

(No Model.)

6 Sheets—Sheet 1.

G. DUNHAM.
MACHINE FOR FINISHING NUTS.

No. 580,597.

Patented Apr. 13, 1897.

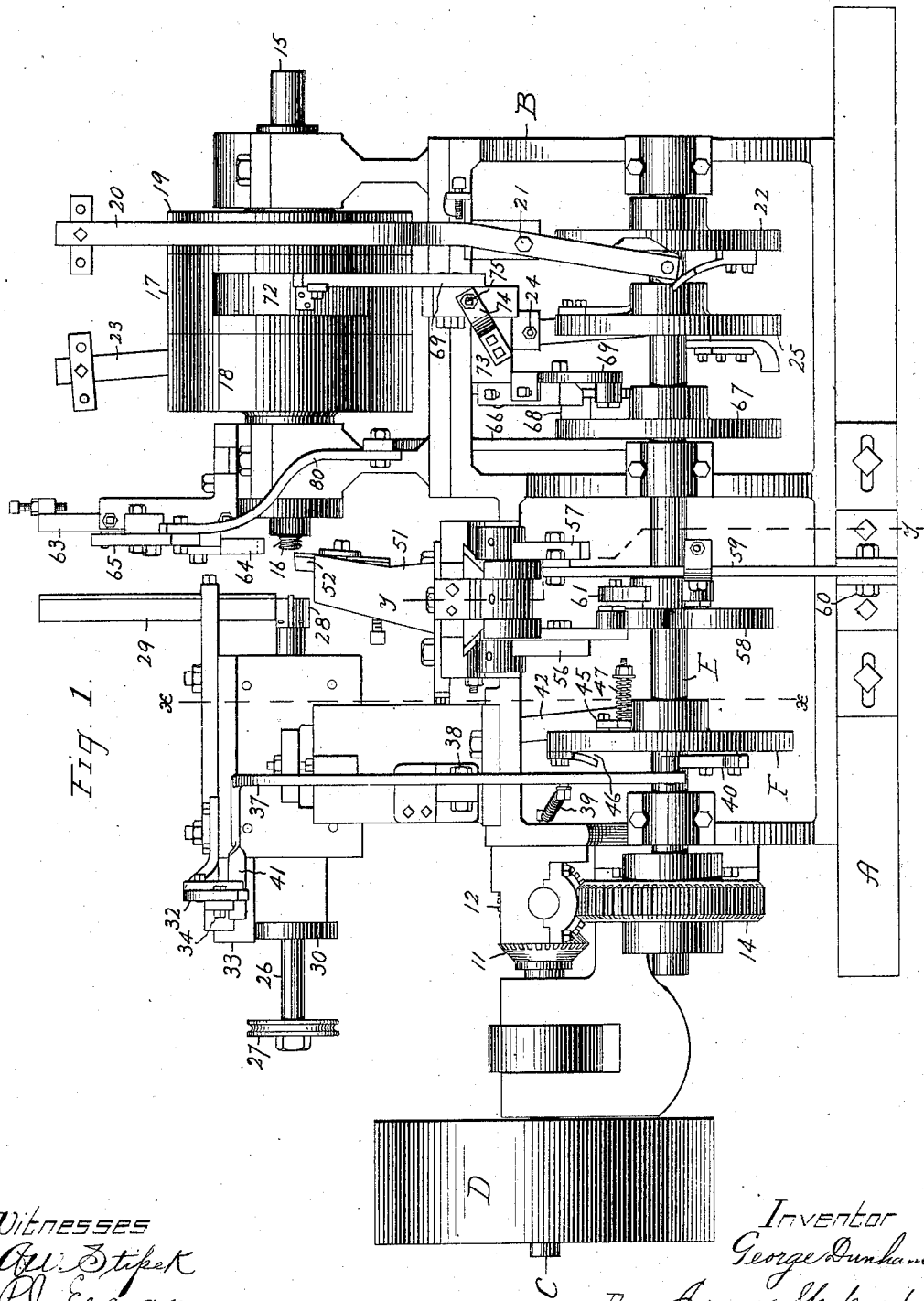


Fig. 1.

Witnesses
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By *James Shepard*
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(No Model.)

