N. F. FRETTER.

CUT-OFF MACHINE.

APPLICATION FILED JUNE 13, 1917.

1,348,635.

Patented Aug. 3, 1920.

2 SHEETS—SHEET 1.

Fig. 2

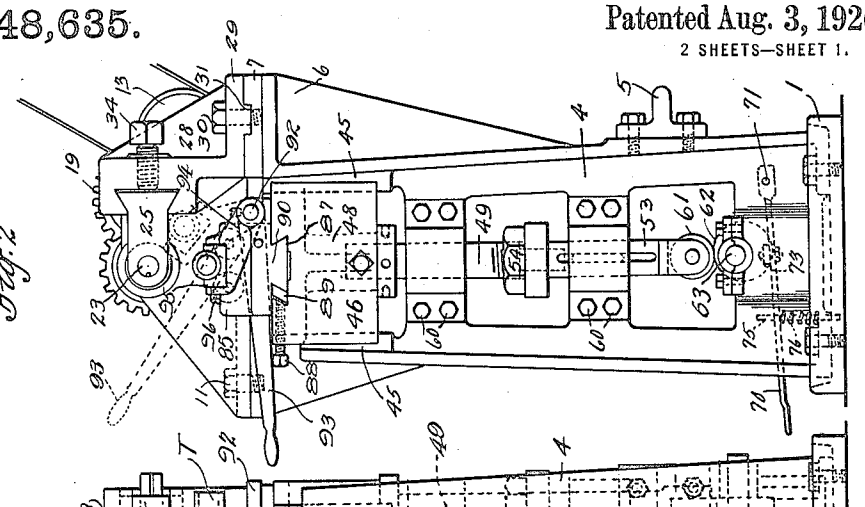
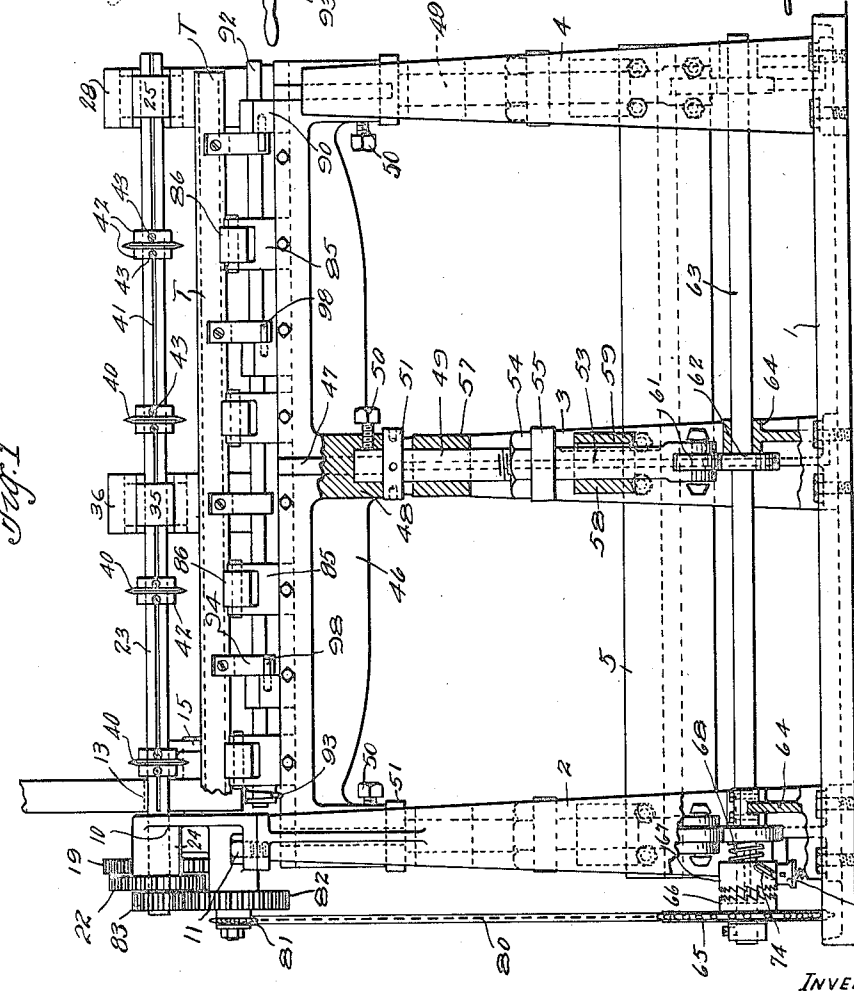


