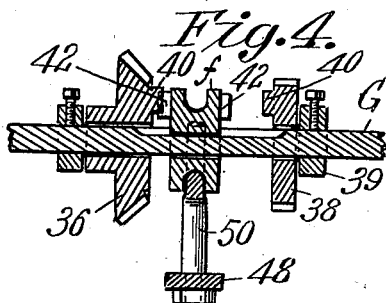


Fig. 5.

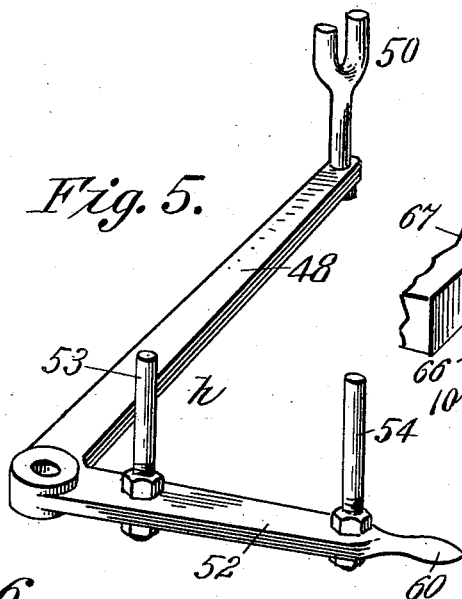


Fig. 9.

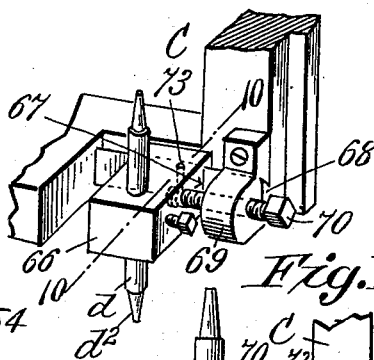


Fig. 10.

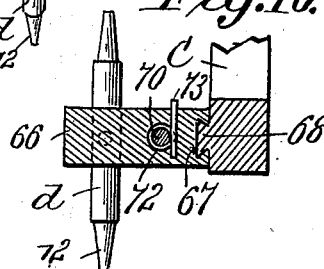


Fig. 6.

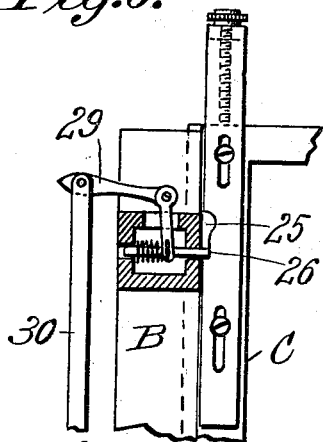


Fig. 8.

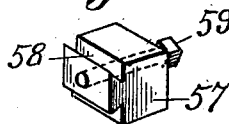
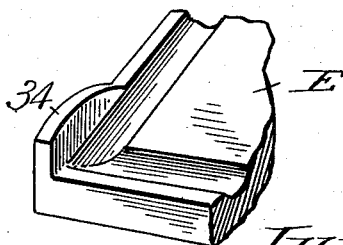


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE ALFRED OWEN, OF SPRINGFIELD, MASSACHUSETTS.

PROFILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 648,287, dated April 24, 1900.

Application filed November 5, 1898. Serial No. 695,554. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ALFRED OWEN, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Profiling-Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in profiling-machines of a class in which the movements of the tool or cutters, one or more, which move in an undulatory course, movable corresponding or relatively to the work being profiled, are automatically controlled by a pattern or former, the operation of profiling being automatic, avoiding the necessity of hand-operated means for maintaining the pattern-stud of the movable tool-support constantly in contact on the pattern or former, so that the operations of profiling may be performed by a person of less skill than heretofore required for such work.

Another object of the invention is to provide mechanism whereby the movable work-carrying bed of the machine will have its longitudinal horizontal movement while the profiling is being performed at a slow rate of speed, automatically shifting or reversing mechanism insuring the quick return movement of the bed.