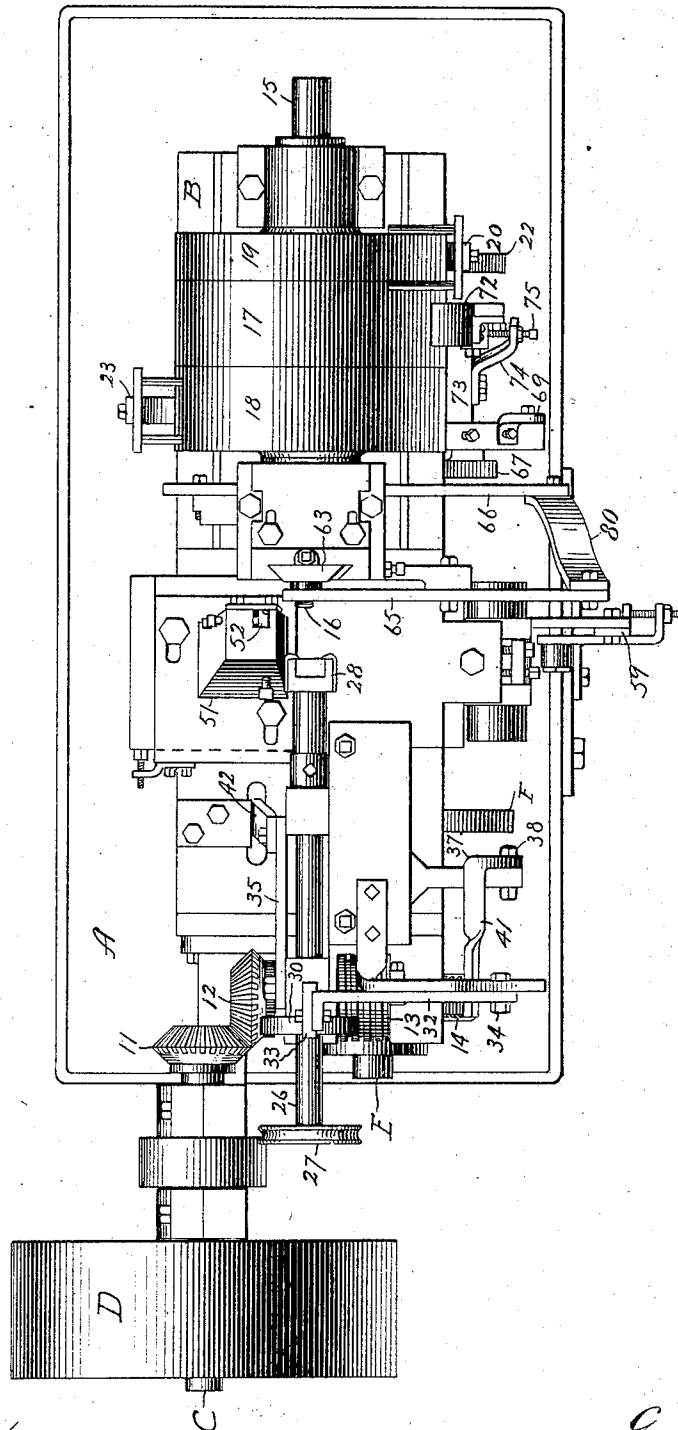
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Fig. 2.



WITNESSES

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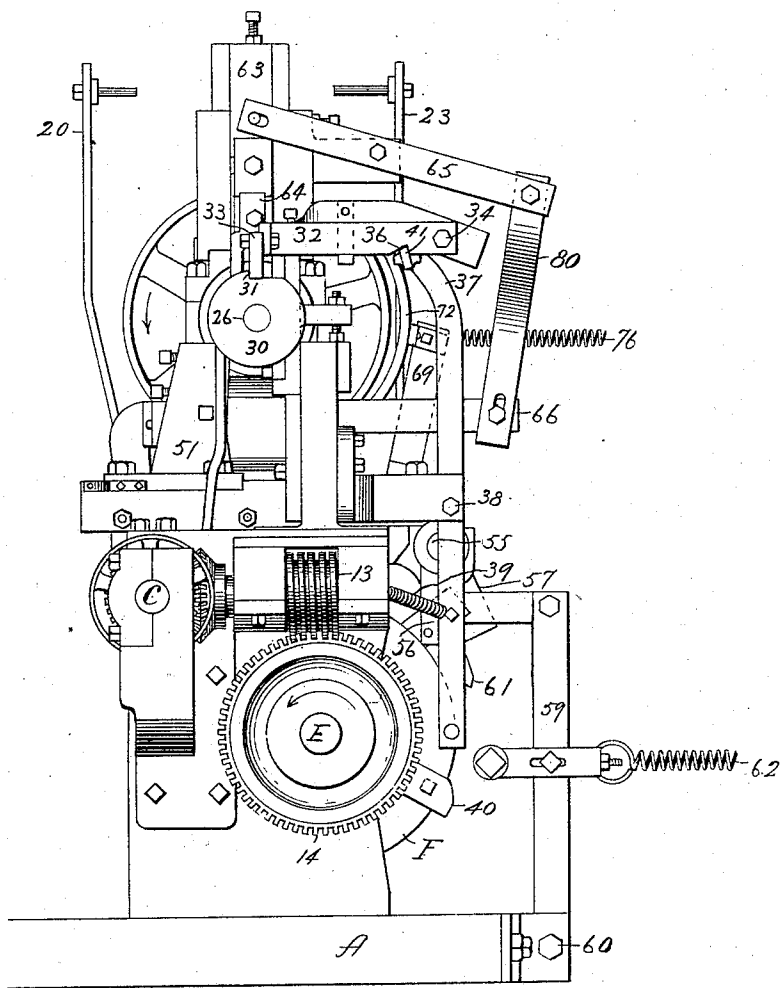
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Fig. 3.