Fig. 1



INVENTOR

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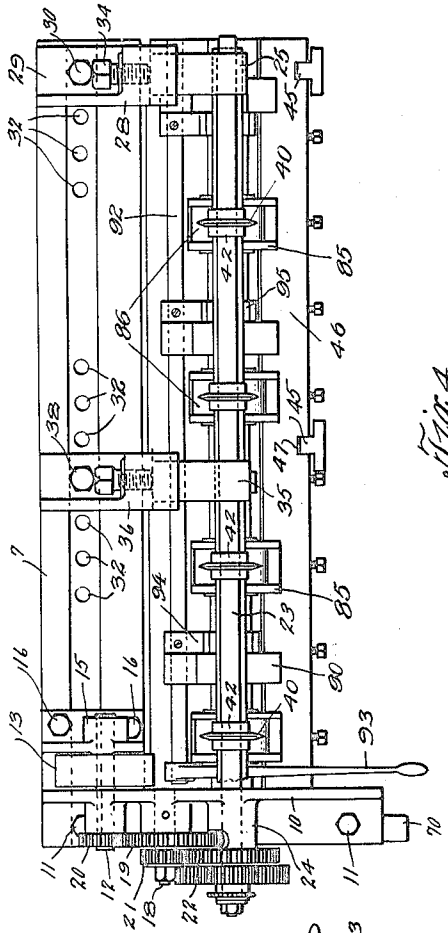


Fig. 4

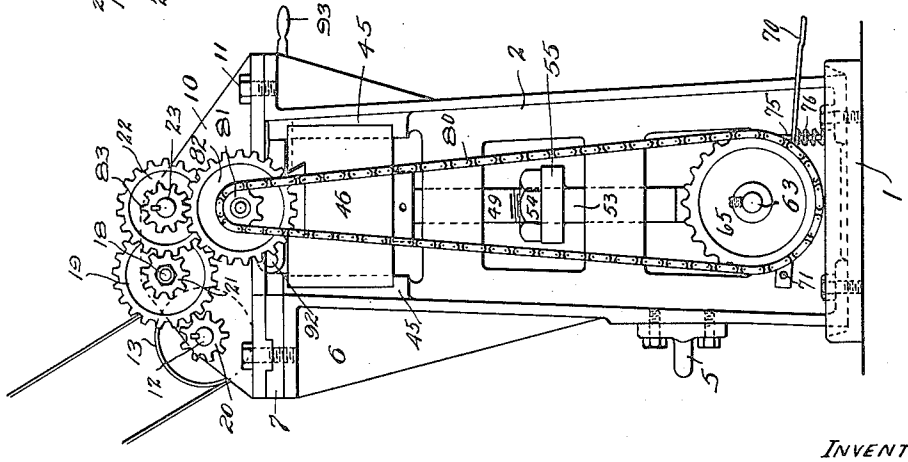


Fig. 3

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UNITED STATES PATENT OFFICE.

NATHAN F. FRETTER, OF CLEVELAND, OHIO.

CUT-OFF MACHINE.

1,348,635. Specification of Letters Patent. Patented Aug. 3, 1920.

Application filed June 13, 1917. Serial No. 174,459.

To all whom it may concern:

Be it known that I, NATHAN F. FRETTER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Cut-Off Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to a cut-off machine, particularly of the multiple type, for severing tubes and similar articles into pieces of any desired length, one instance of its use being the cutting of bushings from a tube of suitable material.

