(No Model.) 3 Sheets—Sheet 1.

J. C. CORAM.

MACHINE FOR FINISHING TUBES.

No. 426,526. Patented Apr. 29, 1890.

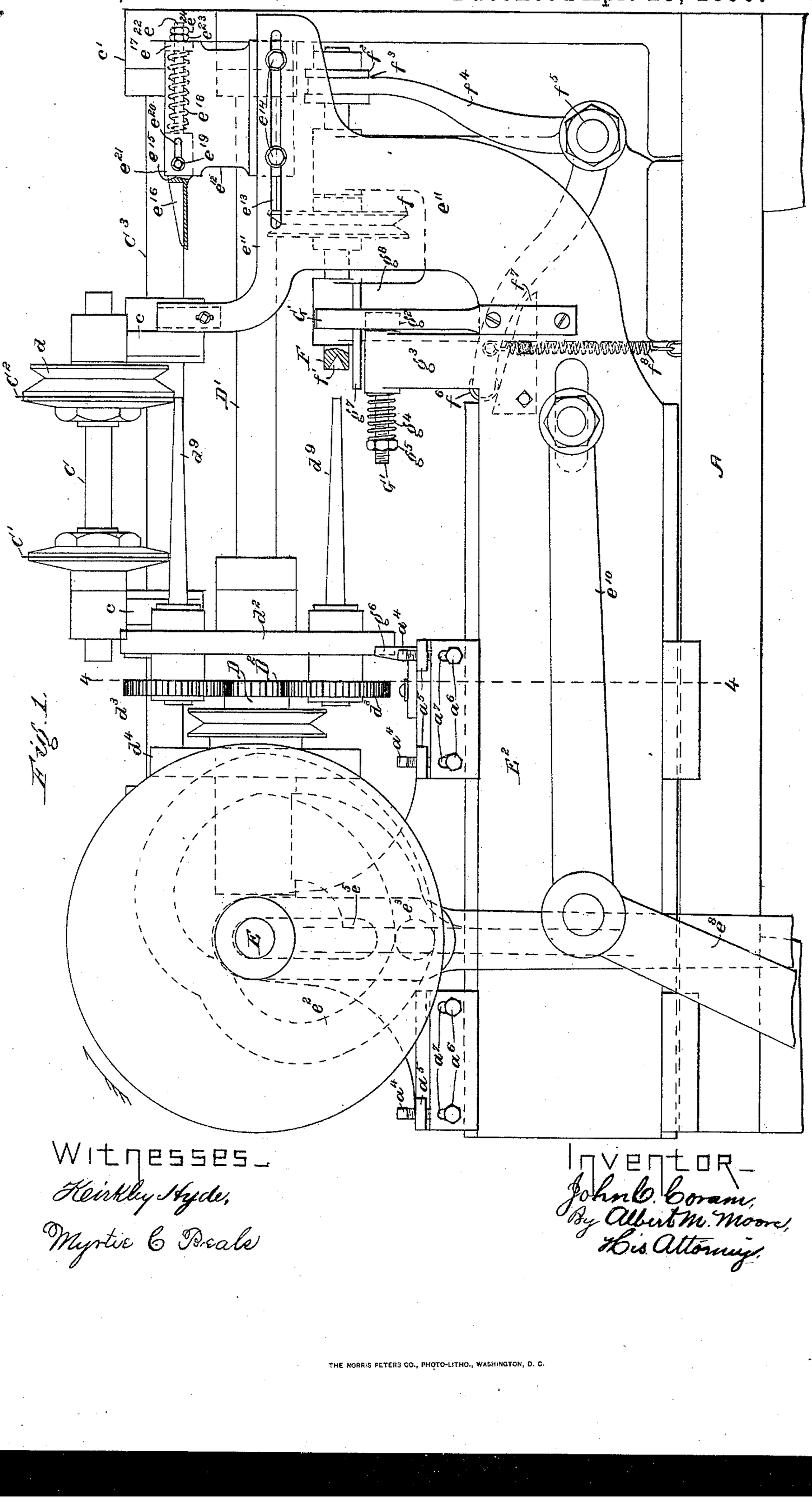

Fig. 1.