Another object of the invention is to provide automatic mechanism for causing the support or supports for the tools or cutters and for the pattern-stud to be automatically lifted clear from the article being profiled and from the patterns after the work-carrying bed has reached the limit of its movement in one direction, leaving the tools and pattern-studs free and clear from the work and patterns while the work-carrying bed is having its quick return movement.

My purpose has further been to provide an automatic profiling-machine having capacity for largely-increased work with efficiency and practicability, which in its construction and organization is comparatively simple and inexpensive.

To these ends the invention consists in the coöperative combination and arrangement of parts, mechanisms, and devices, and in the construction of certain of such parts and

devices, all substantially as set forth in the claims.

Reference is to be had to the accompanying drawings, in which an exemplification of my present improved automatic profiling-machine is illustrated.

Figure 1 is a plan view of the machine with a portion at the rear end of the main bed or support shown as broken out for disclosing underlying mechanism for imparting clearer understanding of the machine. Fig. 2 is a front end elevation, a portion of the bed being broken away to enable clearer illustration of parts of the mechanism. Fig. 3 is a side elevation of the rear end portion of the machine. Fig. 4 is a vertical sectional view of a portion of the reversing mechanism for the work-carrying bed, taken on the line 4 4, Fig. 3. Fig. 5 is a perspective view of appliances comprised in the reversing mechanism, to be hereinafter more particularly referred to. Fig. 6 is a view in front elevation and partial section, showing the device for latching or restraining the tool-support in its lowered position and showing in part the mechanism of connection whereby the said latch device is automatically released. Fig. 7 is a perspective view of a cam device on the work-carrying support which operates to release the last-mentioned latch device. Fig. 8 is a perspective view in detail of the dog or projection provided on the work-carrying bed and which is comprised as a coöperating part in the reversing mechanism. Fig. 9 is a perspective view illustrating the means whereby the pattern-stud is adjusted relatively to the position of the cutting-tool. Fig. 10 is a vertical sectional view taken on the plane indicated by the line 10 10, Fig. 9.

Similar characters of reference indicate corresponding parts in all of the views.

In the drawings, A indicates the main or stationary bed of the machine, mounted on legs, as shown, and provided with suitable journal supports or uprights 12 12 at the rear end for the driving-shaft 13, having thereon the cone-pulley 14, the drum or elongated pulley 15, and the spur gear-wheel 16 of comparatively-small size. Intermediate between the front and rear ends of the bed the latter is at its opposite sides provided with the up-

rights 17 17, rigidly supporting between them the elevated horizontal transverse member *a*, on which, as shown, three independent and transversely-movable carriages B B B are engaged for sliding movement, each of these carriages having vertical ways therein, in which are fitted for vertically-sliding movements the supports C C C for the spindles or shafts *b*, which carry the cutting-tools *c* at their lower ends, said supports also being provided with the depending studs or tracers *d*, which are adapted to bear upon the marginal portions of the pattern or former grooves, hereinafter pointed out.

15 The bed A is provided with the longitudinal ways 18 18, along which is mounted to slide longitudinally the work-carrying bed D, of rectangular form, having superimposed and detachably confining thereon by the screws 19 the work-carrying plate E. The work-carrying plate is provided with the several longitudinally-arranged series of patterns or formers 20, having grooves 21, the contour of each of which corresponds to that of the work to be profiled.

As shown in the present illustration, a series of revolver-barrels are shown as placed on the work-carrying plate, it being deemed not necessary to obscure the drawings by showing the work clamping or confining devices, it being understood that any of the common or otherwise suitable work-confining clamps or jigs may be employed.

In the upstanding tubular cases 22, supported by and above the respective transversely-movable carriages B B B, springs 23 are provided, which are connected to have a lifting action upon the vertically-sliding tool-support C. These supports are depressed against the lifting force of the springs by the levers 24. Each of the outer tool-supports has a notch or catch-rest or shoulder 25, in which a locking bolt or latch 26 (more particularly shown in Fig. 6) engages for restraining the vertically-movable slides in their lowered positions to insure that the tracers will be down in engagement in the pattern-grooves and the cutting-tools lowered to their work on the articles to be profiled until such time as the latching-bolts are disengaged from the said notches 25 by the automatically-operating mechanism, which will be hereinafter particularly described. The middle one of the three vertically-sliding tool-supports is provided with the stud 27, while the slide C, to one side of the middle slide, is provided with the horizontally-extending lug 28, which extends over said stud 27 and serves when the outer slide is depressed to hold also the middle slide depressed.