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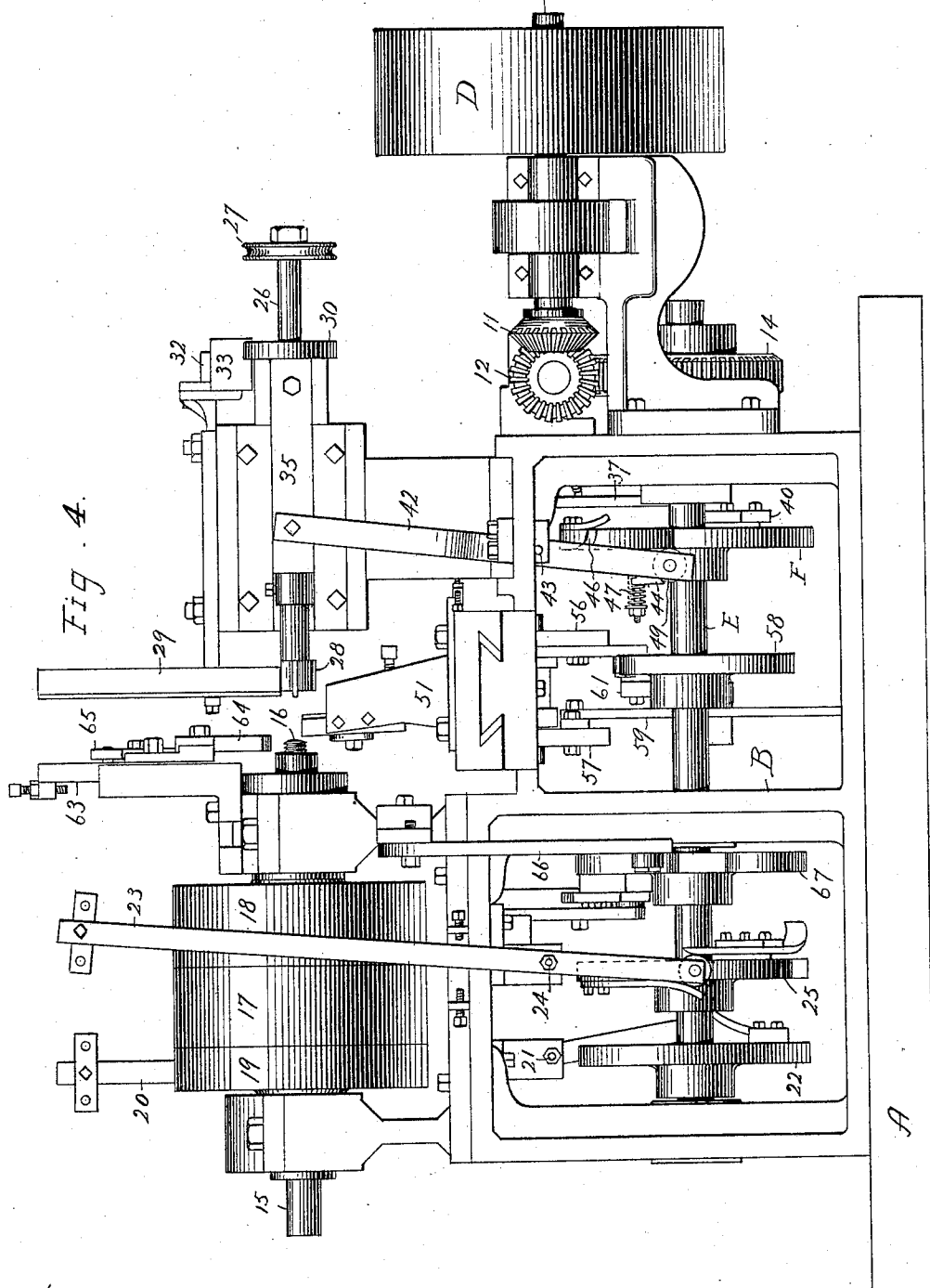
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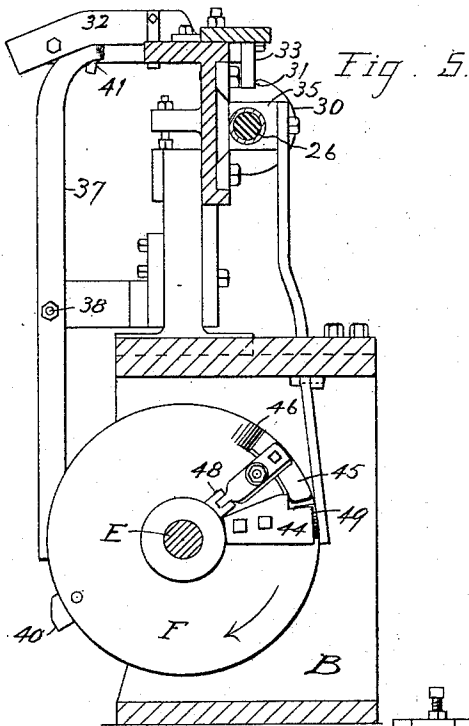


