No. 849,147. PATENTED APR. 2, 1907.

S. H. LEWIS.

METAL CUTTING MACHINE.

APPLICATION FILED FEB. 20, 1906.

2 SHEETS—SHEET 1.

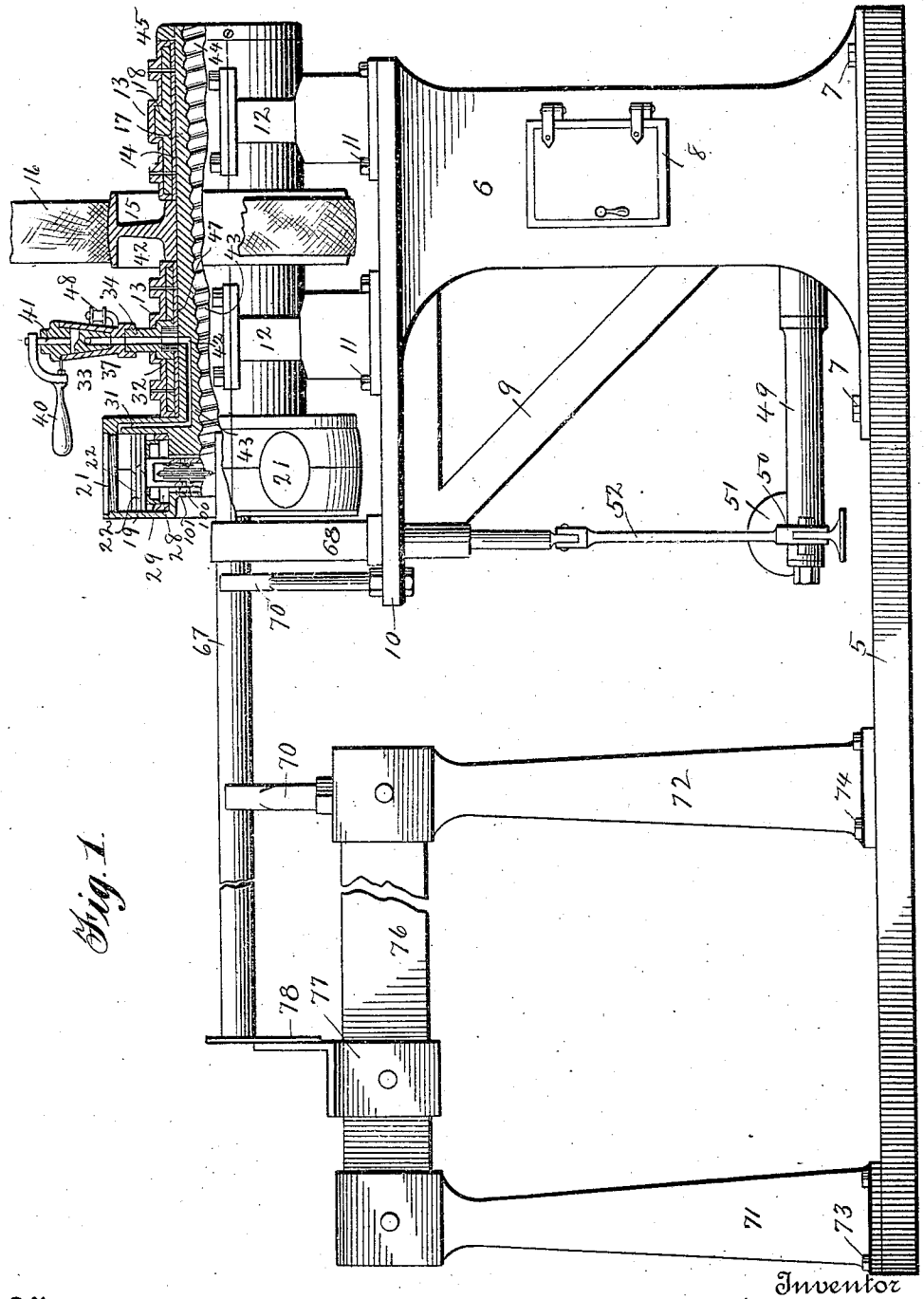


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 5.

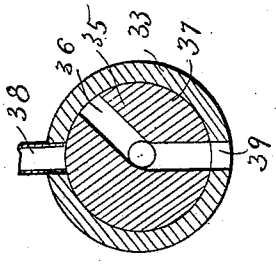


Fig. 6.

