

No. 832,304.

PATENTED OCT. 2, 1906.

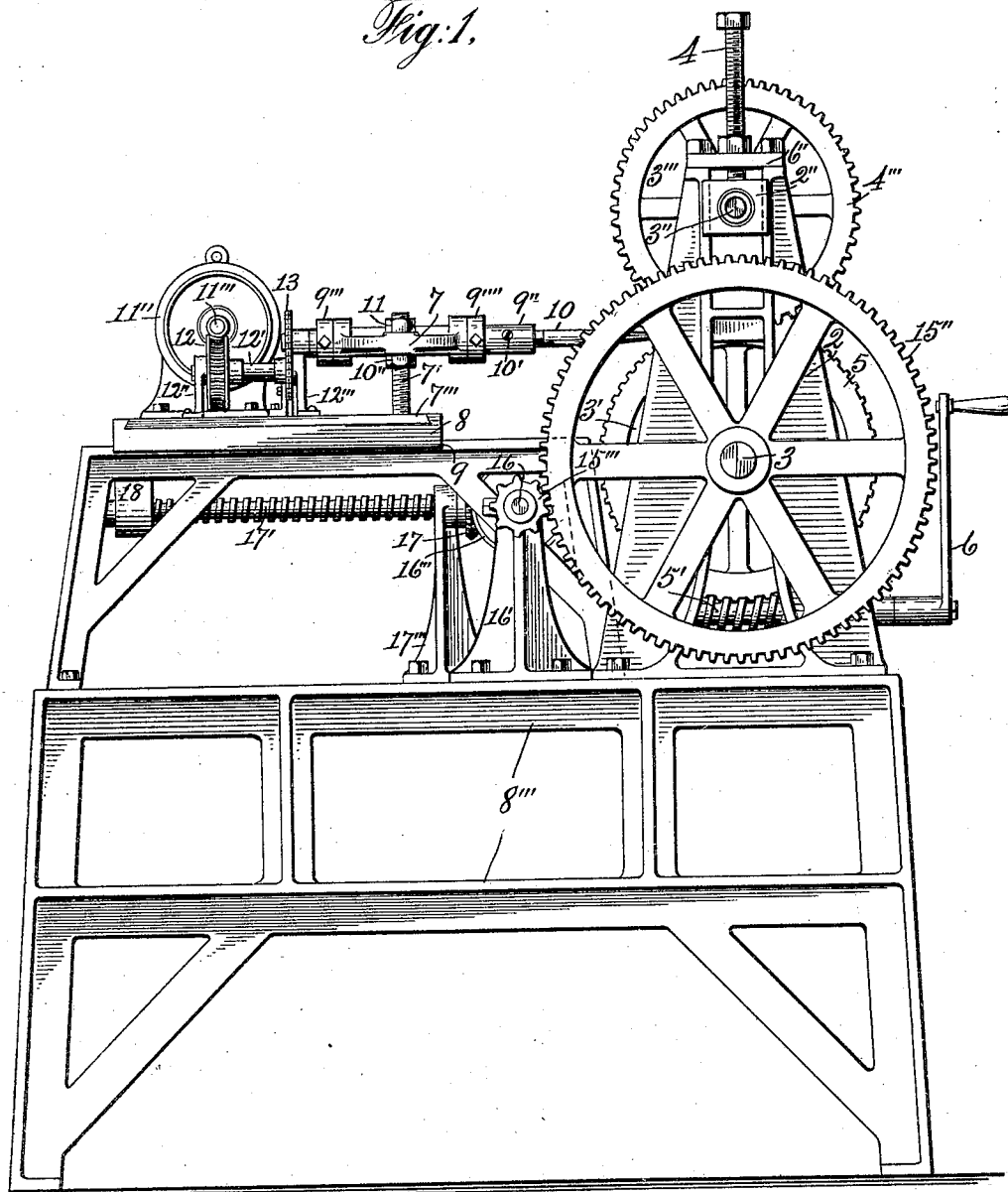
H. FARRINGTON.

APPARATUS FOR PREPARING WIRE TAPERING CYLINDERS.