Fig. 6.

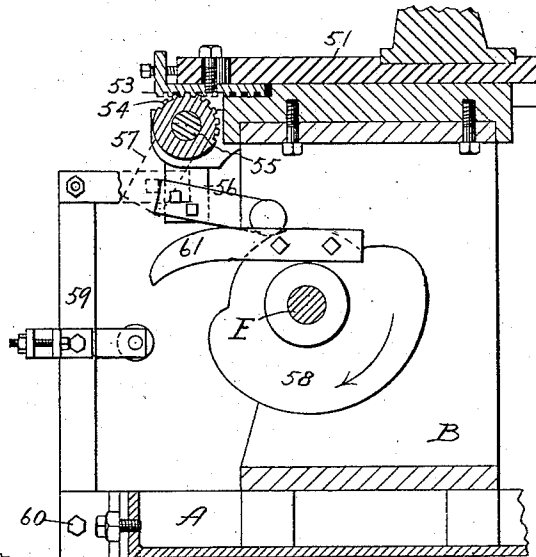
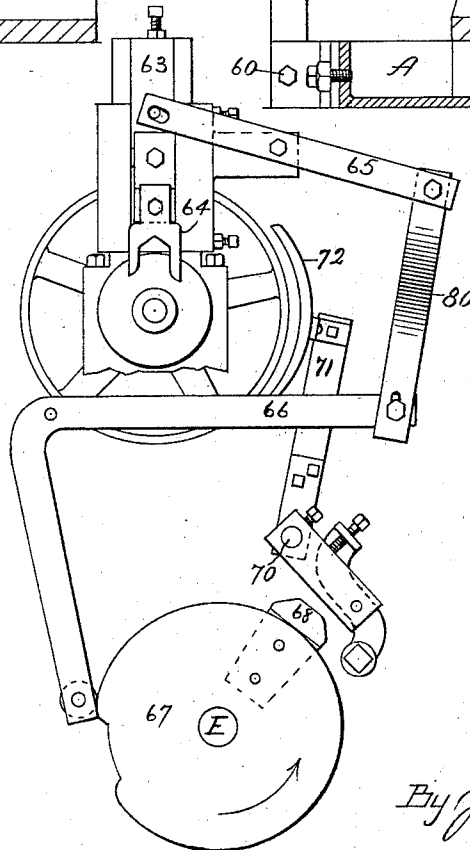


Fig. 7.



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Fig. 8.

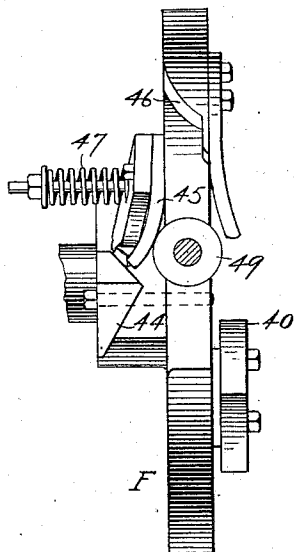


Fig. 9.

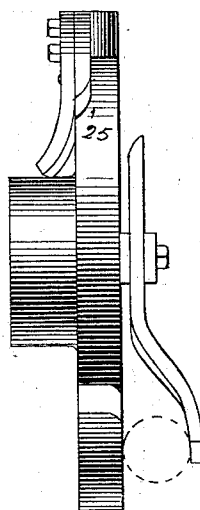
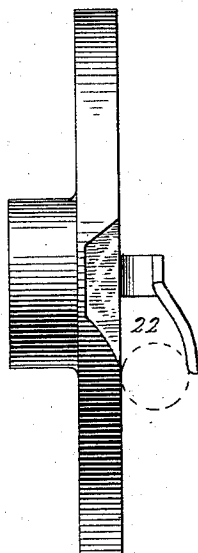


Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE DUNHAM, OF UNIONVILLE, CONNECTICUT.

MACHINE FOR FINISHING NUTS.

SPECIFICATION forming part of Letters Patent No. 580,597, dated April 13, 1897.

Application filed December 20, 1895. Serial No. 572,754. (No model.)