Witnesses—
Kirkley Hyde,
Myrtie C. Beale

Inventor—
John C. Coram,
By Albert M. Moore,
His Attorney.

(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

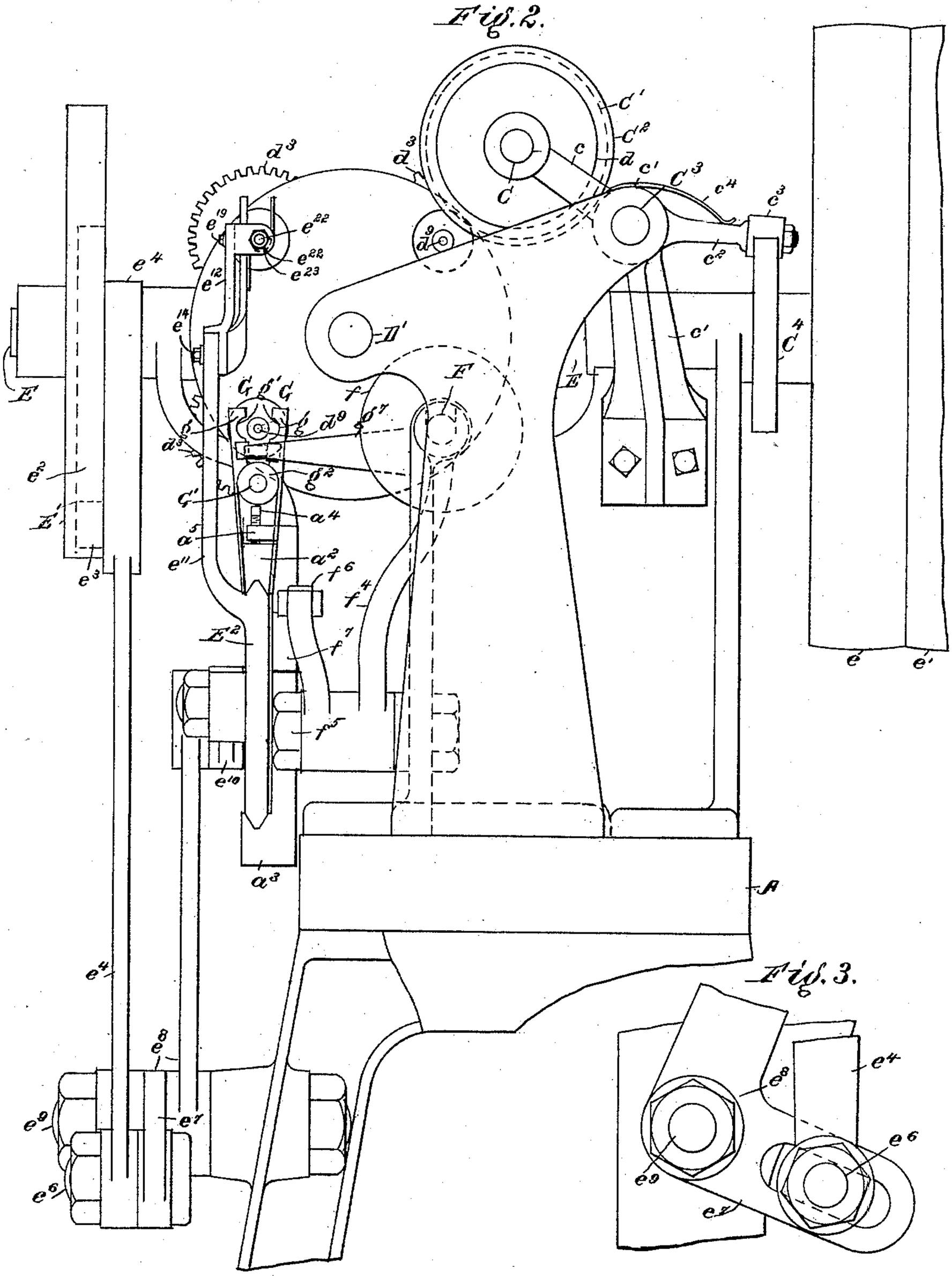

Fig. 3.

