No. 629,777. Patented Aug. 1, 1899.

W. E. CROCKER.

SOLDER CUTTING MACHINE.

(Application filed Feb. 6, 1899.)

(No Model.) 4 Sheets—Sheet 1.

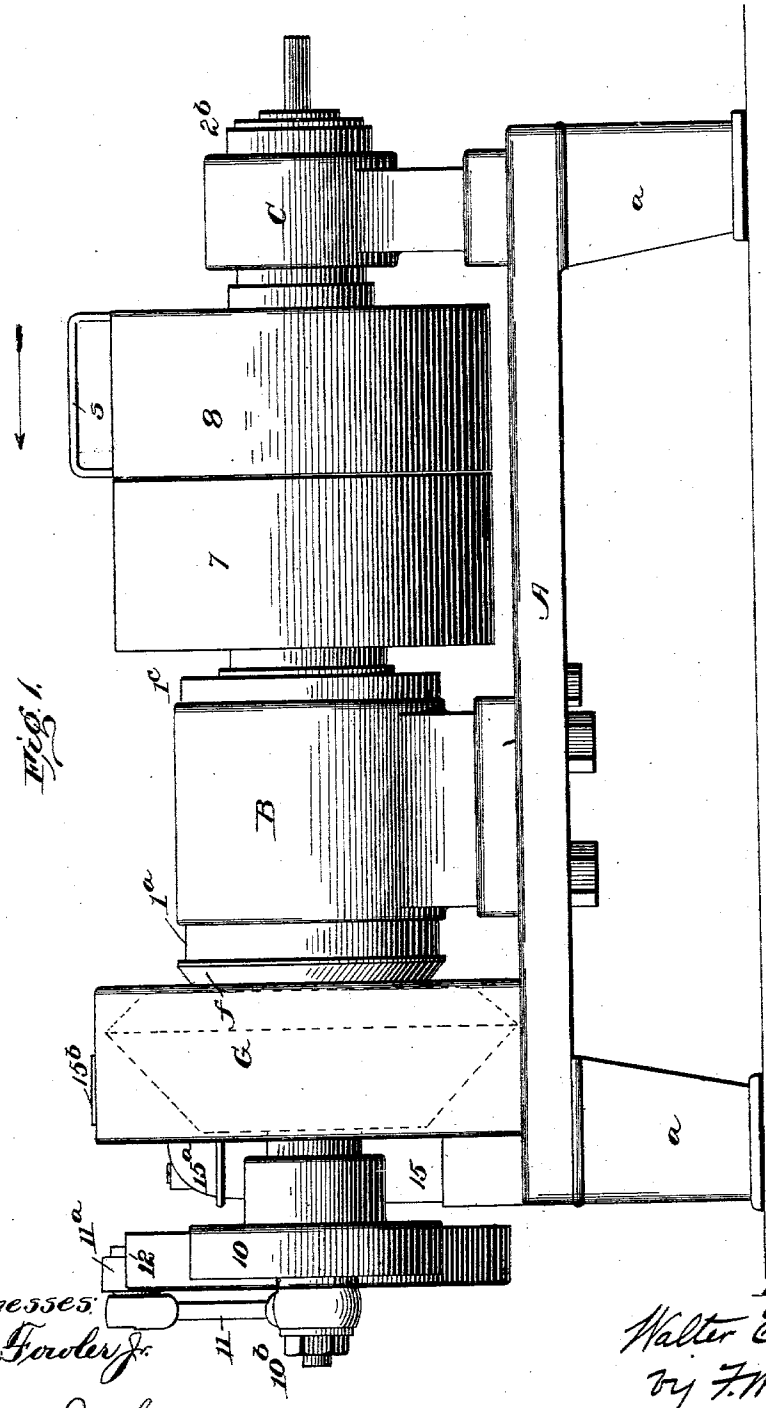


Fig. 1.