To all whom it may concern:

Be it known that I, GEORGE DUNHAM, a citizen of the United States, residing at Unionville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Finishing Nuts, of which the following is a specification.

My invention relates to improvements in machines for finishing or facing nuts; and the objects of my improvement are simplicity and economy in construction, general efficiency and convenience in operation, and particularly to screw the nuts on and off the spindle automatically.

In the accompanying drawings, Figure 1 is a front elevation of my machine. Fig. 2 is a plan view of the same with the nut-chute removed. Fig. 3 is an end view with the driving-pulleys of the main shaft and carrier shaft or spindle removed. Fig. 4 is a rear elevation. Fig. 5 is a vertical section on the line *xx* of Fig. 1. Fig. 6 is a vertical section of the lower part of said machine on the line *yy* of Fig. 1. Fig. 7 is an elevation of parts to illustrate the wrench and brake, together with their operating devices. Fig. 8 is a detached edge view of the cam for moving the carrier-spindle longitudinally and also for operating the carrier-spindle release, and Figs. 9 and 10 are detached edge views of the two shipper-cams.

A designates a pan or base upon which the frame B of my machine is mounted.

C designates the driving-shaft, carrying the driving-pulley D and beveled gear 11, which engages and drives a like beveled gear 12 on the worm 13. The cam-shaft E is provided with a worm-gear 14, that is engaged with the worm 13 and driven thereby to revolve the cam-shaft. A spindle or shaft 15, similar to a lathe-spindle, carries the nut-arbor 16, which is threaded and shouldered for rotating a nut when screwed thereon. Said spindle 15 is also provided with a fast pulley 17, a wide loose pulley 18, and a narrow loose pulley 19, the fast pulley being between the two loose pulleys, as in analogous shafts, for being driven in reverse directions by a straight and cross belt.

Of course the pulleys might be all of the same width if desired; but it is not necessary,

as I contemplate using a wide belt for driving the nut-shaft in the direction to screw the nuts onto the nut-arbor and for facing them when on said arbor and a narrow belt for screwing them off said arbor.

A shipper-lever 20 for the cross-belt is pivoted to a suitable support on the frame, as at 21, Fig. 4, and extends down to the double-acting cam 22 on the cam-shaft E, and a similar shipper-lever 23 is pivoted in like manner, as at 24, Fig. 4, and extends down to the shipper-cam 25 on the cam-shaft E.

In alinement with the nut-arbor 16 is the carrier-spindle 26, mounted to rotate at times in a sliding frame 35, which slides longitudinally in suitable ways or guides. It is provided with a small driving-pulley 27 at one end and with the nut chuck or carrier 28 at the opposite end. The upper side of the carrier 28, when set in position to receive a nut from the chute 29, is flush with the extreme upper side of the adjacent portion of the carrier-spindle, as shown in Figs. 1 and 4, and the lower end of the chute 29 comes down to nearly meet said side of the carrier. The carrier is moved out from under the chute when the nut is screwed on and off the spindle, and its rotary movement, after discharging a nut, is stopped with the carrier in the proper position to again come under the chute and receive a nut by the following mechanism: A round friction-belt is run on the grooved driving-pulley 27 from any convenient driving-shaft, so as to have a tendency to turn the carrier-spindle in the right-hand direction for screwing the nut on the nut-arbor, said belt being left loose enough to slip when the carrier-spindle is held against rotation or when the nut is screwed home on the nut-arbor to permit the said arbor to turn the carrier-spindle instead of its being driven by the said round belt. Upon the carrier-spindle is a stop-disk 30, having a shoulder 31. A swinging arm 32, carrying a stop 33, is pivoted to a stationary support, as at 34, and is provided with a cam-notch 36, Fig. 3, at its under edge. A stop-lever 37 is pivoted to a stationary part of the frame, as at 38, is pulled in one direction by the spring 39 and is forced in the opposite direction by the projection 40 on the cam-disk F of the cam-shaft E. The upper arm 41 of the stop-lever 37 lies under

the cam-notch 36, whereby the movement of said lever brings the stop 33 of the swinging arm 32 out of contact with the stop-disk 30 and permits said swinging arm and stop to fall for stopping the rotation of the carrier-spindle as driven by the pulley 27 with the carrier or chuck right side up and in the proper position to receive a nut from the chute 29. The sliding frame 35, together with the carrier-spindle and connected parts, is reciprocated by means of the lever 42 (which is pivoted to the frame, as at 43, Fig. 4) and cams 44, 45, and 46 on the cam-disk F. The lower end of the lever 42 is provided with a friction-roller 49. (Shown separately in Fig. 8.) The other levers are or may be provided with like rollers; but I consider it unnecessary to describe them further. The cam 44 is rigidly mounted on the cam-disk F and is therefore positive in its action, while the cam 45, which is a continuation thereof, is yielding. I make this cam to yield by constructing it as a swinging block pivoted at 48, Fig. 5, and held to its work by the spring 47. The cams 44 and 45 force the carrier-spindle in the direction to press the carrier upon the nut-arbor and the cam 46 forces the carrier in the opposite direction.