Witnesses—
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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

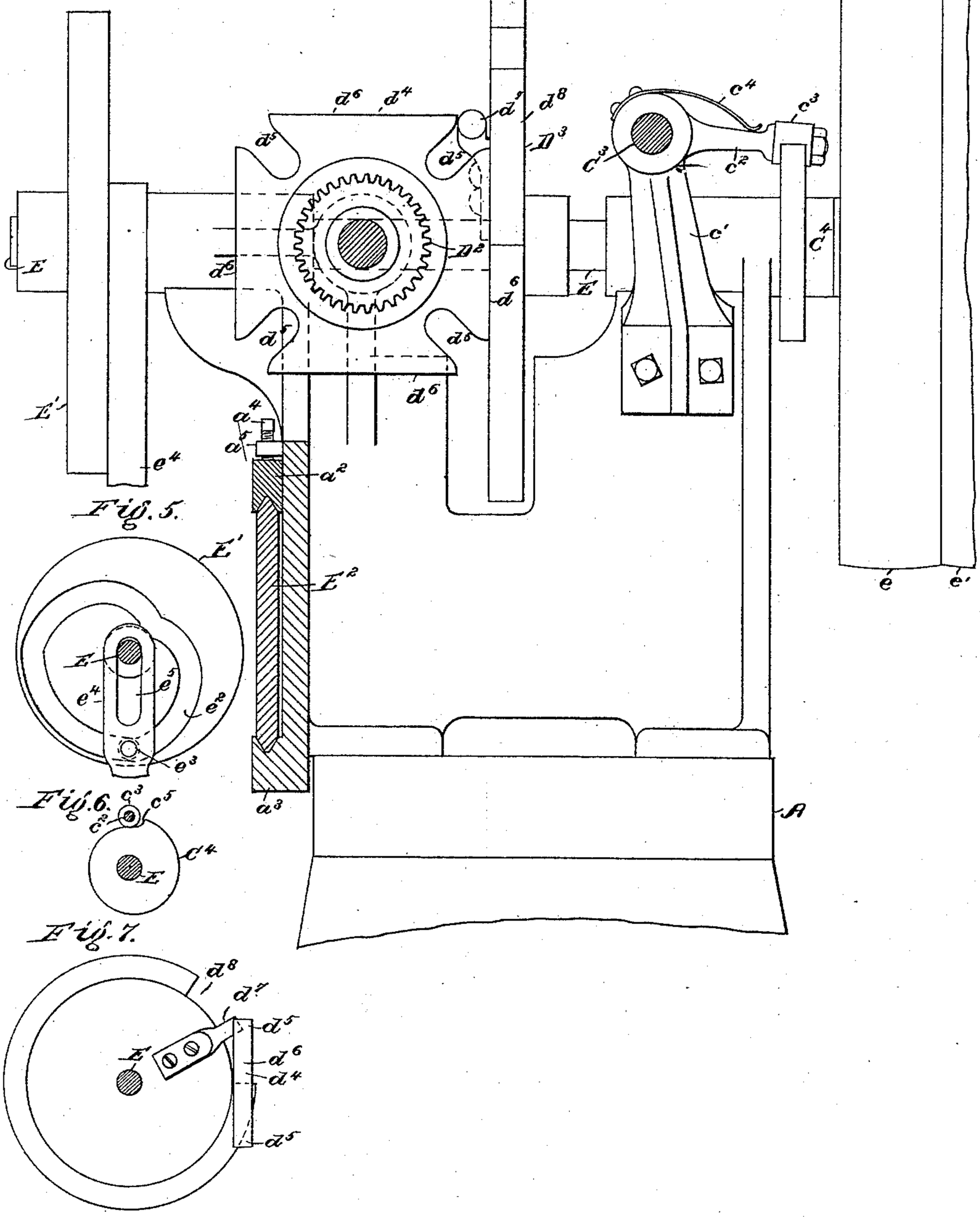

Fig. 5.

Fig. 6.

Fig. 7.