APPLICATION FILED FEB. 1, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



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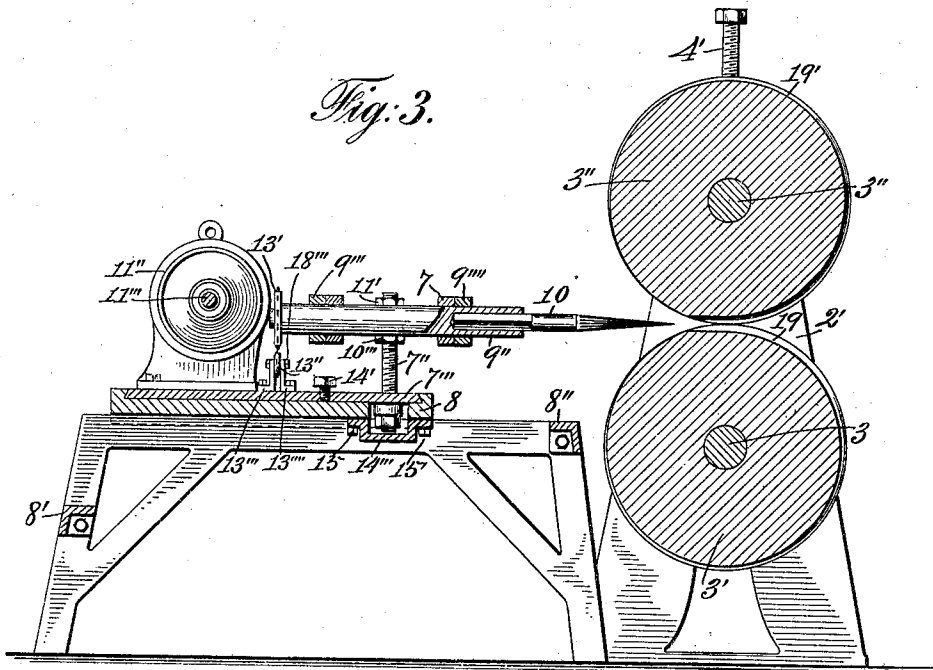
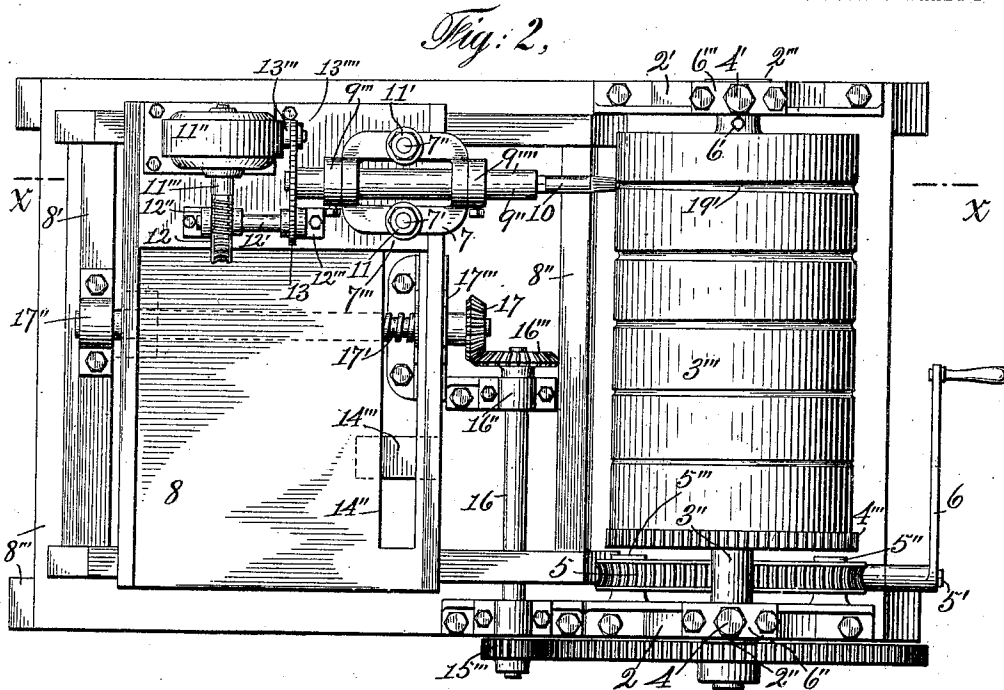
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3 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PREPARING WIRE-TAPERING CYLINDERS.

No. 832,304.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed February 1, 1905. Serial No. 243,629.

To all whom it may concern:

Be it known that I, HARVEY FARRINGTON, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Preparing Wire-Tapering Cylinders, which improvements are fully set forth in the following specification.

