J. F. PIERCE.

DEVICE FOR CUTTING TUBES.

APPLICATION FILED MAR. 30, 1917.

1,345,458.

Patented July 6, 1920.

4 SHEETS—SHEET 1.

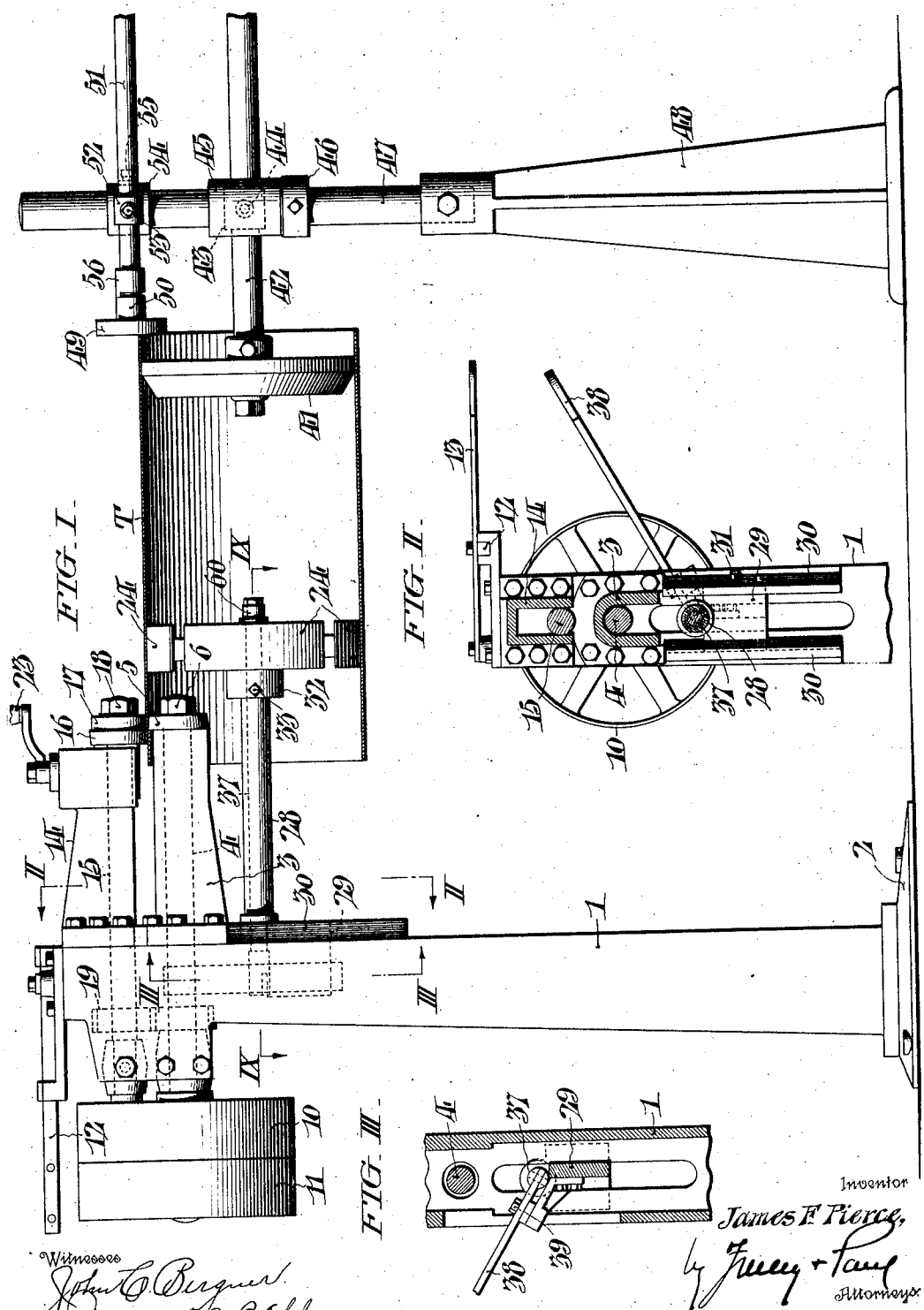


FIG. I.

FIG. II.

FIG. III.

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4 SHEETS—SHEET 2.

FIG. V.