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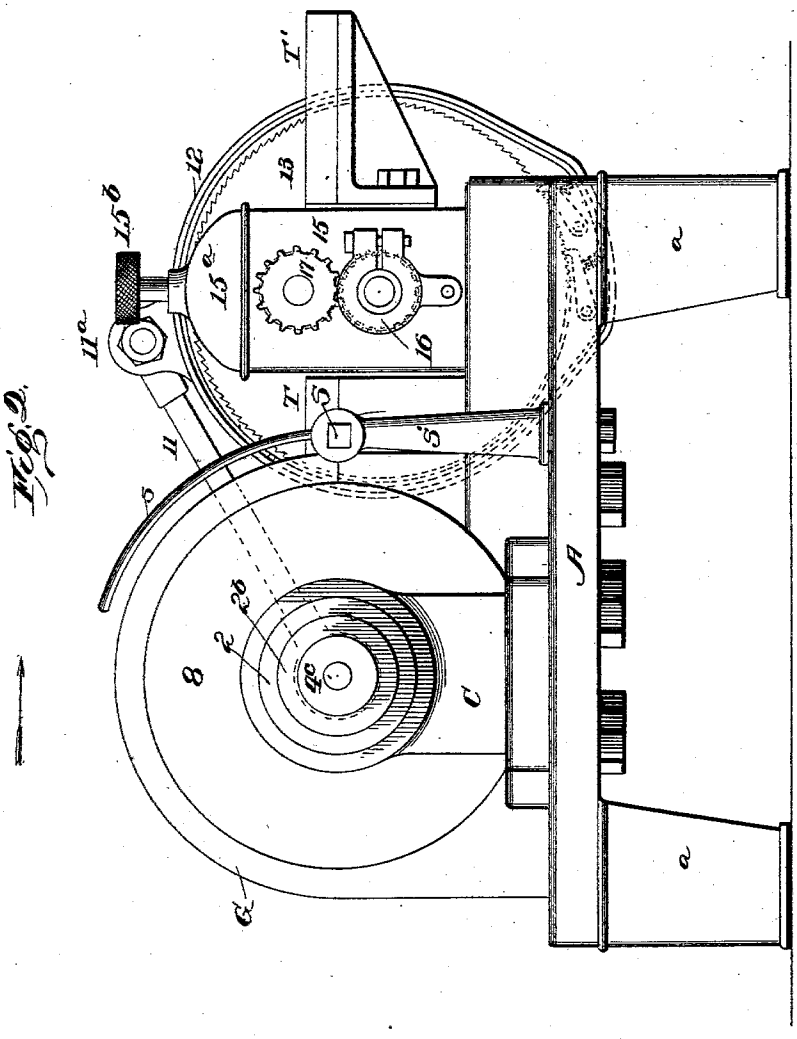
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Fig. 2.