This invention relates to improvements in apparatus for recessing blank cylinders to be used in the operation of tapering segments of wire, such apparatus being well designated "apparatus for preparing wire-tapering cylinders."

The object of this invention is to provide an apparatus of the character above indicated which shall embody mechanism whereby superimposed blank cylinders preferably contacting at their circumferences may be revolved and a reamer or other appropriate tool fed between such cylinders at the line of contact and relatively to the speed of revolution thereof and whereby the respective cylinders may be circumferentially recessed at a single operation, which shall be durable, efficient, and reliable in practical service, and which shall possess certain well-defined advantages over prior analogous constructions.

The invention consists in the novel disposition and relative arrangement of the various cooperating parts thereof, in certain combinations, and in certain details of construction, all of which will be referred to more specifically hereinafter and set forth in the appended claims.

The invention is clearly illustrated in the accompanying drawings, wherein similar reference characters denote corresponding parts throughout the several views.

As to said drawings, Figure 1 is a side elevation of an apparatus for preparing wire-tapering cylinders embodying my said improvements. Fig. 2 is a plan view of same. Fig. 3 is a vertical section along the line *xx* of Fig. 2, and Figs. 4 and 5 are rear and front elevations of said apparatus, respectively, the motor availed of being removed from Fig. 4.

In a general sense my present invention comprises mechanism for sustaining and revolving superimposed blank cylinders, preferably contacting at their circumferences, a tool-carrying head capable of presenting to the line of contact of and passing between said cylinders a reamer or other appropriate

tool, means for rotating said head, and consequently the tool carried thereby, and means for feeding said head toward said cylinders, whereby the tool carried by said head may be moved to and beyond the line of contact of said cylinders and relatively to the speed of revolution of the latter.

Having reference to the accompanying drawings, 2 2' denote opposing upright frame members bolted or otherwise secured to a suitable base and slotted from the top downwardly, the one to receive a bearing-slide 2'' and the other to receive a corresponding bearing-slide 2''' . There is journaled to rotate in the members 2 2' at the lower extremity of the slots therein a shaft 3, on which is securely mounted a cylinder 3', and there is likewise journaled to rotate in the bearing-slides 2'' 2''' a shaft 3'', on which is securely mounted a cylinder 3'', and since the shaft 3'' is adjustable by reason of the sliding relation of the slides 2'' 2''' each with respect to its cooperating frame member toward and away from the shaft 3 cylinder 3'' may by its own gravity contact and have a rolling engagement with the cylinder 3', which relation of said cylinders is preferred and may be made more permanent by means of the set-screws 4 4', operating, respectively, to press the slides 2'' 2''' downwardly.

While I have referred to the cylinders 3' 3'' as being in contact by preference or arranged so that the upper one rests upon and rolls in conjunction with the lower one, hence giving a line of contact between the two cylinders, it will be understood that the same might be arranged somewhat separated, as by increasing the diameter of each of the intermeshing gears 4'' 4''' conjoined with the cylinders 3' 3'', respectively, and whereby said cylinders are caused to move as with a rolling relation between them upon a rotative movement being imparted to either of the shafts 3 3''. In this connection I purpose to rotate the shaft 3, and this may be accomplished by any appropriate driving mechanism, a worm-gear 5, fast on said shaft adjacent to one end of the cylinder 3' and operating in conjunction with a worm-threaded driving-shaft 5', journaled in hangers 5'' 5''' and provided with a crank 6 at its outer end, constituting convenient and practicable hand-operative mechanism whereby said shaft 3 may be actuated.

Any appropriate means may be employed for securing each of the aforementioned cylin-

ders in place on its cooperating shaft, as a set-screw 6', Fig. 2, passing through one side of the hub of the cylinder and binding on the shaft on which such cylinder is mounted.

5 As to the construction thus far described, it will be observed that by removing the respective caps 6'' 6''' shaft 3'', accompanied by the slides 2'' 2''', cylinder 3''', and gear 4''', may be displaced from the frame mem-
10 bers 2 2' and likewise shaft 3, accompanied by the cylinder 3', gear 4'', and any other parts carried thereby, may be displaced from said frame members, this being desirable when the cylinders 3' 3''' shall have been re-
15 cessed, as hereinafter explained, to the end that said recessed cylinders may be removed, respectively, from the shafts 3 3'' and fresh blank cylinders to be recessed replaced thereon, said shafts, with the fresh cylinders ad-
20 justed thereon, being then rearranged with respect to the frame members 2 2', as hereinbefore indicated.