Arranged to move transversely in suitable ways on the frame of the machine is the tool-carriage 51, in which may be mounted any desired form of tool 52 for dressing either side of the nut. On the under side of said tool-carriage is a rack 53, which engages a gear 54 on the shaft 55, Fig. 6. Said shaft is provided with two rocking arms 56 and 57. The arm 56 extends to the periphery of the cam 58 and is forced in one direction thereby to turn the gear 54 and move the tool-carriage slowly in the direction for carrying the tool 52 over the face of the nut on the nut-arbor to dress the nut. The arm 57 is connected with the swinging lever 59, pivoted to the base A, as at 60, and is forced quickly in the direction to return the tool-carriage by means of the projection 61 on the body of the cam 58. A spring 62, Fig. 3, has one end secured to the lever 59, and has its other end secured under a pulling strain to some proper stationary support, thereby having a tendency to keep the rocking arm 56 in engagement with the periphery of the cam 58.

A vertical slide 63 is arranged to move in proper ways or guides over the nut-arbor 16 and carries the fork or wrench 64, the inner corners of both of its arms being rounded and one arm made longer than the other, as shown in Fig. 7. The slide may fall by gravity or be forced downwardly by a spring. It is raised by means of the levers 65 and 66, connecting-link 80, and the cam 67, acting on said lever 66. The body of the cam 67 has secured to it or projecting therefrom the cam projection 68, which acts upon the lower brake-arm 69 for moving the rocking shaft 70, Fig. 7, to which said arm is secured, as is also the upper brake-arm 71, that carries the brake

72 for acting upon the fast pulley 17 of the nut-arbor shaft or spindle. Said rock-shaft is mounted in any suitable boxes or bearings 73, and on said box I arrange a bracket 74, provided with a stop-screw 75 to limit the outward movement of the brake-arm 71 and its brake. The brake may be withdrawn from the pulley 17 and held out of contact therewith (excepting when forced against the same by the cam projection 68) by means of the spring 76, Fig. 3, the spring being strained between said brake and some stationary support.

The chute may be supplied with nuts in any proper manner, and all the nuts in the chute should be faced the same way. The nuts might be placed directly in the carrier one by one by hand, but I prefer to employ the chute. When the carrier or chuck comes under the lower end of the chute, the bottom nut in the chute falls into said carrier. The several pulleys hereinbefore described are provided with the proper belts, which are in motion. The cam-disk F acts upon the lever 42 to move the carrier-spindle and carrier to the nut-arbor. The shipper-cams have so acted on the shipper-levers 20 23 that the narrow reversing-belt will now be on the narrow loose pulley and the wide belt on the fast pulley to drive the nut-arbor and screw it into the nut in the carrier as the nut is pressed with a yielding motion against such arbor through the yielding cam 45, so as to give time for the threads to adjust themselves to each other and not crowd or mar the thread in the nut. The carrier and its spindle are held against rotation in opposition to the revolution of the nut-arbor by means of the slipping or friction belt on the pulley 27, which yieldingly drives said pulley, and it is held in opposition to said belt by means of the shoulder on the stop-disk and the stop interposed in front of the said shoulder. The forward movement of the carrier-spindle will carry the stop-disk 30 by the stop 33, so that it will run off the end of said stop and leave the rotation of the carrier-spindle wholly to the respective belts which drive said spindle and the nut-arbor. Each belt will drive its own spindle until the nut is firmly screwed up against the shoulder on the nut-arbor, and then if the carrier is not withdrawn the belt on the pulley 27 of the carrier-spindle will yield or slip and both spindles will be driven by the more powerful belt on the pulley 17, which drives the nut-arbor. The projection 40 on the cam-disk F now acts to lift the stop 33, and the cam 46 acts to slide the carrier back to its former position. Before the carrier is back the stop 33 falls on the edge of the stop-disk 30 and the belt on the pulley 27 rotates the carrier-spindle until it is stopped by the stop 33, so as to bring the carrier right side up and in proper position to come under the chute for receiving another nut. The cam 58 now acts to move the tool-carriage and facing-tool over the face of the nut