Witnesses—

Kirkley Hyde.

Myrtis C. Beals.

Inventor—

John C. Coram,

By Albert M. Moore,

His Attorney.

UNITED STATES PATENT OFFICE.

JOHN C. CORAM, OF LOWELL, MASSACHUSETTS.

MACHINE FOR FINISHING TUBES.

SPECIFICATION forming part of Letters Patent No. 426,526, dated April 29, 1890.

Application filed September 4, 1889. Serial No. 322,942. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. CORAM, a subject of Victoria, Queen of the United Kingdom of Great Britain and Ireland, residing in Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a new and useful Improvement in Machines for Trimming Tubes, of which the following is a specification.

My invention relates to machines for trimming tubes; and it consists in means for placing the tubes upon the mandrels, means for presenting the tubes carried on said mandrels to the action of cutters, means for carrying the mandrels away from the cutters after the tubes are trimmed, means for burnishing the tubes, and means for removing the tubes from the mandrels.

In the accompanying drawings, on three sheets, Figure 1 is a front elevation of a machine embodying my improvement, some of the concealed parts being shown in dotted lines, the lower parts of the frame, slide-operating lever, and connecting-rod being broken away; Fig. 2, a right end elevation of said machine, the lower parts of the supporting-frame of said machine being broken away; Fig. 3, a front elevation of the lower part of the slide-operating lever and a part of the frame; Fig. 4, a section on the line 4 4 in Fig. 1; Fig. 5, a rear elevation of the slide-operating cam; Fig. 6, a front elevation of the cam which moves the cutter-shaft and cutters into position for operating on the tubes; Fig. 7, a front elevation of the dog-plate.

A is the bed of the machine, supported upon suitable legs and supporting the operative parts of the machine. From any suitable overhead-shaft (not shown) are driven by open belts the cutter-shaft C and the mandrel-rotating sleeve D, the belts running on the grooved pulleys d, fast on said cutter-shaft and mandrel-rotating sleeve, respectively. From the same overhead shaft is driven the cam-shaft E by a quarter-turn belt running on the fast pulley e on said cam-shaft, e' being a loose pulley on said cam-shaft. The cam E′, fast on the cam-shaft, is provided with a cam-groove e^2, which receives a stud e^3, projecting forward from the connecting-rod e^4, said rod having a longitudinal slot e^5, which receives the cam-shaft and guides said rod. The rod e^4 is jointed at e^6 at its lower end to the free end of the lower arm e^7 of the bell-crank e^8, said bell-crank being pivoted at e^9 on the frame of the machine, and the other end of said bell-crank e^8 is pivoted to one end of the nearly-horizontal connecting-rod e^{10}, the other end of said last-named rod being adjustably pivoted to the slide E^2 by well-known means. The main body of the slide E^2 moves in V-shaped ways a^2 a^3 on the frame or bed A, the upper ways a^2 consisting of two blocks vertically adjustable by means of the screws a^4, turning in ears a^5 on said bed and held in place by cap-screws a^6, which pass through vertical slots a^7 in said movable blocks a^2 into said frame. The rotation of the cam-shaft E and cam E′ gives the slide E^2 a reciprocating motion in its ways.

Secured to the upwardly-projecting part e^{11} of the slide E^2 is a feed-block e^{12}, the same being adjustable endwise on said slide by means of slots e^{13} in the slide and bolts e^{14}, which pass through said slots into said block, as shown in Fig. 1, and supported on said feed-block is a feeder e^{15}, the same being a trough e^{16}, in which the tubes are laid, said trough being provided with a reduced shank e^{22}, which passes through an ear e^{17} on said feed-block and is surrounded by a spiral spring e^{18}, compressed between said ear e^{17} and said trough, the trough proper being supported by a stud or bolt e^{19}, inserted in the side thereof and projecting through a horizontal slot e^{20} in another ear e^{21} on said block. The amount of compression of the spring e^{18} is varied by turning the nut e^{23} and check-nut e^{24} on the end of the shank e^{22} outside of the ear e^{17}. The tube, if tapering, is laid in the trough e^{16} with its large end toward the mandrels d^9, and the movement of the slide to the left in Fig. 1 forces the tube onto that one of said mandrels which at the time is the front upper mandrel, there being four mandrels arranged parallel with the horizontal shaft D′ and journaled at equal intervals on the disk d^2, secured to said shaft. The mandrels are given a constant rotation by pinions d^3, secured to said mandrels concentrically therewith, engaging a gear D^2, fast on the sleeve D, said sleeve being rotated, as above described. To the shaft D′, concentrically therewith, is secured a plate d^4, having as