Bearing-slides corresponding to 2'' 2''' may or may not be provided for the shaft 3, as
25 found advisable in practice.

The gears 4' 4''' at all times accompany, by preference, the cylinders to which they are respectively attached, to the end that said cylinders when recessed may be readjusted
30 for a rolling or an approximate rolling relation in conjunction with other appropriate mechanism for wire-tapering purposes, a segment or segments of wire being accordingly fed between them at one or more of the re-
35 cesses formed therein.

7 denotes a vertically-adjustable tool-head, here shown as being adjustably held in position by opposing supports 7' 7'', rising from a secondary carriage 7''', which is shift-
40 able to and fro parallel with the cylinders 3' 3''' and supported by a primary carriage 8, which is shiftable toward and away from said cylinders and supported on a supplemental supporting-frame consisting, in this instance,
45 of suitable upright side members duly braced and duly tied together, as by the cross-pieces 8' 8'', said supplemental supporting-frame being in turn supported in any appropriate manner, as by the general frame 8''' of the
50 apparatus. More specifically, the secondary carriage 7''' has a dovetail relation with the primary carriage 8, and the latter is provided with downturned lips 9 9', at the opposite sides thereof, which serve to guide the car-
55 riage 8 in its movements toward and away from the cylinders 3' 3''' along the rails or trackway formed by the upper edges of the side members of said supplemental supporting-frame.

60 The tool-head 7 has a tool-holder 9'' rotatably mounted therein, means, as the collars 9''' 9''', mounted on said holder at the opposite ends of said head, being provided for preventing longitudinal displacement of
65 the tool-holder with respect to said tool-

head, and said tool-holder having in this instance and as is customary a many-sided axial socket or recess at its front portion to receive the many-sided shank of a reamer 10 or other appropriate tool, the same being se-
70 cured in its operative relation with respect to said tool-holder in any approved and well-known manner, as by means of a set-screw 10', Fig. 1.

More specifically with respect to the tool-
75 head 7 and the means availed of for adjustably supporting the same, said tool-head approximates in form that of a link and has opposite side openings upwardly through which project, respectively, the supports 7' 7'', the
80 latter being respectively threaded to receive the sustaining-nuts 10'' 10''' beneath and which serve to primarily sustain said tool-head and the retaining-nuts 11 11' above and which serve to fasten firmly down
85 to place on the nuts 10'' 10''' said tool-head. It will thus be seen that by properly manipulating the nuts 10'' 10''' 11 11' the tool-head 7 may be readily adjusted to different heights
90 along the supports 7' 7'' and there firmly held in position for service, this feature of the apparatus being desirable, to the end that the tool 10 may be properly presented to the contact-line of cylinders of varying diameters to be operated upon, as will be clearly under-
95 stood.

I prefer that the tool-holder 9'', with the tool 10 carried thereby, be driven independently of the remaining operative parts of the apparatus, and in this connection any appro-
100 priate medium for supplying the driving power may be availed of, although for this purpose it is my intention to make use of an electric motor 11'', the same being directly and firmly mounted on the secondary car-
105 riage 7''', and hence accompanying at all times said carriage 7''' and likewise the carriage 8 in the movements thereof, respectively, all as will be apparent from the accompanying drawings.

The driving-shaft 11''' of the motor 11'' is here shown as being worm-threaded for en-
gaging and driving the worm-gear 12, firmly mounted on the counter-shaft 12', journaled to rotate in the upright bearings 12'' 12''',
115 rising from the secondary carriage 7'''. Counter-shaft 12' is operatively connected with the tool-holder 9'' through the medium of an endless sprocket-chain 13, running in a triangular course and leading over a sprocket-
120 wheel 13', fast on the tool-holder 9'', at the rear thereof, around a sprocket-idler 13'', turning between upright bearings 13''' 13''', rising as from the secondary carriage 7''', Fig. 3, and returning beneath and upwardly
125 around a sprocket-wheel 14, firmly mounted on the counter-shaft 12'.

It will be understood that the transference of the power and motion of the motor-shaft 11''' to the tool-holder 9'' may be effected
130

otherwise than through the medium of the parts described in the next preceding paragraph as intervening between said motor-shaft and said tool-holder.