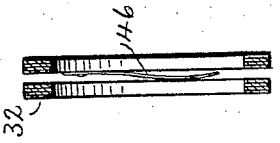


Fig. 3.

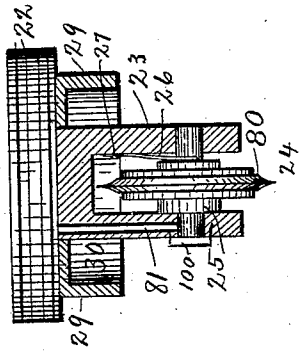


Fig. 4.

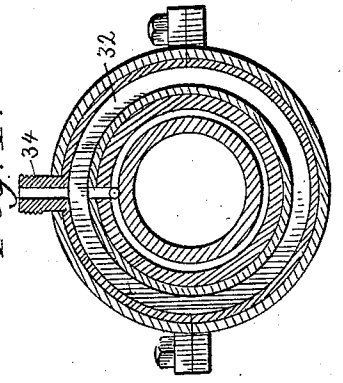
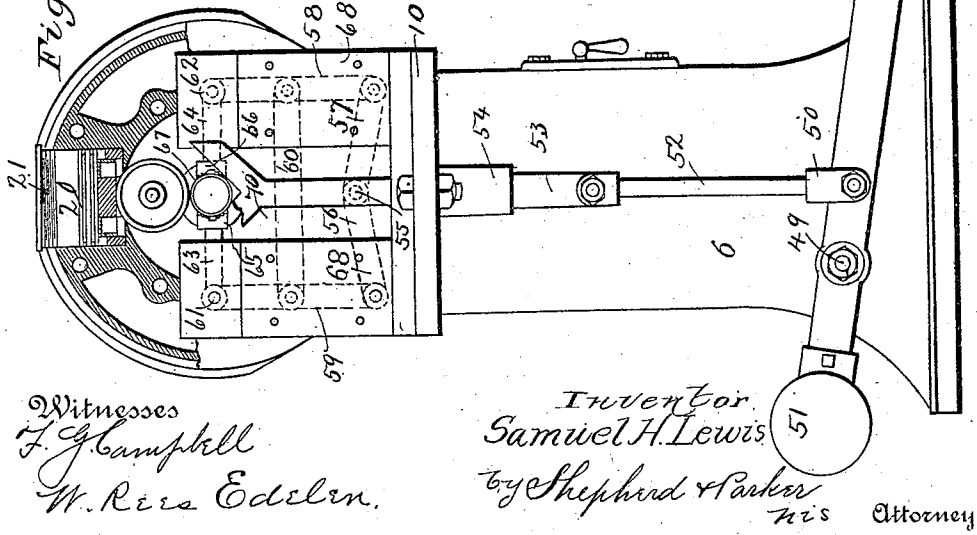


Fig. 2.



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UNITED STATES PATENT OFFICE.

SAMUEL H. LEWIS, OF PORTSMOUTH, VIRGINIA.

METAL-CUTTING MACHINE.

No. 849,147. Specification of Letters Patent. Patented April 2, 1907.

Application filed February 20, 1906. Serial No. 302,034.

To all whom it may concern:

Be it known that I, SAMUEL H. LEWIS, a citizen of the United States, residing at Portsmouth, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Metal-Cutting Machines, of which the following is a specification.

This invention relates to metal-cutting machines, particularly designed for use in cutting boiler-tubes, though it is not limited to such use, but may be used for cutting any kind of tubing.

The object of the invention is the provision of a machine of this character provided with a rotative head in which are mounted radially-movable cutting-wheels, together with means for advancing the cutting-wheels toward the material to be acted upon and forcing said cutting-wheels into operative relation to the stock.

Further objects and advantages of the invention will be set forth in the detailed description which now follows.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a metal-cutting machine constructed in accordance with the invention. Fig. 2 is an end elevation, partly in section, of said machine. Fig. 3 is a detail sectional view of a cutting-wheel hereinafter described. Fig. 4 is a transverse section through a portion of the head of the machine. Fig. 5 is a horizontal section of a valve hereinafter described. Fig. 6 is a detailed sectional view of a pair of packing-washers hereinafter described.

Like numerals designate corresponding parts in all of the figures of the drawings.