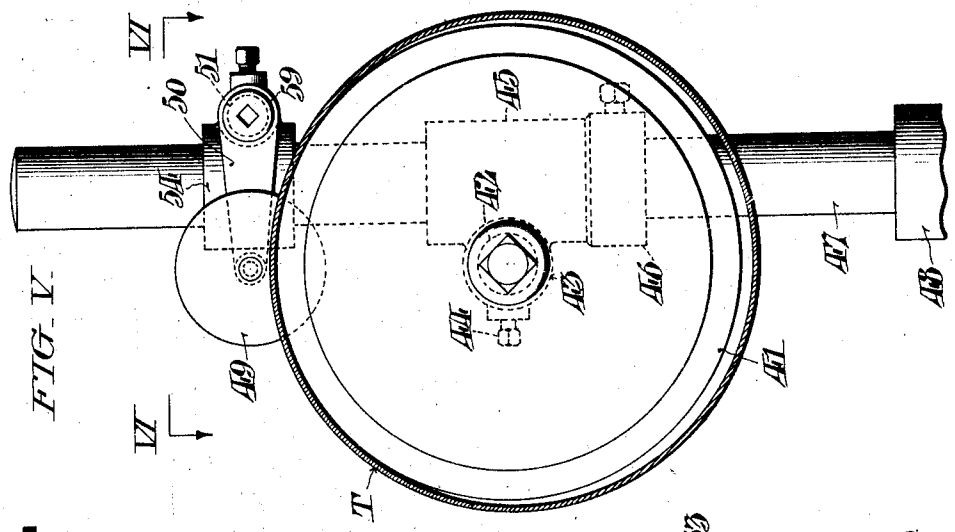


FIG. VI.

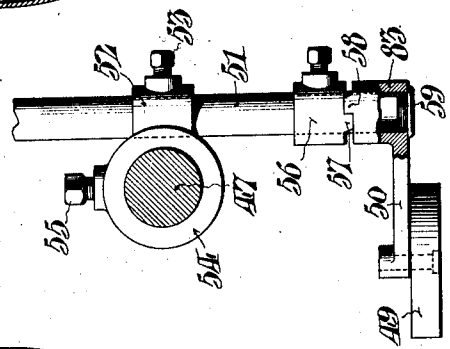


FIG. IV.

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4 SHEETS—SHEET 3.

FIG. VII.

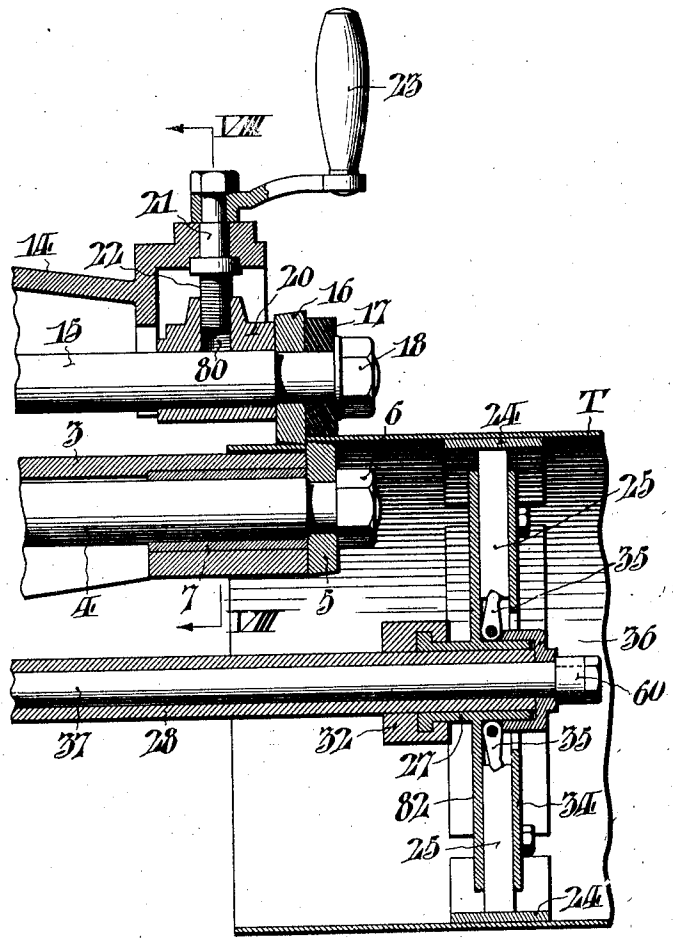
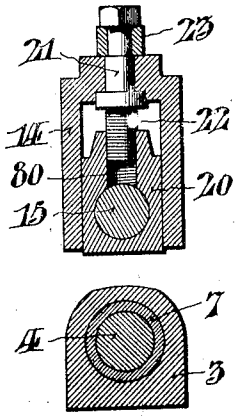


FIG. VIII.