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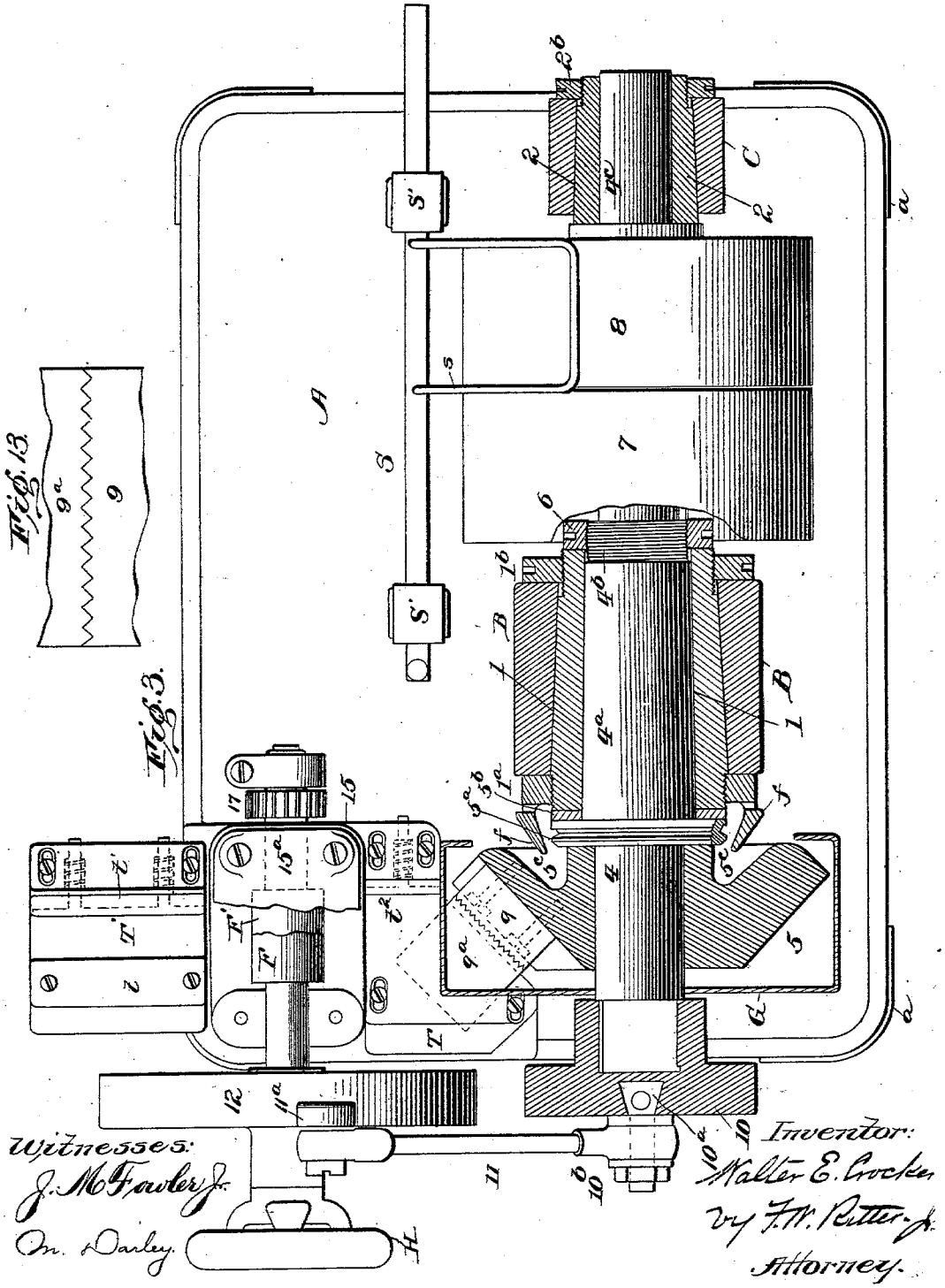
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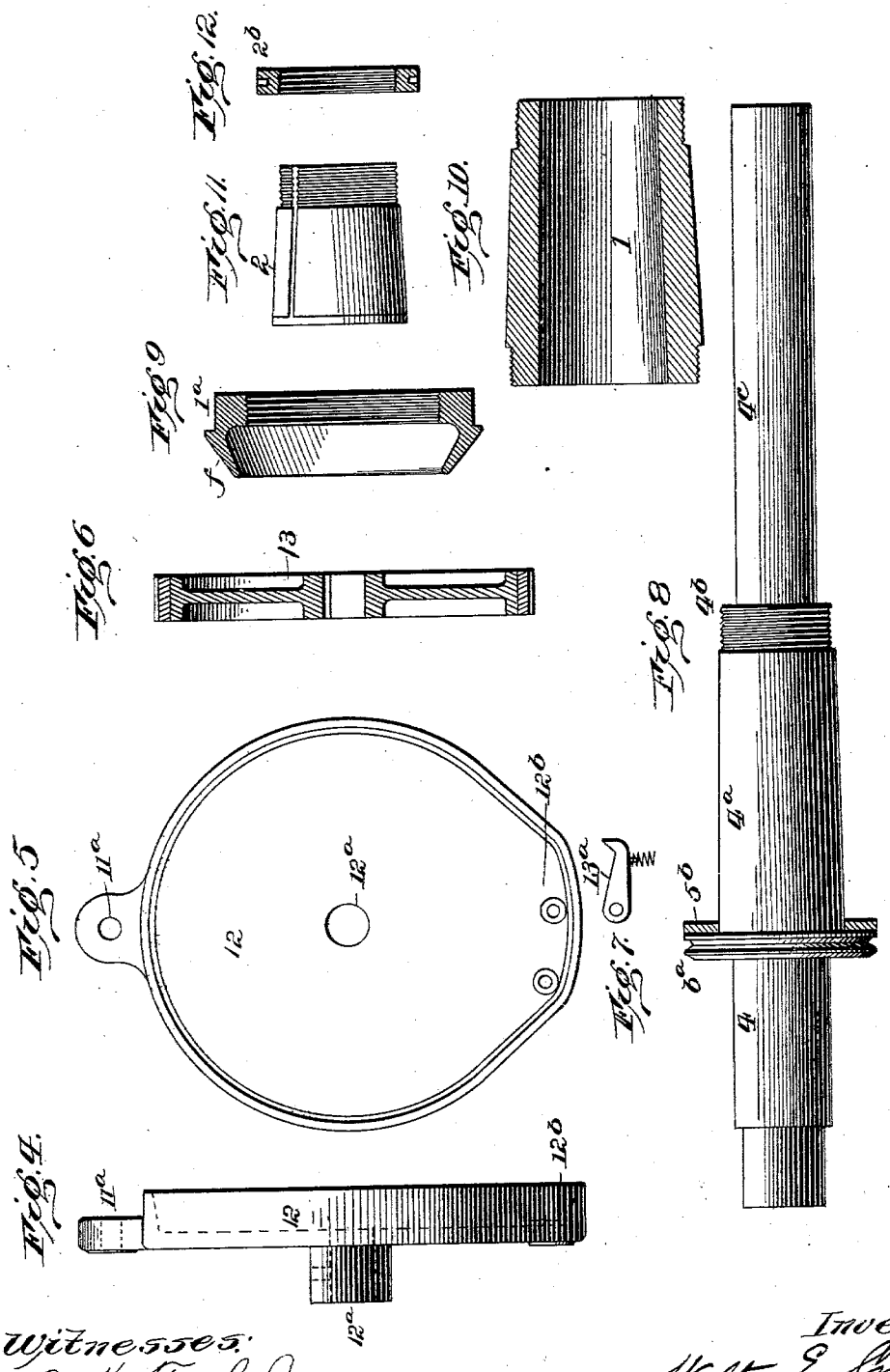
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UNITED STATES PATENT OFFICE.