Referring to the drawings, the numeral 5 designates a supporting-base upon which a standard 6 is bolted, as at 7. This standard is hollow and is provided with a door 8, through which tools may be inserted or removed. This structure is common to metal-working machines and forms no part of the present invention. The standard 6, together with a brace 9, supports a table 10. Secured upon this table by bolts 11 are bearings 12, which, together with the bearing-caps 13, form a support for a rotative stem 14, which is mounted in said bearings. Secured to the stem 14 is a pulley 15, to which power may be applied by a belt 16. A sleeve or thimble 17, made of steel or other wear-resisting material, is secured upon the stem 14, while the bearing-caps 13 are lined with Babbitt or other bearing metal 18. The stem 14 has a head 19 formed integral therewith, and in this head a plurality of radially-movable pistons are mounted, said head being divided into cylinders 20 for the reception of these pistons. The outer ends of these cylinders are closed by caps or plugs 21. These pistons are shown in detail in Fig. 3 and comprise the pistons proper, 22, and inwardly-extending bifurcated shanks 23, in which are mounted cutting-wheels 24, as is clearly illustrated in Fig. 3. The hubs 25 of these cutting-wheels do not entirely fill the space between the members of the bifurcated shank 23, but are of such size as to have a slight lateral movement. The flat spring 26 is secured, as at 27, to the inner face of one of the members of the bifurcated shanks, the lower end of said spring bearing against the hub of the cutting-wheel to normally force such cutting-wheel to the left in said Fig. 3.

The cylinders 20 are reduced in diameter, as at 28, and receive the downturned flange 29 of an inverted cup 30, which is secured to the under face of piston 22. Air-supply passages 31 lead from the cylinders 20 to an air-receiver 32, formed in the bearings 12. This air-receiver extends entirely around the bearing 12, so that each of the ports 31 may come in communication therewith. A two-way valve 33 is threaded upon a nipple 34, which leads to the air-receiver. This valve comprises the outer valve-casing and a plug 35, which has a horizontal port 36 formed therethrough, said horizontal port communicating with a vertical port 37, which leads to the air-receiver. Passing through the side of the valve-casing 33 is an air-supply pipe 38, while formed through the opposite side of said casing is an exhaust-port 39. A handle secured to the stem 41 of the plug 35 provides means for imparting movement to said plug to bring the channel 37 into communication with the air-supply pipe 38 or the exhaust-port 39. Fiber washers 42 form the side walls of the air-receiver 32 and are clamped in place by steel bushings 43, which surround the stem 14 and bind said fiber washers between them. An outwardly-flaring channel 44 is formed through the stem 13, the walls of which may be corrugated, as at 45, if desired. Fiber washers, such as illustrated in Fig. 6, may be employed as packing for the air-receiver. In this form of packing a spring 46 is

inserted between the washers and serves to press said washers firmly against the walls of an annular U-shaped ring 47, from which the nipple 34 extends and in which said packing-rings are located.

An oil-cup 48 is mounted upon the side of the valve-casing 33 and communicates with the port 37, whereby oil may be supplied to the pistons and cutting-wheels, as will be hereinafter described.

Extending from the lower portion of the standard 6 is a support 49, upon which is pivoted a foot-lever 50, which is weighted, as at 51. Connected at this foot is a link 52, said link being in turn connected to a vertically-movable rod 53, which passes through a guide-sleeve 54, carried by table 10. The upper end of the rod 53 is pivoted, as at 55, to links 56 57. The outer ends of the links 56 57 are pivoted to links 58 59, which are connected by a cross-bar 60. The upper ends of the links 58 59 are pivoted, as at 61 62, to the shanks 63 64 of clamping members 65 66, which clamping members are adapted to grasp the stock 67 and are mounted in heads 68, carried by the table 19. This foot-actuated clamping mechanism is of the usual construction and forms no part of the present invention.

V-shaped guide members 70 provide means for supporting and guiding the stock. Mounted in standards 71 72, which are bolted, as at 73 74, to the base 5, is an angular guide-bar 76, upon which is slidably disposed an angular collar 77, which carries a plate 78, adapted to form a stop for the end of the stock and to provide a gage by which the length of tubing to be cut off may be determined when it is desired to cut a number of tubes the same length. A lug 100, formed upon the shaft of cutting-wheel 80, projects into a keyway 101 of the piston-rod 23 and prevents said piston-rod from turning. The stock 67 having been placed in position, as shown in Fig. 1, motion is imparted to shank 14 and head 17 through pulley 15 and belt 16. The handle 40 of the valve 33 is then moved to turn the plug into such position as to establish communication between the air-supply pipe 38 and the channel 37. Air under pressure passes through the port 31 to the interior of cylinders 20, where it acts upon the pistons 22 and forces the cutting-wheels 24 against the periphery of the stock 67.