many radial slots d^5 as there are mandrels, and between said slots having straight faces d^6. On the cam-shaft E is secured a dog-plate D^3, (see Figs. 4 and 7,) the side of which rests during the greater part of the revolution of said dog-plate against one of the straight faces d^6 of the plate d^4 and prevents the rotation of said last-named plate, one of the mandrels at this time being in position to receive a tube from the trough e^{16}. A projection d^7, secured to the side of the dog-plate and offset therefrom, as shown in Fig. 4, once in every revolution of the dog-plate enters one of the slots of the plate d^4 and rotates the last-named plate one-fourth of a revolution, the face of the dog-plate being cut away in advance and in the rear of the projection d^7 at d^8 for a sufficient distance to allow the parts of the plate d^4 to pass said dog-plate. A quarter-revolution of the plate d^4 brings the mandrel which receives the first tube into a position near to the trimming-cutters C′ C^2, the same being sharp-edged steel disks fast on the cutter-shaft C, above named. The cutter-shaft is parallel with the shaft D′, and is journaled in arms *c c*, radially secured to the shaft C^3, the latter being journaled in the frame of the machine or in brackets *c′*, secured to said frame. Another arm c^2 is secured to the shaft C^3, and its rear free end or an anti-friction roller c^3 carried thereon is held by a spring c^4 (secured to one of said brackets *c′* and pressing upon said arms c^2) in contact with the periphery of a cam C^4, fast upon the cam-shaft E, (see Figs. 4 and 6,) so that at every revolution of the shaft E the cutters are thrown down by raising the rear end of the arm c^2 and the rocking of the shaft C^3 against the tube on the (for the time being) rear upper mandrel d^9 and trim off the ends of said tube and reduce the tube to a definite length equal to the distance between the cutters C′ C^2. After the tubes are trimmed the pressure of the spring c^4 rocks the shaft C^3 in the other direction and raises the cutters, the radius of the cam being suddenly reduced at c^5 to allow the arm c^2 to drop just before the projection d^7 on the dog-plate turns the plate d^4 another quarter of a revolution. In the meantime another tube has been placed on the then front upper mandrel. The second quarter-revolution of the plate d^4 carries the trimmed tube to the burnishing devices.

The burnishing devices (see Fig. 1) consist of a horizontal shaft F, journaled in the frame of the machine and having a longitudinal motion therein, and driven from the same overhead shaft from which the mandrel-rotating sleeve and cutter-shaft are driven by a belt or band connecting said overhead shaft and a pulley *f*, fast on the shaft F, said shaft having a conical hole *f′* at its inner end capable of receiving the free end of a mandrel and tube, and having also a collar f^2, provided with annular groove f^3, which receives the forked upper end of a bell-crank lever f^4, pivoted at f^5 on the frame of the machine, the lower end of said lever being provided with an anti-friction roller f^6, which rests upon an incline f^7, secured to the slide E^2, and is held in contact therewith by the contractile force of a spring f^8, connected to the lower arm of said lever and to the bed of the machine, so that when the slide E^2 moves in the direction necessary to push a tube upon the mandrel the incline f^7 moves out from under the lower arm of said lever and allows the lever f^4 to be turned by the spring f^8 in a direction to throw the shaft F to the left in Fig. 1 and force its hollow end over the lower rear mandrel and against the end of the tube, thus burnishing the end of said tube by friction, said shaft F and mandrel revolving in opposite directions at considerable speeds. When the slide E^2 returns to position, the incline f^7 runs under the lower end of the lever *f* and draws the burnishing-shaft F away from the mandrel at the same time that the cutters C′ C^2 are thrown upward and backward by the action of the spring c^4. The next quarter-revolution of the plate d^4 carries the tube first placed upon a mandrel forward, the mandrel which carries said tube being the front lower mandrel. Another movement of the slide now places a tube upon the fourth mandrel, and at the same movement of the slide the strippers G G, secured to the slide, are carried over the lower front mandrel. The strippers G G are nearly-vertical springs secured to the slide E^2, and provided at their upper ends with jaws *g g*, the inner faces of which are provided with rounded grooves *g′ g′*, adapted to surround the mandrel back of the tube, said jaws being held apart in passing over the mandrel by the head g^2 of the spring-bolt G′, arranged to slide in a bracket g^3 on said slide E^2, said head g^2 being held between said jaws by a spiral spring g^4 and a nut g^5, carried on said bolt near its free end, until by the movement of said slide said bolt is carried against a bracket g^6, supported on said bed, which pushes said head-gear g^2 out from between said jaws and allows them to close upon the mandrel, so that the said slide in returning to position strips the tube from the mandrel. The jaws in their return motion are opened for another operation by running on opposite sides of a wedge-shaped piece g^7, supported on a bracket g^8, secured to the frame of the machine, until the head g^2 is forced by the spring g^4 between said jaws.