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4 SHEETS—SHEET 4.

FIG. IX.

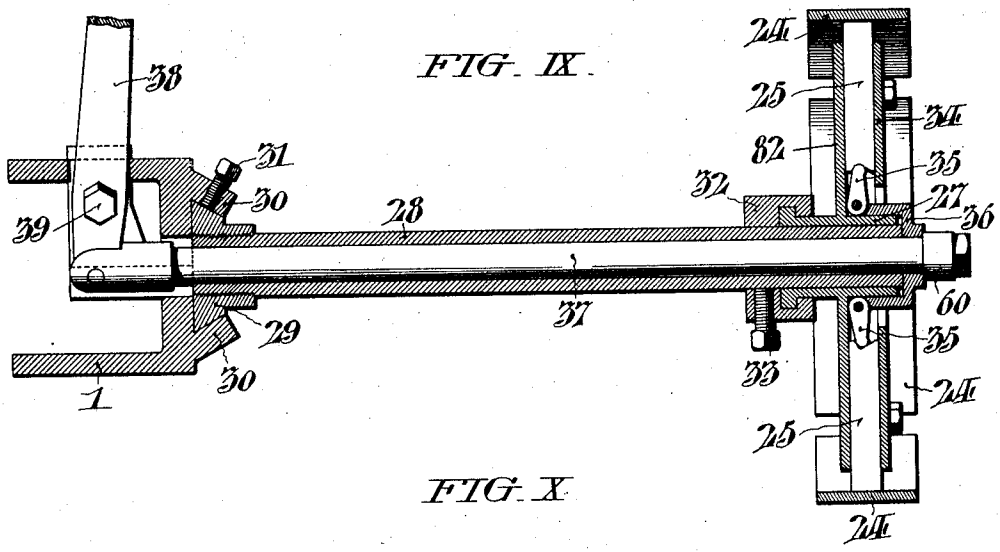
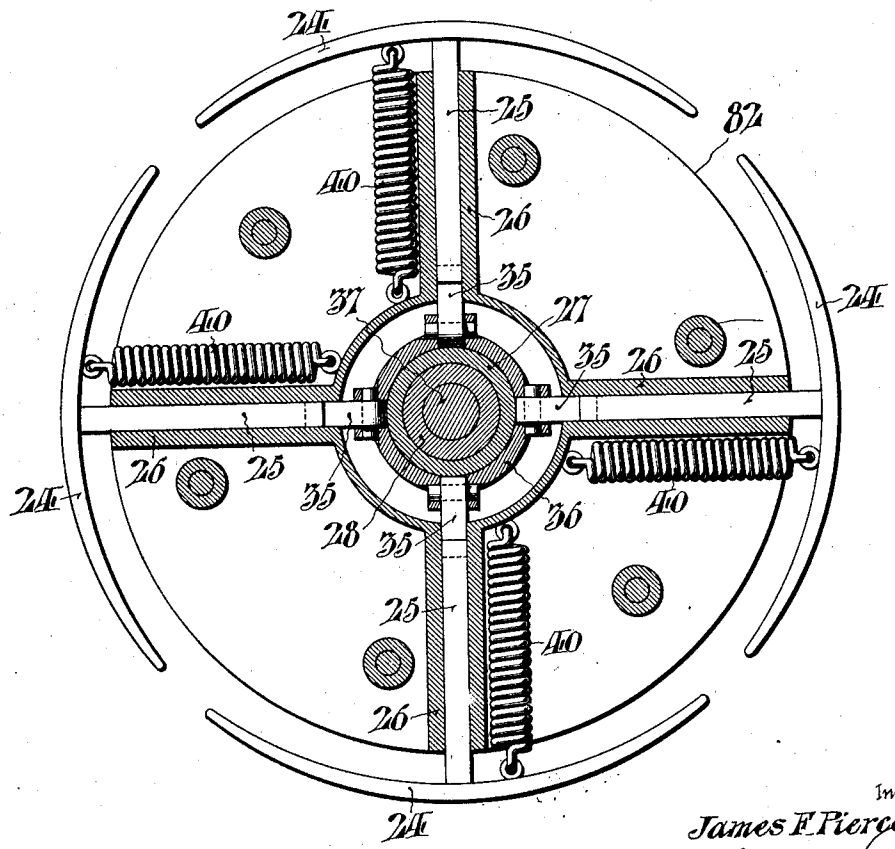