The invention has for its objects the production of a machine of the foregoing character which is comparatively simple of construction and very convenient of operation; wherein the cutters are readily adjustable toward and from each other, thereby to cut pieces of various lengths; wherein supports are provided, adjustable to permit them to be placed in proper position with respect to the cutters to effectually support the article during the cutting operation; to provide a machine of the character in question having throwoff or ejecting mechanism for the various pieces after they are cut and which is provided with convenient operating means; to provide a machine of the aforesaid character wherein the cutter shaft is supported in a fixed position by substantial bearings while the article support is movable toward and from the cutter shaft; and wherein an adjustment is provided to take care of tubes or articles of various diameters or sizes.

The foregoing objects, and others which will become apparent as this description proceeds, are attained in a machine constructed in accordance with the accompanying drawings, wherein Figure 1 is a front elevation of the machine, with parts broken away to more clearly reveal certain structural details; Fig. 2 is a right hand end elevation; Fig. 3 a left hand end elevation; and Fig. 4 a plan.

By supporting the cutter shaft on a fixed axis and moving the tube support toward the same during the cutting operation, I am enabled to employ a simple train of gearing between the driving and cutter shafts, for all of the driving and driven parts are maintained in fixed relation with respect to each other.

Proceeding now with a detailed description of the machine by the use of reference characters, 1 represents a bed plate from which rise standards 2, 3 and 4. These standards are connected together at their rear by a beam 5, and at their upper ends have bracket extensions 6 upon which a plate 7 is supported along the rear of the machine.

An end housing 10 is secured, by screws 11, to the left hand standard 2, and in the rear of this housing there is supported a driving shaft 12, equipped with a pulley 13, through which said shaft receives its power from any suitable source. The end of the shaft 12, opposite the housing 10, is journaled within a bracket 15 that is secured, by screws 16, to the plate 7. Upon a stub shaft 18 that is supported in the housing 10 above and forward of the shaft 12 is a gear 19 that meshes with a pinion 20, keyed or otherwise secured to the shaft 12, and a pinion 21 is fastened to the gear 19 which, in turn, meshes with a gear 22 that is fastened to the end of the cutter shaft 23 where it projects beyond a boss 24 of the housing 10, in which its left hand end has bearing. At its opposite end, the cutter shaft is journaled within a block 25 which has dovetail connection with a bracket 28, the base 29 whereof is adapted to be secured to the plate 7 by a screw 30, the plate having a channel within which a rib 31 of the bracket base is adapted to fit to hold the bracket against turning. The plate 7 is provided with a series of holes 32 into any one of which the screw 30 may be screwed, thereby providing an adjustment of the bracket lengthwise of the plate. The block 25 is clamped against lateral movement with respect to the bracket by a set screw 34, and this connection between the bracket and block permits of a much finer adjustment than the connection between the bracket and the plate 7. Consequently, any desired ultimate adjustment between the block and plate may be obtained. Intermediate its ends the cutter shaft is supported within a bearing block 35 that has dovetail connection with a bracket 36 which may be secured at various locations along the plate 7 by means of the screw 38, the construction and adjustability of these parts being identical with those of the former block and bracket 25 and 28, respectively.

Cutters 40 of the usual rotary type (in

which an integral key is common) are mounted upon the cutter shaft with their keys within a keyway 41, each cutter being clamped between collars 42 that are secured to the shaft by set screws 43. It is obvious that, by loosening the set screws 43, the collars and cutters may be adjusted along the shaft and spaced apart a distance equal to the length of pieces it is desired to cut from the tube or other object. When the cutters are set to cut comparatively short length pieces and all the cutters that are on the shaft are located toward the left hand end of the machine, then the brackets 29 may be set farther to the left than shown in the drawings so as to better support that portion of the shaft which is subjected to the thrust resulting from the cutting operation.

As will be readily seen from Figs. 2 and 3, the upper ends of the standards 2, 3 and 4 are bifurcated, and the opposed branches of each have rails 45 formed on their inner faces.