Obviously the number of mandrels may be increased or diminished, as desired. Thus the tubes may be trimmed without burnishing, which would require but three mandrels, or the number of mandrels may be doubled, and the feeding, trimming, burnishing, and stripping devices may be duplicated.

I claim as my invention—

1. The combination of a mandrel, means, substantially as described, for rotating the same, cutters, and means, substantially as described, for rotating the same against said

mandrel to trim the ends of a tube placed upon said mandrel, as and for the purpose specified.

2. The combination of the sliding feed-trough to carry a tube placed therein, a mandrel to receive said tube, and a rotary cutter to trim said tube on said mandrel, as and for the purpose specified.

3. The combination of the sliding feed-trough to carry a tube placed therein, a mandrel to receive said tube, and rotary cutters to trim said tube on said mandrel, as and for the purpose specified.

4. The combination of an intermittently-rotating disk, and a series of rotary mandrels arranged parallel with each other upon said disk, against which said mandrels are successively brought by the rotation of said disk, as and for the purpose specified.

5. The combination of an intermittently-rotating disk, a series of rotary mandrels arranged parallel with each other upon said disk, and a pair of cutters against which said mandrels are successively brought by the rotation of said disk, as and for the purpose specified.

6. The combination of an intermittently-rotating disk, a series of rotary mandrels arranged parallel with each other upon said disk, and a rotary cutter to which said mandrels are successively presented by the rotation of said disk, as and for the purpose specified.

7. The combination of an intermittently-rotating disk, a series of rotary mandrels arranged parallel with each other upon said disk, and a pair of rotary cutters to which said mandrels are successively presented by the rotation of said disk, as and for the purpose specified.

8. The combination of an intermittently-rotating disk, rotary mandrels journaled therein, and a stripper arranged to strip said mandrels, as and for the purpose specified.

9. The combination of an intermittently-rotating disk, a series of rotary mandrels journaled therein, a trimming device, a burnishing device, and a stripper, to which trimming and burnishing devices and stripper said mandrels are successively presented by the rotation of said disk, as and for the purpose specified.

10. The combination of the slide, the feed-trough supported thereby, a rotary cutter, the stripper supported on said slide, an intermittently-rotating disk, and mandrels journaled in said disk, said disk being arranged, when at rest, to present one of said mandrels to the action of said feed-trough, another to the action of said cutter, and a third to the action of said stripper, as and for the purpose specified.

11. The combination of the rotating mandrel, a rotary cutter, and a stripper, as and for the purpose specified.

12. The combination of the feed-trough, rotating mandrel, a rotary cutter, and a stripper, as and for the purpose specified.

In witness whereof I have signed this specification, in the presence of two attesting witnesses, this 23d day of August, A. D. 1889.

JOHN C. CORAM.

Witnesses:
ALBERT M. MOORE,
FRANK C. MURRAY.