FIG. X



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UNITED STATES PATENT OFFICE.

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DEVICE FOR CUTTING TUBES.

1,345,458. Specification of Letters Patent. Patented July 6, 1920.

Application filed March 30, 1917. Serial No. 158,766.

To all whom it may concern:

Be it known that I, JAMES F. PIERCE, of Glynrich, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Devices for Cutting Tubes, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates more particularly to a device for cutting large tubes, such as seamless fiber tubes which are used in making receptacles or the like.

An object of the invention is to provide a cutting device of the above character wherein a yielding pressure roll coöperates with the cutting disks for feeding the material to said cutting disks.

A further object of the invention is to provide a cutting device with means for engaging the material and supporting the same, so that it may be freely turned and presented to the cutting mechanism.

A still further object of the invention is to provide a gage coöperating with the cutting mechanism, so that the material may be trimmed to a predetermined length.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings, which show by way of illustration one embodiment of the invention, Figure I, is a side view of a machine embodying the improvements.

Fig. II, is a sectional view on the line II, II, of Fig. I.

Fig. III, is a sectional view on the line III, III, of Fig. I.

Fig. IV, is a front view of the machine.

Fig. V, is a view of the supporting wheel and gage for supporting the tube being trimmed.

Fig. VI, is a sectional view on the line VI, VI, of Fig. V.

Fig. VII, is a longitudinal sectional view through the cutting mechanism.

Fig. VIII, is a sectional view on the line VIII, VIII, of Fig. VII.

Fig. IX, is a transverse sectional view on the line IX, IX, of Fig. I.

Fig. X, is a vertical sectional view through the supporting clamp.

The invention consists primarily in a supporting standard on which is mounted a work supporting arm carrying a cutting disk and also an overhanging arm carrying a coöperating cutting disk. These cutting disks are mounted on shafts which are intergeared, and driven by suitable driving mechanism. Mounted on the shaft of the upper disk is a smaller yielding pressure roll or disk which engages the material being trimmed and feeds the same between the disks. This yielding pressure roll and the upper cutting disk are mounted for rotation in a bearing which is vertically adjustable so that the cutting disk may be moved toward and away from the lower cutting disk. The cutting device is especially adapted for cutting tubes, and it is desirable to separate the cutting disks in order to insert the material between them. This adjustable bearing permits this to be done. Coöperating with the cutting disks and mounted in an adjustable bracket, is a clamp, which is capable of being expanded or contracted to respectively clamp or release the tube to be cut. Coöperating with the clamp is a supporting wheel mounted to turn freely on a shaft carried by a standard, this wheel operating to support the outer end of the tube being trimmed. Coöperating with this supporting wheel is a gage which engages the end of the tube and determines the length to which it is to be trimmed.

Referring more in detail to the drawings, the invention is shown as applied to a machine having a supporting standard 1, carried by a base 2. A work supporting arm 3, is mounted on the standard 1, and extending lengthwise of the arm 3, is a shaft 4, which carries a lower cutting disk 5. The disk 5, is clamped to the end of the shaft 4, by a nut 6. A suitable bearing 7, is formed at the end of the work supporting arm for the shaft 4, see Fig. VII. This shaft extends through the standard and is provided with a suitable pullev 10, which may be used for driving the same. There is also a loose pulley 11, mounted on the shaft, and the belt may be quickly shifted from the loose pulley to the fixed pulley by a belt shifter 12, which is operated by a hand lever 13, (see Fig. IV).