WALTER E. CROCKER, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO W. & S. BLACKINTON, OF SAME PLACE.

SOLDER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 629,777, dated August 1, 1899.

Application filed February 6, 1899. Serial No. 704,697. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. CROCKER, a citizen of the United States, residing at Providence, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Solder-Cutting Machines; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a solder-cutting machine embodying my invention, looking in the direction of the arrow, Fig. 2. Fig. 2 is an end view of the machine, looking in the direction of the arrow, Fig. 1. Fig. 3 is a plan view of the machine, partly in horizontal section, to show the construction of the shaft or spindle, spindle-boxes, adjusting-nuts for the spindle-boxes, and the relative arrangement of the fixed and rotary cutters and the feed-rollers. Fig. 4 is a detached side or edge view of the crank-disk for operating the feed-rollers. Fig. 5 is an inner face view of the crank-disk shown in edge elevation, Fig. 4. Fig. 6 is a sectional view of the ratchet-wheel included in and actuated by the crank-disk. Fig. 7 is a side elevation of one of the two spring-dogs mounted on the crank-disk for actuating the ratchet-wheel of the feed-roller. Fig. 8 is a detached view of the shaft or spindle which carries the cutter-head. Fig. 9 is a detached sectional view of the adjusting-nut of the front spindle-box. Fig. 10 is a detached view of the front spindle-box. Fig. 11 is a detached view of the rear spindle-box. Fig. 12 is a detached sectional view of the adjusting-nut of the rear spindle-box. Fig. 13 is an enlarged detail view of the cutters.

Like symbols refer to like parts wherever they occur.