A table 46 is vertically reciprocable in the bifurcated ends of the standards and on its front and back faces has guideways 47 which are occupied by the rails 45. In the plane of each standard, the table is provided with a boss 48 having a recess in its lower face for the reception of the upper end of a post 49, the post being held in the recess by means of a set screw 50. Adjacent the boss, the post is equipped with a flange 51 having radial sockets for the reception of a spanner wrench whereby the post may be turned. The lower end of the post is threaded into the upper end of a lifter 53, and a lock nut 54 maintains the post and lifter in fixed relative position, the upper end of the lifter being flanged at 55 to form a bearing for the lock nut. The post and lifter, respectively, are guided within vertical bearings formed in cross members 57 and 58 of the respective standard, and a key 59, which occupies a keyway in the bearing of the cross member 58 and a spline in the lifter 53, prevents the latter from turning, while permitting free vertical movement. The bearings are made in halves, as indicated in Fig. 2, and the removable portions are held in place by screws 60.

A roller 61 is journaled within the forked lower end of each lifter 53 and rides upon a cam 62 that is fastened to a shaft 63, journaled within bearings 64 that may be made a part of each standard.

A sprocket wheel 65 is loosely mounted on the left hand end of the shaft 63 and has a clutch face 66 for coöperation with a clutch member 67, splined to the shaft 63 and impelled, by a spring 68, toward the clutch face of the sprocket wheel. A pedal 70 is pivoted at 71 to the outer side of the left hand standard and extends beneath the clutch member 67, the pedal being provided therebeneath with a pin 73 which is arranged to enter a cam groove 74 in the clutch member. The forward end of the pedal may be guided upon a post 75 which rises from the bed plate and which is surrounded by a spring 76 that tends to hold the pedal elevated with its pin 73 in the cam groove 74. The action of the clutch mechanism is this: When the pedal is depressed and its pin 73 withdrawn from the cam groove of the clutch member, the spring 68 moves the clutch member into coöperation with the clutch face of the sprocket wheel 65, thus locking the sprocket wheel to the shaft so that, as the shaft is driven, the cams 62 will be rotated to elevate the risers 53 and the posts 49, thus elevating the table 46. As the clutch member approaches normal position its cam slot is brought into register with the pin 73 of the pedal so that the pin may enter the slot, and upon further rotation of the parts the clutch member will be cammed away from the clutch face of the sprocket wheel 65 thereby freeing the sprocket wheel from the shaft and holding the shaft in fixed condition with the cams 62 in normal position and the table 46 lowered to the position shown.

The sprocket wheel 65 is driven, through a chain 80, from a sprocket pinion 81 that is fixed to the hub of a gear 82 which meshes with a pinion 83 that is keyed to the left hand end of the cutter shaft 23.

Associated with each cutter 40 is a tube support 85 having rollers 86 journaled in its top and between and upon which is supported the tube T that is to be cut. The bottoms of the supports 85 are of dovetail formation to be received by a correspondingly shaped groove 87 in the top of the table 46, and set screws 88 are threaded through the table top in the plane of the groove 87 for engagement with a gib 89 which serves to clamp the supports 85 in any position along the table top.

The lower dovetailed ends of blocks 90 are likewise clamped within the groove 87. These blocks are distributed at suitable intervals along the top of the table and have journaled in their rear ends a rock shaft 92 having an operating lever 93 secured to its left hand end. Fastened to this rock shaft, preferably midway between adjacent supports 85 and to the right of the right hand support, are arms 94, within the free ends of which are set crotch blocks 95 that are held in place by screws 96. After the completion of the tube cutting operation which is performed by the elevation of the table 46, as previously described, the lever 93 may be thrown upward into the dotted-line position shown in Fig. 2 which will swing the arms 94 upward to remove the cut tubes from the supports. The forward or down-

ward movement of the arms 94 is limited by stops 98 which project from the sides of the blocks 90 into the path of the adjacent arms.