5 The secondary carriage 7''' may be adjusted by hand or otherwise to and fro laterally along the primary carriage 8 and held at any desired position with respect to said carriage, as by means of a set-screw 14', passing
10 through the carriage 7''' and binding on the carriage 8, Fig. 3, and to provide clearance for the lower ends of the supports 7' 7'' carriage 8 may be provided with a slot 14'', bridged at its under side by a depressed cap 14''', held in place in any common and well-known manner, as by means of the fastening bolts or screws 15 15'.

Now to the end that the tool 10 may be fed into an operative relation with the cylinders
20 3' 3'', as by intersecting and passing beyond the contact-line thereof or working between them, and with a speed relative to the speed of revolution of, say, the shaft 3, and hence said cylinders, I purpose to extend the shaft 3 outwardly beyond the frame member 2 for the
25 reception of a driving spur-gear 15'', which meshes with a pinion 15''', fast on the counter-shaft 16 at the adjacent outer end thereof, said shaft 16 being journaled to rotate in
30 upright bearings 16' 16'', rising from the bed of the general frame 8''', and being provided at its inner end or at a point suitably therealong with a bevel-gear 16''', which meshes
35 with a similar bevel-gear 17, fast on the adjacent end of the carriage-actuating shaft 17', the latter being suitably journaled for a rotative action, as in the upright bearings 17'' 17''', rising, respectively, from the cross-piece 8' and the bed of the general frame 8''' and
40 being worm-threaded and extended through a correspondingly worm-threaded lug 18, depending from the primary carriage 8. Hence it will be seen that the worm-threaded shaft 17' serves to directly actuate the carriage 8
45 and control the same with the parts thereon for a shifting action toward and away from the cylinders 3 3''' upon, say, shaft 3, and accordingly said cylinders, being duly rotated, and through the medium of the intermediate
50 parts just described, such shifting action of the carriage 8, with the parts thereon, being accordingly accomplished at a speed relative to the speed of revolution of the shaft 3, and hence the cylinders 3' 3'''.

55 While I have described specific parts constituting mechanism for actuating and controlling the primary carriage 8 and the parts mounted thereon, it will be understood that this mechanism may vary widely in character and constituent elements.

60 Again referring to the connections between the motor-shaft 11''' and the tool-holder 9'', it will be observed that the sprocket-idler 13'' turns on an axle 18', which is adjustably
65 arranged in vertical slots formed, respec-

tively, in the bearings 13''' 13''', that are formed in the bearing 13''', being clearly indicated in Fig. 4, and denoted by the reference character 18'' and thereof the one formed in the bearing 13''' being a duplicate. The
70 axle 18' may approximate a headed bolt suitably threaded to receive a fastening-nut 18'''. This construction permits the endless chain 13 to be kept serviceably taut under varying adjustments of the tool-head 7, as will be
75 readily understood.

In operation the parts being assembled substantially as indicated in the several views of the drawings, with the carriage 8 adjusted to the position indicated, say, in
80 Fig. 3, and blank cylinders occupying the shafts 3 3'', respectively, motor 11'' is set in motion, thereby causing the tool-holder 9'', with the tool 10 carried thereby, to rotate, whereupon the operator by properly turning
85 crank 6 revolves shaft 3, with the cylinder 3' thereon, through the medium of the worm 5' and worm-gear 5, and consequently and relatively revolves shaft 3'', with the cylinder 3''' thereon, through the medium of the spur-
90 gears 4'' 4''', such revolution of the shaft 3 resulting, through the medium of the spur-gear 15'', carriage-actuating shaft 17', and the gears, pinion, and counter-shaft intermediate thereof, in a direct-feed motion being
95 imparted to the carriage 8 and at a speed relative to the speed of revolution of the relatively moving cylinders 3' 3''' or the shafts carrying the same, respectively, and a continuation of this operation brings the tapered
100 tool 10 (the head 9'' being properly adjusted to this end) gradually between the contacting or nearly contacting cylinders for a recessing or cutting action simultaneously on the two
105 cylinders, with the result that a circumferential recess, as 19, is formed in one of said cylinders, while there is also formed in the other cylinder a corresponding recess 19', the said
110 recesses each gradually and uniformly tapering in width, varying correspondingly in depth, as clearly shown in the drawings, and being both produced at one and the same operation. For correspondingly forming a series of recesses such as above referred to
115 along the respective superimposed cylinders the supplemental carriage 7''' is shifted to different positions along and secured to the primary carriage 8, and the foregoing operation is repeated in each instance. Again,
120 neighboring recesses each varying in area from its neighbor or neighbors, as indicated in the drawings, may be formed along the respective cylinders aforementioned by replacing the tool 10 with one of a proper taper for forming each of such recesses. A reverse move-
125 ment may be imparted to the carriage 8 by reversely turning crank 6, as will be clearly understood, or other well-known means to this end may be availed of.