My invention relates to that class of devices employed for shredding or comminuting solder, and while of general application to the comminuting of all kinds of solder has been especially devised for shredding or comminuting gold, silver, or other composition used in hard or soft soldering jewelry.

The object in view is the production of a solder-shredder rapid and accurate in operation and which will produce uniform results as to length and width of the solder shreds, though the length and width of the shreds or particles of solder may be varied at will by change of cutters and adjustment of feed.

In carrying out my invention I employ in combination a fixed cutter and a rotary cutter, said cutters being correspondingly serrated or provided with teeth or notches, which fit one within the other and operating at other than a right angle to the line of feed, whereby the width of the shred may be controlled by the feed, and such a combination embraces the main feature of my invention. I also prefer to employ a spindle or shaft set at right angles to the line of feed and provided with a beveled cutter-head to which a serrated cutter is detachably secured, and in conjunction therewith a fixed correspondingly-serrated cutter set in a plane corresponding to the bevel of the cutter-head, whereby a shear cut is obtained with all the advantages incident thereto, and such a construction embodies a secondary feature of my invention. I also combine with the spindle which carries the rotary cutter and with one of the feed-rollers an interposed crank-disk and pawl-and-ratchet mechanism mounted on one of the feed-rollers and means whereby the feed is adjustably controlled from the cutter-spindle, and such a construction embodies a further feature of my invention.

There are other minor features of invention relating to the particular construction of the feed mechanism and also to the cutter-spindle and its bearings and the means of adjusting the same, all as will hereinafter more fully appear.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates a suitable bed-plate for the support of the operative devices, which bed-plate, if desired, may be in turn supported by legs *a a* or in other suitable manner.

At one side of and supported by the bed-

plate A are front and rear pedestals or pillow-blocks B and C, tapered on the interior (see section Fig. 3) for the reception of the front and rear spindle-boxes 1 and 2, which are correspondingly tapered on their exterior.

The spindle-boxes 1 and 2 are of the same general construction—that is to say, are longitudinally slotted or spring sleeves adapted to inclose the shaft or spindle 4. The forward or front spindle-box is, however, the larger and is bored on a taper to accommodate a corresponding taper 4^a of the shaft or spindle 4 and is threaded at each end for the adjusting-nuts 1^a 1^b, while the rear spindle-box is smaller, has a bore of uniform diameter to accommodate the reduced shaft, and is only threaded at one end to receive a single adjusting-nut 2^b.

4 indicates the shaft or spindle, to the forward end of which is secured in any suitable manner a beveled cutter-head 5, back of which on the shaft is a collar 5^a and a thrust-washer 5^b, of brass or other suitable material.

As before noted, the shaft or spindle 4, back of the beveled head 5, tapers, as at 4^a, for the reception of the front spindle-box 1 and is threaded, as at 4^b, (see Fig. 3,) for a nut 6, which prevents the endwise movement of the spindle-box or of the spindle within the box. The remainder of the spindle or shaft 4 may be of uniform diameter, as at 4^c, (see Fig. 8,) and carry a fast pulley 7 and a loose pulley 8.

The cutter-head 5 may be beveled at any desired angle, preferably at an angle of forty-five (45°) degrees, and is slotted for the reception and attachment of a serrated cutter 9, which may be bolted or otherwise removably secured thereto. The rear face of the cutter-head 5 is recessed, as at 5^c, for the reception of an annular taper or beveled flange *f* on the nut 1^a, which guards the spindle-bearing from the dust and shredded solder produced by the operation of the machine. Said nut 1^a, as well as the nuts 1^b, 6, and 2^b, is provided with holes for a spanner-wrench, or other suitable provision is made for rotating the nuts when required.

S indicates a shipper-rod longitudinally movable in suitable brackets or supports S′ and provided with a shipper yoke or fork *s* for shifting the driving-belt from the fast to the loose pulley, all of which may be of any approved design.

G indicates a casing or cover for the cutter-head 5 to confine the shredded solder, and the same (see Fig. 3) should extend over the fixed cutter 9^a.