Also carried by the standard 1, is an overhanging arm 14. Extending through the arm 14 and pivotally journaled near one end therein, is a shaft 15, carrying a second cutting disk 16, which is disposed on the shaft 15, so as to coöperate with the cutting disk 5, by overlapping the same, as is well known in this type of cutting

mechanism. Adjacent the cutting disk 16, is a smaller disk or roll 17, made of rubber or other yielding material, and the two disks are secured on the shaft 15, by a nut 18. The shaft 15, is intergeared as indicated at 19, with shaft 4, and is journaled at its free end in a bearing 20, which is mounted to slide in the free end of the overhanging arm 14, and is adjusted by means of a shaft 21, which is threaded at 22, and engages a threaded aperture 80, in the bearing 20. This shaft 21, is provided with a handle 23, whereby the shaft may be quickly turned to raise and lower the bearing 20, which adjustment is permitted by reason of the pivotal movement of the opposite end of the shaft 15 in the arm 14.

The diameter of the rubber disk 17, is slightly less than that of the cutting disk 16, so that, when the cutting disks 5, and 16, are in overlapped cutting relation, the disk 17, grips the material being cut and exerts a yielding pressure thereon which cooperates with the disk 5, to feed the material to the cutting disks 5, and 16.

The cutting device is especially adapted for cutting seamless tubes, such as indicated at T, in the drawings, which are of fiber or other similar material. Such a tube is inserted between the disks when separated as above described, and properly placed for trimming, after which the handle 23, is turned to bring the cutting disk 16, down on to the tube and by gradually increasing the pressure the disks cut through the tube. As soon as the yielding disk 17, engages the outer face of the tube, it grips the surface thereof, gradually turning the same and feeding it to the cutting disks.

Coöperating with the cutting disks is a rotatable supporting clamp for the tube. This supporting clamp consists of four segments 24, each of which is mounted on a sliding radial bar 25, see Figs. IX and X. Bars 25, slide in guideways 26, formed in a support 82, integrally formed with a sleeve 27, which is in turn mounted on the outer end of a tubular extension 28. The extension 28, is fixed to a bracket 29, which is adapted to slide in suitable guideways 30, carried by the standard, and a set screw 31, holds the bracket 29, in adjusted positions. The sleeve 27, is rotatably connected to a collar 32, which is secured to the extension 28, by a set screw 33. This permits the sleeve 27, with the support 82, and the segments carried thereby to rotate, but prevents the same from moving endwise on the extension 28. The radial bars 25, are held in place by a cap plate 34.

Located in each guideway at the inner end of the bars 25, is a dog 35. These dogs are pivoted to a collar 36, which is adapted to slide endwise on the sleeve 27, but turns therewith. The collar 36, is secured to rod 37, by a collar 60, and moved endwise on the sleeve 27, by a rod 37, which extends longitudinally through the extension 28. The rod 37, is pivoted at its inner end to a lever 38, which is fulcrumed on a stud 39, carried by the bracket 29. By swinging the lever 38, the rod 37, is moved endwise. Cooperating with each segment 24, is a spring 40, the outer end of which is attached to the segment and the inner end to the support 82. These springs normally tend to force the segments inwardly, thus contracting the clamp.

When the rod 37, is shifted to the right, as viewed in Fig. VII, the dogs 35, are moved out at their lower ends and permit the springs to withdraw the segments. When the rod 37, is moved in the opposite direction, however, the dogs 35 force the radial rods 25, outwardly and move the segments 24, out into clamping position.

In the drawings, the clamp is shown expanded and engaging the tube which is supported thereby. The whole clamp, as above noted, is mounted on the sleeve 27, which may freely turn so that, while the tube is clamped and supported, it may be rotatably fed to present its entire periphery to the cutting devices.

Associated with this clamping device is a supporting wheel 41, which is mounted to turn freely on a rod 42, clamped to a boss 43, by a set screw 44. The boss 43, is formed integral with a collar 45, which is adapted to rotate freely upon a vertical shaft 47, and held in place thereon by a fixed collar 46. Shaft 47, is mounted in a suitable base 48. Wheel 41, is adapted to extend within the tube, so as to support the outer end thereof. This wheel is also adjusted so that its top is on the same level with the top of the lower cutting disk 5, so as to hold the tube being cut in a horizontal position.