Having thus described my invention, what I claim is:—

1. In a machine of the character set forth, the combination of a cutter, driving mechanism operatively connected to said cutter, an article support movable toward and from the cutter, a cam sustaining the weight of the article support and serving when actuated to move the support toward the cutter and control its gravitation therefrom, and separable connections between said cam and the driving mechanism.

2. In a machine of the character set forth, the combination of a cutter, driving mechanism operatively connected to the cutter, an article support movable toward and from the cutter, a cam, adjustable means through which the support is sustained by the cam and whereby the cam when actuated will move the support toward the cutter and control its gravitation therefrom, and separable connections between the driving mechanism and said cam.

3. In a machine of the character set forth, the combination of a frame, a rotary cutter sustained with its axis in fixed relation to the frame, driving mechanism operatively connected to the cutter, a shaft, a cam upon said shaft, an article support movable within the frame toward and from the cutter, the weight of the article support being sustained by the cam so that when the cam is actuated it will cause the support to be moved toward the cutter and control its gravitation therefrom, and separable connections between the driving mechanism and said shaft.

4. In a machine of the character set forth, the combination of a frame, a table guided for movement within the frame, a cutter shaft supported by the frame, a plurality of cutters adjustable along said shaft, a plurality of article supports adjustable along said table, means for moving the table toward and from the cutter shaft, driving mechanism and separable connections between the driving mechanism and said means.

5. In a machine of the character set forth, the combination of a frame, a table guided within the frame for vertical movement, a cutter shaft supported by the frame above the table, a plurality of cutters adjustable along said shaft, a plurality of article supports adjustable along said table, a cam shaft journaled within the frame, a cam upon said shaft, operative connections between the cam and table, driving mechanism and separable connections between the driving mechanism and cam shaft.

6. In a machine of the character set forth, the combination of a frame, a table movably supported by said frame, a cutter shaft supported by the frame and toward and from which the table is movable, driving mechanism operatively connected to the cutter shaft, a plurality of cutters adjustable along the shaft, a plurality of article supports adjustable along the table, ejector mechanism carried by the table and constituting, when in normal position, auxiliary article supports, means for operating said ejector mechanism, means for moving the table, and separable connections between the driving mechanism and said means.

7. In a machine of the character set forth, the combination of a frame, a cutter shaft having one of its ends journaled within a part of said frame, bearings adjustable along said frame wherein remote portions of said shaft are journaled, a plurality of cutters adjustable along the cutter shaft, a table supported by the frame and movable toward and from the cutters, article supports adjustable along the table, driving mechanism operatively connected to the cutter shaft, means for moving the table, and separable connections between said means and the driving mechanism.

8. In a machine of the character set forth, the combination of a cutter, an article support movable toward and from the cutter, means for so moving said support, ejector mechanism movable with said support and serving when in normal position as an auxiliary support, and means for actuating said ejector mechanism.

9. In a machine of the character set forth, the combination of a plurality of cutters adjustable toward and from each other, driving mechanism operatively connected to said cutters, a plurality of article supports adjustable so as to be maintained in operative relation to the cutters, means for producing relative movement between the cutters and supports, and operative connections between the driving mechanism and said means.

10. In a machine of the character set forth, the combination of a plurality of cutters, mechanism for driving said cutters, a table, means for producing relative movement between the cutters and table, operative connections between said means and driving mechanism, a plurality of article supports adjustable along the table so as to be maintained in operative relation to the cutters, a rock shaft supported by the table, ejector arms carried by said rock shaft and projecting beneath an article resting upon the aforesaid supports, and means for rocking said shaft.

11. In a machine of the character set forth, the combination of a plurality of cutters adjustable toward and from each other, driving mechanism operatively connected

to the cutters, a table, means for producing relative movement between the table and cutters, the table having a guideway, article supports adjustable along the guideway so as to be maintained in operative relation to the cutters, bearing blocks adjustable along said guideway, a rock shaft journaled within said bearing blocks, ejector arms adjustable along the rock shaft and constituting, when in normal position, auxiliary article supports, and means for oscillating the rock shaft.