Keyed to the outer end of spindle 4, beyond the cutter-head, is a disk 10, having a transverse slide-recess, wherein is an adjustable slide 10^a, carrying a wrist-pin 10^b, with which one end of a connection-rod 11 is pivotally connected, the opposite end of said connection-rod being pivotally connected, as at 11^a, with a crank-disk 12. The adjustment of slide 10^a to and from the center of rotation of disk 10 will determine the eccentricity of wrist-pin 10^b and the movement or throw of connection-rod 11 and the consequent feed of the feed-rollers, as will hereinafter appear.

12 indicates a crank-disk (see Figs. 2, 3, 4, and 5) provided with a journal-opening 12^a, by means of which it is journaled on the shaft of one of the feed-rollers F, and with an ear 11^a, to which one end of the connection-rod 11 is pivoted. Said crank-disk 12 is flanged on its inner face to form a housing for a ratchet-wheel 13, which is fastened to the shaft of feed-roller F, and its periphery is projected, as at 12^b, to house two spring pawls or dogs 13^a, pivoted on the crank-disk 12 and which engage the ratchet-wheel 13, whereby the ratchet-wheel 13 is rotated, and with it the feed-roller F, when the crank-disk is rocked by connection-rod 11.

To a suitable die-block or table T (see Fig. 3) in front of the cutter-head and at an angle corresponding with the bevel of the cutter-head 5 is removably secured a fixed serrated cutter 9^a, so adjusted with relation to the serrated rotary cutter that the teeth of the rotary when in operation shall pass between the teeth of the fixed cutter.

Directly back of and in line with the die-bed or table T is a pair of feed-rollers F F′, (see Figs. 2 and 3,) journaled in suitable roller frames or housings 15, provided with a housing-cap 15^a and housing-screw 15^b, and with said rolls and housing-screw the usual or any approved interposed pressure-spring may be employed, if desired.

The feed-rollers consist of a lower roller F, whose shaft is extended to receive the ratchet-wheel 13, secured thereto and by which said roller is driven, to form a journal on which the crank-disk 12 is loosely mounted and on which it rocks, and to receive a hand-wheel H, by means of which the feed-roller F may be rotated independently of the pawl-and-ratchet feed mechanism, when desired. The opposite end of the shaft of roller F carries a small pinion 16, (see Fig. 2,) which gears with a corresponding pinion 17 on the shaft of the upper roller F. The feed-rollers, it will be noted, have their axes parallel with the rotating shaft, which carries the beveled cutter-head. Consequently while the line of feed is at right angles to the plane of the cutter-shaft or plane of rotation of the cutter-head owing to the bevel of the cutter-head and the arrangement of the cutters the cut is diagonally across the solder slip or at other than a right angle to the line of feed, which is a material feature of my invention, as thereby the interlocking serrated teeth of the cutters are caused to cut substantially rectangular shreds the width whereof will be determined by the length of feed.

Directly back of and in line with the feed-rollers F F′ is the feed-table T′, provided with the guides *t t′*, one of which, *t′*, is yieldingly

or spring supported, and a corresponding yielding or spring-supported guide f^2 may be used in conjunction with table or die-bed T.

In setting up the machine the front and rear spindle-boxes 1 and 2 may be inserted in the pillow-blocks B and C, and the spindle 4, with attached cutter-head 5, may then be inserted endwise through the front spindle-box 1, the hubs of the pulleys 7 and 8, and the rear spindle-box 2, after which the nut 6 may be turned to draw the spindle 4 home in the front spindle-box 1 and force the end of the spindle-box against the thrust-washer 5^b, after which the nuts 1^a, 1^b, and 2^b may be manipulated to secure the proper adjustment of the bearings within the pillow-blocks B and C and thereafter to take up slack or wear in the bearings.