to finish one of its broad sides, after which the carriage is quickly moved back by the mechanism hereinbefore described. A lot of nuts may be all put in with their rounding
 5 face toward the nut-arbor and have the tool formed to dress their flat side, and then the same lot of nuts may be again put through the machine but faced the other way in the chute to present their flat sides to the shoulder of the nut arbor and have their rounding
 10 side dressed by a tool of the desired form, or the machine may be used for either one of these operations alone. The shipper-lever 23 is now operated through the shipper-cam
 15 25 to throw the driving-belt upon the loose pulley 18, and then the projection 68 on the cam 67 acts to press the brake upon the pulley 17 to stop the revolution of the nut-arbor, and then retreats. The recess in the cam 67 then
 20 comes in front of the lower end of the lever 66 to permit the wrench or fork to descend upon the nut on the nut-arbor. If the side faces of the nut stand substantially parallel to the wrench-arm, the wrench will readily
 25 fall into place, but if not then the long arm will strike and rest upon one of the side faces of the nut ready to slide down over it as the spindle begins to move, and then hold the nut against rotation. The short arm, if present,
 30 must be so far above the long arm as not to engage the nut until after the long arm has slipped down for substantially the whole length of the side face engaged therewith. In fact the long arm alone will act as a wrench,
 35 but the two arms balance the lateral strain on the spindle. The shipper-cam 22 acts quickly to throw the reversing-belt from the narrow pulley 19 to the fast pulley 17 to revolve the nut-arbor in the direction to unscrew the nut therefrom before the recess in
 40 the cam 67 passes the end of the lever 66 to raise the wrench or fork back to its former position, and then said cam returns said belt to its loose pulley. The opposing or second
 45 face of the shipper-cam 25 now acts to throw the driving-belt upon the fast pulley and the operations before described may be repeated in facing or dressing other nuts.

I wish it distinctly understood that I do not
 50 limit my improvements to the precise details of construction, but contemplate making such changes as may be suggested by mechanical skill and as are fairly within the scope and spirit of my invention.

55 I claim as my invention—

1. A nut-finishing machine comprising a shouldered nut-arbor, mechanism for automatically screwing a nut on said arbor and up against its shoulder, mechanism for automatically driving said arbor backwardly and
 60 mechanism for automatically holding the nut against rotation while the said shouldered arbor is thus turned back substantially as described.

65 2. A nut-finishing machine comprising a shouldered nut-arbor, a dressing-tool, mechanism

for automatically screwing a nut on said arbor up against its shoulder, for carrying the dressing-tool over the face of the nut and back, for automatically driving said
 70 shouldered arbor backwardly and for holding the nut against rotation while the said shouldered arbor is thus turned back substantially as described.

3. A nut-finishing machine comprising a
 75 nut-arbor, mechanism for presenting a nut to said arbor for screwing it on, devices for crowding it thereon with a yielding pressure as the threads are about to engage mechanism for dressing the face of the nut while
 80 rotated on said arbor and for unscrewing the nuts from said arbor, substantially as described.

4. An automatic nut-finishing machine comprising a nut-arbor, a nut-carrier for presenting
 85 a nut thereto, a wrench or fork arranged to reciprocate in a right line to and from the nut on said arbor and at right angles to the axis of said arbor, mechanism for driving the said nut-arbor in reverse directions and for
 90 automatically presenting and withdrawing the said wrench or fork at the proper time relatively to reversing the motion of said nut-arbor, substantially as described.

5. A nut-finishing machine comprising a
 95 nut-arbor, means to rotate said arbor for screwing it into a nut, a nut-carrier, a carrier-spindle and means for yieldingly driving said carrier-spindle in the reverse direction from that of said nut-arbor in screwing on a nut,
 100 substantially as described and for the purpose specified.

6. A nut-finishing machine comprising a nut-arbor, fast and loose pulleys for straight
 105 and cross belts to drive said nut-arbor first in one direction and then reverse, a nut-carrier for presenting a nut to said arbor and screwing it thereon, a dressing-tool, mechanism for moving said tool over the nut to dress it when on said arbor, a nut-holding
 110 device to prevent rotation of the nut as the nut-arbor is turned in the reverse direction, and automatic mechanism for presenting and withdrawing said nut-holding devices, all combined and relatively timed substantially
 115 as described and for the purpose specified.

7. In a nut-finishing machine, the combination of a rotating nut-arbor, a nut-carrier, carrier-spindle on which said carrier is mounted,
 120 and devices for moving said carrier-spindle longitudinally and for rotating it at times, substantially as described and for the purpose specified.

8. The combination of a nut-arbor, a carrier for repeatedly presenting nuts to said
 125 arbor, means for operating said carrier, mechanism for driving said arbor backwardly when said carrier is withdrawn and automatic mechanism for holding the nut on said arbor against rotation while the said arbor is
 130 thus driven backwardly substantially as described.

9. The combination of a nut-arbor, means for automatically driving said arbor alternately in reverse directions, a chute, a carrier for taking a nut from said chute, presenting it to said nut-arbor and holding it against rotation while the arbor is being screwed into it, and automatically-operated means for holding the nut against rotation while the said arbor is being driven backwardly, substantially as described.