12. In a machine of the character set forth, the combination of standards having opposed guides at their upper ends, a table reciprocable within said guides, a cutter shaft toward and from which the table is movable, driving mechanism operatively connected to the cutter shaft, cutters adjustable along the shaft, article supports adjustable along the table, means for moving the table, and operative connections between said means and the driving mechanism.

13. In a machine of the character set forth, the combination of standards having opposed guides at their upper ends, a table reciprocable within said guides, a top plate supported by the standards to one side of the table, brackets adjustable along said top plate and overhanging the table, a cutter shaft supported within said brackets, one of the standards having an extension wherein one end of the cutter shaft is journaled, driving mechanism operatively connected to the cutter shaft, cutters adjustable along the shaft, article supports adjustable along the table, a cam shaft journaled within the standards, cams upon said shaft, adjustable operative connections between said cams and the table, and separable connections between said cam shaft and the driving mechanism.

14. In a machine of the character set forth, the combination of standards having opposed guides at their upper ends, a table reciprocable within said guides, a top plate supported by the standards to one side of the table, brackets adjustable along said top plate and overhanging the table, a cutter shaft supported within said brackets, one of the standards having an extension wherein one end of the cutter shaft is journaled, driving machanism operatively connected to the cutter shaft, cutters adjustable along the shaft, article supports adjustable along the table, a cam shaft journaled within the standards, cams upon said shaft, adjustable operative connections between said cams and the table, separable connections between said cam shaft and the driving mechanism, and ejector mechanism carried by the table.

15. In a machine of the character set forth, the combination of a cutter, a work support, a cam sustaining the weight of said support, and means for moving the cam thereby to advance the work toward the cutter and control its gravitation therefrom.

16. In a machine of the character set forth, the combination of a tool, means supporting an article, a cam sustaining the weight of said means and operable to move said means toward the tool and control its gravitation therefrom, and further means for creating relative movement between the tool and article whereby the tool is caused to operate on the article.

17. In a machine of the character set forth, the combination of a frame, a table guided within the frame for vertical movement, work holders and tools sustained in operative relation to each other one by the frame and the other by the table, means for creating relative movement between the work and tools thereby to cause the tools to operate upon the work, a cam shaft journaled within the frame, a cam upon said shaft, said cam sustaining the weight of the table so that when the cam is rotated it will alternately elevate the table and control its gravitation, driving mechanism, and separable connections between said mechanism and the cam shaft.

18. In a machine of the character set forth, the combination of a plurality of tools adjustable to alter the distance between them, work supports associated, one with each tool, and likewise adjustable to correspond with the adjustment of the tools, means for creating movement relatively toward and from each other of the supports and tools, and means for relatively moving the tools and work thereby to cause the tools to operate on the work.

19. In a machine of the character set forth, the combination of a cutter, a work support, a cam, an adjustable thrust element through which the cam lifts the support into operative relation to the cutter and controls its gravitation therefrom, and means for operating the cam.

20. In a machine of the character set forth, the combination of a frame, a cutter shaft supported by the frame, a plurality of cutters adjustable along said shaft, an article support carried by the frame and movable in a direction away from the cutters by gravity, means for moving the article support toward the cutters, driving mechanism operatively connected to the cutter shaft, and separable connections between the driving mechanism and the aforesaid means.

21. In a machine of the character set forth, the combination of a frame, a cutter shaft supported by the frame, a plurality of cutters adjustable along said shaft, a table guided by the frame for movement toward and from the cutters, a plurality of

article supports adjustable along the table, and means for moving the table toward and from the cutters.

22. In a machine of the character set forth, the combination of a frame, a table guided for movement within the frame, a cutter shaft supported by the frame, a plurality of cutters adjustable along said shaft, an article support sustained by the table, means for moving the table toward and from the cutter shaft, driving mechanism, and separable connections between the driving mechanism and said means.

In testimony whereof, I hereunto affix my signature.

NATHAN F. FRETTER.