The solder to be shredded or comminuted will be first rolled into sheets of the desired thickness and then reduced to strips of the desired width, which strips will be passed through the feed-rollers F F' and over the fixed cutter 9^a within the path of the rotating cutters. As the cutters operate diagonally across the solder strip, the width of the shreds will depend on the length of feed or extent to which the edge of the strip is advanced beyond the edge of the fixed cutter 9^a; but the length of the shreds of solder will depend on the length and width of the teeth. Therefore the cutters will have to be changed to obtain different lengths of shreds; but two or three sizes of cutters will be found to suffice for all required sizes of shreds. Power being applied to rotate the spindle 4 and cutter-head 5, the connection-rod 11 will be reciprocated, its throw depending on the position of slide 10^a and wrist-pin 10^b off the center, and by its movement the connection-rod 11 will rock the crank-disk 12, which, through the medium of spring dogs or pawls 13^a, will rotate the ratchet-wheel 13 and lower roller F, which will in turn rotate the upper roller F, thus automatically and continuously feeding the solder strip to the cutters, the feed being uniform and controlled by the travel of the connection-rod, which latter can be adjusted and regulated as hereinbefore pointed out.

The advantages incident to the construction hereinbefore set forth are rapidity of operation—from five thousand to twenty-five thousand shreds may be cut per minute, according to the speed of the spindle—conservation of power, and durability of the machine resulting from the shear cut and the multiple cutting edges, and uniformity of product, which can be varied and graded to meet any requirements by the use of a minimum number or series of changeable cutters, according to the lengths of shreds required, the width being controllable by the feed of the machine.

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

1. In a solder-cutting machine, the combination of two coacting serrated cutters whose teeth lap or fit the one set within the other and devices which cause the feed of the solder strip to the cutters at other than a right angle; substantially as and for the purposes specified.

2. In a solder-cutting machine, the combination of a fixed serrated cutter and a movable serrated cutter, the teeth of the cutters corresponding and adapted to fit one within the other and devices which cause the feed of the solder strip to the cutters at other than a right angle; substantially as and for the purposes specified.

3. In a solder-cutting machine, the combination with a rotary beveled cutter-head, of a serrated cutter, and a fixed serrated cutter, the teeth of one cutter adapted to pass between the teeth of the other cutter and feed mechanism arranged to feed the solder strip in a line at right angles to the axial line of the beveled rotary cutter-head; substantially as and for the purposes specified.

4. In a solder-cutting machine the combination of a fixed cutter, a rotary cutter, feed-rollers, a crank-disk and pawl-and-ratchet mechanism mounted on one of the feed-rollers, and means for actuating the crank-disk from the rotary cutter; substantially as and for the purposes specified.

5. In a solder-cutting machine, the combination with a rotary cutter and feed-rollers, of a ratchet-wheel on the feed-roller shaft, a crank-disk carrying pawls which engage the ratchet-wheel, and a connection-rod for actuating the crank-disk from the rotary cutter; substantially as and for the purposes specified.

6. In a solder-cutting machine, the combination of a fixed cutter, a rotary cutter, feed-rollers, a pawl-and-ratchet mechanism, for actuating the feed-rollers, and a connection-rod having an adjustable wrist-pin for actuating the pawl-and-ratchet mechanism from the rotary cutter; substantially as and for the purposes specified.

7. The combination with a spindle of a rotary cutter-head, said spindle having a tapering section, of a longitudinally-slotted internally-tapered spindle-box, and means for confining the box to the spindle; substantially as and for the purposes specified.

8. The combination with a rotary spindle having a tapering section, of a longitudinally-slotted internally-tapered spindle-box threaded at its ends, and nuts for confining the spindle-box to the spindle; substantially as and for the purposes specified.

9. The combination with a spindle having a tapered section, and a section of uniform diameter, of two longitudinally-slotted and threaded spindle-boxes one of said boxes having a tapered bore, and nuts for confining the spindle-boxes to the spindle; substantially as and for the purposes specified.

10. In a solder-cutting machine, the combination with a rotary cutter-head having an

annular recess on the side toward its bearing, of an annular beveled flange which surrounds the bearing of the cutter-head and projects into the annular recess of said head; substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 4th day of February, 1899.

WALTER E. CROCKER.

Witnesses:
GEORGE H. SMITH,
AMOS S. BLACKINTON, Jr.