10. The combination of a nut-arbor, a carrier for presenting a nut thereto and holding it while the arbor is screwed thereinto, a dressing-tool, means for moving said tool over the face of the nut while rotated on said arbor, means for driving the arbor backwardly and for holding the nut against rotation while the arbor is thus driven back, all combined for acting automatically at the proper relative times, substantially as described.

11. The combination of a nut-arbor, a chute or hopper, a carrier for taking a nut from said hopper, presenting it to said nut-arbor and holding it while being screwed on, a dressing-tool for moving over the nut to dress it, fast and loose pulleys on said arbor for straight and cross belts, a shipper for said belts, and a wrench arranged to automatically move over the nut, hold it against rotation while being unscrewed from said arbor and then to withdraw, substantially as described.

12. The combination of a rotary nut-arbor for holding and rotating the nut to be dressed, a rotary carrier-spindle, stop devices to prevent rotation at times, and means for removing said stop devices to release the carrier substantially as described.

13. The combination of a nut-arbor, fast and loose pulleys thereon for straight and cross belts, a shipper for said belts, a carrier for presenting a nut to said arbor and holding it against rotation while being screwed on, and a wrench arranged to move over the nut and hold it against rotation while being unscrewed from said arbor substantially as described.

14. The combination of the nut-arbor, a chute or hopper, the carrier for presenting a nut to said arbor for screwing it on, devices for crowding it thereon with a yielding pressure as the threads are about to engage, mechanism for dressing the face of the nut while rotated on said arbor and for unscrewing the nut from said arbor, substantially as described.

15. The combination of the nut-arbor, a fixed chute or hopper, the carrier for taking a nut from said hopper and presenting it to said arbor, said carrier being mounted so as to slide and also to rotate at times, means for holding said carrier against rotation until the nut is screwed home on said arbor and then permitting said carrier to rotate with said arbor, the dressing-tool for dressing the nut when rotated on said arbor and means for automatically unscrewing the nut from

the arbor after being dressed, substantially as described.

16. The combination of the nut-arbor, a dressing-tool, means for moving said tool over the face of the nut while rotated on said arbor, the sliding and rotating carrier and means for holding the carrier against rotation and then releasing it, substantially as described and for the purpose specified.

17. The combination of the nut-arbor, the sliding and rotating carrier, means for holding the carrier against rotation and then releasing it, and means for taking the nut from said arbor, substantially as described and for the purpose specified.

18. The combination of the nut-arbor, the carrier for presenting a nut thereto, means for holding the carrier against rotation and then releasing it, a dressing-tool for moving over the nut to dress it, and means for taking the nut from the arbor, substantially as described and for the purpose specified.

19. The combination of a nut-arbor, a dressing-tool for moving over the face of the nut while rotated on said arbor, the fixed chute, the carrier, and means for sliding and rotating said carrier, substantially as described and for the purpose specified.

20. The combination of the fixed chute, the carrier having a straight longitudinal face to fit under and pass the lower end of said fixed chute, and the sliding and rotating carrier-spindle on which said carrier is mounted to slide without rotation when said face is engaged with said chute and to rotate when disengaged, substantially as described and for the purpose specified.

21. The combination of the nut-arbor, the chute, the carrier, the carrier-spindle having the shouldered stop-disk, a stop for said shoulder to engage, means for rotating said spindle in the direction to bring said shoulder and stop into engagement for stopping the carrier in proper position to receive a nut, the dressing-tool for moving over the nut to dress it, and means for taking the nut from said arbor, substantially as described.

22. The combination of a nut-arbor, means for dressing the face of a nut when rotated on said arbor, the carrier-spindle, a lever for moving said spindle longitudinally, and a lever-operating cam having a yielding face, substantially as described and for the purpose specified.

23. The combination with the carrier, the carrier-spindle having the shouldered stop-disk, a stop for said shoulder to engage, means for rotating said spindle in the direction to bring said shoulder and stop into engagement for stopping the carrier in proper position to receive a nut, substantially as described.

24. The combination of a nut-arbor, a chute or hopper, a carrier-spindle for taking a nut from said hopper and presenting it to said arbor, its operating-lever, a cam acting to reciprocate said lever and having a yielding por-

tion at the latter part of the forward stroke of said carrier-spindle, substantially as described and for the purpose specified.

25. The combination of the nut-arbor, its driving and loose pulleys, shipper-levers and cams for the belts of said pulleys, brake mechanism for stopping the revolution of said arbor when the belts are on the loose pulleys, and mechanism for holding the nut against rotation as the reverse-belt drives the nut-arbor for unscrewing the nut therefrom, sub-

stantially as described and for the purpose specified.

26. The combination of the nut-arbor and the sliding wrench or fork having one of its arms made longer than the other, substantially as described and for the purpose specified.

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