For determining the length of the tube, a gage disk 49, is provided and is carried by an arm 50, so that it may freely rotate thereon. The arm 50, is freely supported on a rod 51, which is adjustably secured within a boss 52 by a set screw 53. The boss 52, is integral with the collar 54, and this is set by a screw 55, to the shaft 47. The movement of the arm 50, around the rod 51, is limited by a stop collar 56, (see Fig. VI), which has a lug 57, formed thereon, adapted to engage a lug 58, formed on the shank 83, of the arm 50. The arm 50, is held on the rod by a cap screw 59.

In practice the supporting wheel 41, is swung about the vertical shaft 47, to facilitate its insertion into the end of the tube to be trimmed, the gage disk 49, being at the same time swung about its pivotal support for a similar reason. The tube is then brought into line with the clamp slipped

over the same and shifted rearwardly to the extent allowed by the gage disk, whereupon the clamp is expanded, the power applied and the upper cutting disk brought into engagement with its fellow until the cutting operation is completed.

It is obvious that minor changes in the details of construction and the arrangement of parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus described my invention, I claim:

1. A tube cutting machine including in combination, a supporting frame, a rotatable shaft mounted in said supporting frame, a cutting disk mounted on said shaft, a second rotatable shaft pivotally mounted in the supporting frame and capable of being moved toward and from the first named shaft, a cutting disk mounted on the second named shaft and coöperating with the disk on the first named shaft, a supporting bracket for the movable shaft, and a hand wheel for adjusting said bracket vertically to move the shafts toward and from each other.

2. A tube cutting machine including in combination, a supporting frame, a rotatable shaft mounted in said supporting frame, a cutting disk mounted on said shaft, a second rotatable shaft pivotally mounted in the supporting frame and capable of being moved toward and from the first named shaft, a cutting disk mounted on the second named shaft and coöperating with the disk on the first named shaft, a supporting bracket for the movable shaft, a hand wheel for adjusting said bracket vertically to move the shafts toward and from each other, and a yielding feed roll carried by the movable shaft and opposed to and coöperating with the disk on the first named shaft for feeding the tube to the cutting disks.

3. A tube cutting machine including in combination, coöperative cutting disks, means for moving said cutting disks toward and from each other to receive the work therebetween, a rotatable clamping device for supporting the tube to be trimmed, said clamping device including radially movable segments for engaging the inner face of the tube, springs for moving said segments toward the center of the clamping device, expanding dogs for moving the segments outwardly to clamp the tube, said dogs being arranged to hold the clamping device expanded, and manually controlled means for moving the dogs.

4. A tube cutting machine including in combination, a supporting frame, cutting disks mounted on said supporting frame, an expansible clamping device for engaging the inner face of the tube and supporting the same horizontally, said clamping device being rotatably mounted so that the tube may be turned as it is trimmed, means coöperating with the cutting disks for feeding the tube to said cutting disks, and a supporting wheel for guiding and supporting the outer end of the tube.

5. A tube cutting machine including in combination, a supporting frame, cutting disks mounted on said supporting frame, an expansible clamping device for engaging the inner face of the tube and supporting the same horizontally, said clamping device being rotatably mounted so that the tube may be turned as it is trimmed, means cooperating with the cutting disks for feeding the tube to said cutting disks, a supporting wheel for guiding and supporting the outer end of the tube, and a gage for engaging the outer end of the tube for determining the length thereof.

6. A tube cutting machine including in combination, a supporting frame, a rotatable shaft mounted in said supporting frame, a cutting disk mounted on said shaft, a second rotatable shaft pivotally mounted in the supporting frame and capable of being moved toward and from the first named shaft, a cutting disk mounted on the second named shaft and coöperating with the disk on the first named shaft, a supporting bracket for the movable shaft, a journal mounted on the end of one of said shafts and having a threaded opening, and an adjusting means rotatably journaled on said bracket and having a threaded portion engaging with the threaded opening in said journal whereby rotation of said means will raise and lower one shaft relatively to the other.

In testimony whereof I have hereunto signed my name at Philadelphia, Pennsylvania, this nineteenth day of March, 1917.

JAMES F. PIERCE.

Witnesses:
WILLIAM EVES, 3rd,
JAMES H. BELL.