Each of the latching-bolts 26 has an angular bolt-operating lever 29, and to each of these angular levers a connecting or thrust rod 30 is secured by its upper end, the lower end of the rod being connected or engaged with an intermediate portion of a lever 32, the outer end of which is pivoted on the bracket

33, affixed to the outer carriage, the inner extremities of each of these levers projecting transversely beyond the marginal portion of the work-carrying plate.

The work-carrying plate has at its lateral edges next to its front end the cam projections 34, which when the work-carrying bed D and plate E have been moved to about their rearward limit impinge against the levers 32, securing the swinging movements thereof, and the release of the latch-bolts for the two outer tool-carrying slides permitting them to be by their springs elevated and leaving the intermediate one of the slides also unrestrained to be also elevated by its spring.

The mechanism for imparting the slow rearward working motion to the movable bed and work-holding plate and for insuring the return movement thereof at a much quicker rate of speed will be now described.

Below the pulley-shaft 13, parallel therewith, is the horizontal transverse counter-shaft G, having on its end the comparatively-large spur gear-wheel 35, which meshes in the gear 16 on the driving-shaft 13. The counter-shaft G has loose thereon the bevel gear-wheel 36, the hub of which is in abutment against the fixed collar 37 on the counter-shaft. Opposite said bevel-gear 36 and suitably distant therefrom is a spur-gear 38, which is also understood as loose on the counter-shaft, it being held against outward displacement by the collar 39. The inner faces of both said gear-wheels 36 and 38 have the clutch members 40 provided thereon. The shiftable clutch-sleeve *f*, which is splined and longitudinally movable on the counter-shaft between the said gear-wheels 36 and 38, has projecting from its opposite faces the clutch members 42, so that when said sleeve is moved endwise in the one or the other direction the counter-shaft primarily driven from the shaft 13 will cause either the rotation of the bevel gear-wheel 36 or the spur gear-wheel 38 in the same direction as that of the rotation of the counter-shaft; but only one of these gears, however, will be rotated at any one time.

Longitudinally supported centrally and horizontally under the stationary bed A is a feed-screw or worm shaft *g*, having fixed on its end next to and to mesh into the aforesaid bevel gear-wheel 36 the somewhat-smaller bevel gear-wheel 44. The said feed-screw shaft has near its end, a short distance within the location of the said bevel gear-wheel 44, another fixed and considerably-larger bevel gear-wheel 45. A short stud-shaft 41 is horizontally journaled under the stationary bed A, parallel with the counter-shaft and a short distance forward thereof, which stud-shaft has thereon the fixed spur gear-wheel 46 and the comparatively-small bevel gear-wheel 47, which meshes into the larger bevel gear-wheel 45 on the feed-screw shaft. The clutch-sleeve shifter, as seen in detail in Fig. 5, the same consisting of the rigid angular lever *h*, hav-

ing a pivotal support at its elbow for a swinging movement in a horizontal plane under the stationary bed A, its longitudinal arm 48, extended rearwardly under the counter-shaft, 5 being provided with the upstanding fork 50, which embraces and engages the grooved splined clutch-sleeve *f*. The laterally-projected arm 52 of said angular lever is provided with the upstanding studs or posts 53 and 54, 10 the one nearer the fulcrum-support being extended through the arc-formed slot 55, formed in and through the top of the main bed A, said slot being indicated by the dotted lines in Fig. 1, and, as shown in Fig. 2, the upper 15 end of said stud 53 projects above the surface of the top of the bed A. The work-carrying bed at its front end has the edgewise-provided depending lug or abutment 56, which is in line with the stud 53. The other upstanding 20 stud 54 of the angular lever has its position outside of the lateral edge of the movable bed and work-holding plate, as shown in Figs. 1 and 2, and the movable work-carrying bed has at its lateral edge, near its rear end, the 25 adjustable dog or abutment-block 57, the same as shown in Fig. 8, having the dovetail rib 58, which enters the corresponding shaped groove 59 therefor in the side edge of the movable bed D, said dog being held in any 30 of its positions of adjustment longitudinally by the confining-bolt or set-screw 59.