One end of the stock, which is here illustrated as a tube, having been entirely cut off by the cutting-wheels the piece which is cut off falls into the channel 44, and the rotation of the head, together with the inclination and the corrugation of said channel, feeds the piece thus cut off from the head, together with the filings which may have accumulated. By referring to Fig 3 it will be seen that the faces of the cutting-wheels 24 are beveled, as at 80. When the tube is finally cut through, the spring 26 gives and permits said wheels to move toward the wall to which said spring is secured. This structure is necessary to accommodate the beveled face 80 upon the left-hand side of the cutting-wheel in Fig. 3. When it is desired to retract the cutting-wheels, the handle 40 is moved to bring the plug 35 into such position as to establish communication between the channel 37 and the exhaust-port 39. This permits the air to escape from the cylinders 20. The centrifugal force then acting upon the pistons 22 causes said pistons to move to the outer portions of the cylinders 20, thereby permitting another tube to be inserted, as will be readily understood. Formed through the pistons 22 and through one of the members of the bifurcated shanks are minute oil-passages 81. Oil from the oil-cup 48 passes to the channel 37 and is carried by the air to the interior of cylinders 20, where it finds its way through passages 81 to the bearings of the cutting-wheels 24, and from said bearing it works to the outer edge of said cutting-wheels to provide oil at the point where the cutting is being done.

It will of course be understood that the clamping members 65 66 are actuated to hold the tube against the turning while it is being acted upon by the cutting-wheels.

From the foregoing description it will be seen that simple and efficient means are herein provided for accomplishing the objects of the invention; but while the elements shown and described are well adapted to serve the purposes for which they are intended it is to be understood that the invention is not limited to the precise construction set forth, but includes within its purview such changes as may be made within the scope of the appended claims.

Having described my invention, what I claim is—

1. In a device of the character described, the combination with a supporting-frame, of a rotative head a plurality of cylinders formed in said head and a plurality of pistons mounted in said cylinders, cutting-wheels actuated by said pistons and means for supplying fluid under pressure to said cylinders.

2. In a device of the character described, the combination with a rotative head, of means for advancing stock to said head, means for clamping said stock, a plurality of pistons mounted for radial movement in said head, a plurality of cutting-wheels actuated by said piston, means for imparting rotative movement to said head and means for supplying fluid under pressure to the pistons.

3. In a device of the character described, the combination with a rotative head, of cutting members carried by said head said head having an outwardly-flaring channel formed

therethrough the walls of which are corrugated.

4. In a device of the character described, a rotative head having a plurality of cylinders formed therein a plurality of pistons mounted for radial movement in said cylinders, cutting-wheels carried by said pistons and having lateral movement and means for supplying fluid under pressure to said pistons.

5. In a device of the character described, the combination with a rotative head having a plurality of cylinders formed therein of a plurality of radially-mounted pistons in said cylinders, cutting-wheels carried by said pistons, means for supplying fluid under pressure to said pistons and means for supplying oil to said cutting-wheels.

6. In a device of the character described, a rotative head formed with a longitudinal channel therethrough, said channel having corrugated walls.

7. In a device of the character described, a rotative head formed with a longitudinal channel therethrough, said channel being formed with spirally-corrugated walls.

8. In a device of the character described, a rotative head formed with a longitudinal outwardly-flaring channel therethrough, said channel being formed with spirally-corrugated walls.

9. In a device of the character described, a rotative head formed with a longitudinal channel therethrough and means embodied as an integral part of said head within said channel, for feeding material outwardly therefrom.

10. In a device of the character described, the combination with a rotative head, of a plurality of cutting-blades mounted for radial movement in said head and fluid-pressure-operated means for positively advancing said cutting-blades toward the material to be acted upon.

11. In a device of the character described, a rotative head formed with a longitudinal channel therethrough, a plurality of cutting-wheels mounted within said head and adapted for radial movement toward and within said channel and fluid-pressure-operated means for positively advancing said cutting-wheels toward said channel and the material to be acted upon, therewithin.

12. In a device of the character described, the combination with a rotative head, of a plurality of cutting-knives mounted for radial movement therein, cut-out-controlled means for positively advancing said cutting-knives to the material to be acted upon, said cutting-knives being designed to move away from said material by the centrifugal force of the rotation of said head upon the stoppage of the operation of said last-named means.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL H. LEWIS.

Witnesses:
J. M. TATEM,
B. F. LASSITH.