It will be observed that the tool 10 per- 130

forms when rotating and urged to its work a cutting or recessing function at the opposite sides thereof on the cylinders 3' 3''' and that being tapered, and hence gradually increasing its cutting or recessing capacity proportionately to the speed of revolution of the cylinders, the resultant recess formed in either of said cylinders varies accordingly in depth and width, and constitutes an exact counterpart of the recess formed simultaneously therewith in the other cylinder, the parts naturally being properly adjusted to this end. Further, since any transverse surface line of either of the recesses thus formed constitutes a semicircle upon said cylinders being properly adjusted, say, in such relation each to the other that the deepest ends of their registering recesses are brought into a uniform opposite relation, a circular opening, as 20, Fig. 5, is formed between said cylinders, which opening upon the cylinders being revolved in the proper direction is caused to gradually and uniformly diminish in diameter. Hence said cylinders having been relatively adjusted as last specified it will be seen that a segment of wire properly fed between them at the registering recesses therein and when revolved as last stated will emerge therefrom at the opposite side thereof, tapered or shaped according to the variations in the opening 20 which shall have been effected by the relative action of the cylinders aforementioned, as stated, and in the accomplishment of this purpose the mechanism intermediate of the shaft 3 and the carriage 8 may be disconnected or said cylinders when duly recessed may be removed from my present apparatus and replaced in conjunction with another apparatus capable of receiving and sustaining the same for coöperation as herein described.

Naturally the foregoing wire tapering or shaping effect may be widely varied where the cylinders are provided with a series of registering recesses forming, respectively, openings 20, capable of being correspondingly varied in diameter, as herein set forth.

It will be seen that my improved apparatus for preparing wire-tapering cylinders is particularly well adapted for the purposes for which it is intended and, further, that the same may be modified to some considerable extent without departing from the spirit and principle of my invention.

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

1. An apparatus of the class described comprising upright frame members, cylinder-sustaining shafts journaled in said frame mem-

bers one above the other, a gear-wheel secured to each of said shafts and adapted to intermesh, whereby said shafts will be driven at the same relative speed, means for adjusting said shafts toward or from each other, a primary carriage, means actuated through the cylinder-sustaining shafts for moving said carriage toward and from the said shafts, a secondary carriage mounted on the primary carriage and adapted to move thereon parallel with the cylinder-shafts, a tool-holder carried by said secondary carriage and a motor mounted on said secondary carriage and connected to the tool-holder to rotate the same.

2. An apparatus of the class described comprising upright frame members, cylinder-sustaining shafts journaled in said frame members one above the other, a gear-wheel secured to each of said shafts and adapted to intermesh, whereby said shafts will be driven at the same relative speed, means for adjusting said shafts toward or from each other, a primary carriage, means actuated through the cylinder-sustaining shafts for moving said carriage toward and from the said shafts, a secondary carriage mounted on the primary carriage and adapted to move thereon parallel with the cylinder-shafts, a tool-holder carried by said secondary carriage, a motor mounted on said secondary carriage and connected to the tool-holder to rotate the same, and means for vertically adjusting the tool-holder without disconnecting it from its motor.

3. An apparatus of the class described comprising upright frame members, cylinder-sustaining shafts journaled in said frame members one above the other, a gear-wheel secured to each of said shafts and adapted to intermesh, whereby said shafts will be driven at the same relative speed, means for adjusting said shafts toward and from each other, a primary carriage, means actuated through the cylinder-sustaining shafts for moving said carriage toward and from the said shafts, a secondary carriage mounted on the primary carriage and adapted to move thereon parallel with the cylinder-shaft, a tool-holder carried by said secondary carriage and a motor mounted on said secondary carriage, flexible driving means connecting said motor to the tool-holder, whereby the tool-holder may be vertically adjusted without disconnecting it from the motor, and means for vertically adjusting the tool-holder without disconnecting it from its motor.

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Witnesses:

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