The extremity of the transversely-extending member of the angular lever H, as shown in the drawings, is formed rounded and tapered to constitute a handle 60 to be conveniently grasped for a manual operation to be hereinafter described.

The tool-carrying spindles *b*, vertically journaled in each of the slides C and which 40 at their lower ends are provided with the cutting-tool *c*, are provided with the pulleys 62, around which run the belts 63, which also run around and are driven by the drum 15.

The operation of the machine will be now 45 described, it being understood that the work-carrying bed with the work-holding plate having the patterns thereon provided to correspond with the articles to be profiled is in the forwardly-returning position, (shown in Fig. 50 1,) having been run about two-thirds forward to its starting position, the series of work having been previously profiled and the sliding splined clutching-sleeve being in clutch with the bevel gear-wheel 36, so that such gear 55 working on the smaller bevel gear-wheel 44 will cause the return movement of the work-carrying bed at a comparatively-fast rate of speed, and when the work-carrying bed has about reached its limit of forward movement 60 the dog 57, contacting on the member 54 of the clutch-shifting device *h*, will throw the spline out of engagement with the gear-wheel 36, so that there will be no further forwardly driving of the feed-screw shaft from the shaft 65 G through the gearing 36 and 44. The new series of parts to be profiled having been properly placed on the work-holding plate and

the slides C C having been lowered to present the tracers in contact in the pattern-grooves and the cutting-tools for operation at 70 the edges of the work the handle portion 60 of the clutch-shifting device is grasped and forwardly swung, placing the clutch-sleeve *f* in clutch with the gear-wheel 40, which is loose on the shaft G, whereupon such gear- 75 wheel rotates, and through the gears 46 and 47, which operate on the feed-screw-shaft gear-wheel 45, cause the rotation of the feed-screw shaft *g* at a much slower rate than the rotation which it has when driven through 80 the gearing 36 44 and in the reverse direction, all as is suitable for the proper slow feeding motion of the bed while the cutters are performing their work. As the work-carrying bed approaches its rearward limit 85 of movement its abutment 56 in striking against the upstanding member 53 of the clutch-sleeve-shifting device, which member 53 is shown as located near the fulcrum of the angular lever comprised in such shifting 90 device, imparts by a slight degree of bodily movement of the member 53 as forced by the abutment 56 a comparatively considerable swinging movement of the rear end of the lever-arm 48 and corresponding extent of 95 sliding movement of the clutch-sleeve to carry the latter not only entirely out of clutch with the gear-wheel 36, but into clutch with the spur gear-wheel 38 to insure automatically and immediately the reversal and return 100 movement of the work-holding bed, and just before or at about the time that the clutch is reversely shifted for the purpose stated the cam projections 34 operate on the levers 32, automatically disengaging the latch-bolts 26 105 from their restraining engagements with the lowered tool-carrying slide C, leaving the latter free to be lifted by their springs, and in the return movement of the work-carrying bed the dog 57 again serves to throw the clutch-sleeve out of engagement with the gear-wheel 110 36, as before described, it being noticed that the dog 57 in its forcing movement on the member 54 is operating at the extremity of the lever-arm 52 and distant from its fulcrum, 115 and that there is quite a long distance between the right-hand end of the clutch-sleeve and the gear-wheel 38, so that the sleeve *f* will not be unduly placed in clutch with the gear-wheel 38. 120

The tracers *d* are shown as provided with tapered extremities *d*² and vertically adjustable through the lug or bracket therefor (indicated at 66) forwardly extended beyond the face of the lower portion of each tool-carrying slide. For fine adjustments, so that 125 the surfaces of the tracers to engage the edges of the pattern-grooves may be properly in relation to the cutting-tools, the tracers may be raised or lowered slightly in their bracket; 130 but in order to provide greater latitude of adjustment for manifest convenience and increased availability the brackets 66 are themselves bodily adjustable in a line toward and

away from the tool-carrying shafts, as clearly shown in Figs. 9 and 10, in which each bracket 66 is shown as consisting of a block having a dovetail way 67 at its inner edge fitting to slide over the dovetail rib 68 on the tool-carrying support C. The tool-carrying support is provided with a rigid lug or fixture 69, to which an adjusting and operating screw 70 is passed with a screw-thread engagement, the extremity of said screw being entered to engage in the bracket 66 in such a way as to rotate relatively thereto and yet to insure that the bracket will be forced bodily in unison with the screw. This engagement of the part of the screw which penetrates into the socket therefor in the bracket 66 is shown as being made with the bracket by providing an annular groove 72 around the end portion of the screw and providing a key or pin 73 to engage the grooved part of the screw.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a profiling-machine, a stationary bed, a horizontally-movable work-carrying support provided with one or more pattern or former plates, a reversible driving mechanism for imparting the longitudinal feed and return movements to said work-carrying support along said bed, a tool-carrying support movable horizontally transversely relatively to the pattern and also adapted for a vertical sliding movement toward and from the surface of the work-carrying support, having a tracer to engage the pattern and carrying a cutting-tool, means for rotating the cutting-tool, a device for engaging the sliding tool-carrying support for confining it in its lowered position, means operated by the work-carrying support and acting on the said engaging devices for the sliding tool-support for periodically and automatically releasing the latter, means for elevating and sustaining the released vertically-sliding support, a device operated by the work-carrying support for automatically reversing the driving mechanism for said work-carrying support when the same has completed its longitudinal feed movement, and for automatically placing said reversible mechanism out of driving connection with the said longitudinally-movable support when the latter has completed its return movement.

2. In an automatic profiling-machine having the longitudinally movable and reciprocating work-carrying bed and means for imparting its movements thereto, said bed being provided with a cam 34, and the transversely-movable carriage B and vertically-movable slide C having the tracer and profiling-tool, substantially as described, of a latching-bolt adapted to engage the slide and having an operating-lever, a lever 32 carried by the carriage and located across the path of

movement of the cam, and a connection between said lever 32 and the latch-bolt-operating lever, substantially as described.

3. In an automatic profiling-machine, in combination, the main bed and the longitudinally-movable work-carrying bed having formers, the transverse elevated support *a* having the carriage B movable along same provided with the vertical slide C having tool-carrying shaft and tracer, the shaft G and means for rotating it, the gear-wheels 36 and 38 loose on said shaft, the splined clutch-sleeve, on said shaft G, the longitudinal feed-screw shaft engaging the movable carriage having the gear 44 meshing gear 36, and having the gear-wheel 45, the gear 46 meshing the gear 38 and having the gear 47 meshing the gear 45, a sleeve-shifting device moved in opposite directions to shift the sleeve by the movable bed, and means for rotating the tool-shaft, substantially as and for the purposes set forth.

4. In an automatic profiling-machine, in combination, the main bed and the longitudinally-movable work-carrying bed having formers and the abutment 56, the transverse elevated support *a* having the carriage B movable along same provided with the vertical slide C having tool-carrying shaft and tracer, the shaft G and means for rotating it, the gear-wheels 36 and 38 loose on said shaft, the splined clutch-sleeve, on said shaft G, the longitudinal feed-screw shaft engaging the movable carriage having the gear 44 meshing gear 36, and having the gear-wheel 45, the gear 46 meshing the gear 38 and having the gear 47 meshing the gear 45, a swinging sleeve-shifting device having the projection 53 adapted to be engaged by said abutment 56 of the movable bed, and means for rotating the tool-shaft.

5. In an automatic profiling-machine, in combination, the main bed and the longitudinally-movable work-carrying bed having formers and the distantly-located abutments 56 and 57, the transverse elevated support *a* having the carriage B movable along same provided with the vertical slide C having tool-carrying shaft and a tracer, and means for rotating the tool-shaft, the shaft G and means for rotating it, the gear-wheels 36 and 38 loose on said shaft, the splined clutch-sleeve, on said shaft G, the longitudinal feed-screw shaft engaging the movable carriage having the gear 44 meshing gear 36, and having the gear-wheel 45, the gear 46 meshing the gear 38 and having the gear 47 meshing the gear 45, a swinging sleeve-shifting device having the projections 53 and 54 adapted to be successively engaged by said abutments 56 and 57 of the movable bed, for the purposes set forth.

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