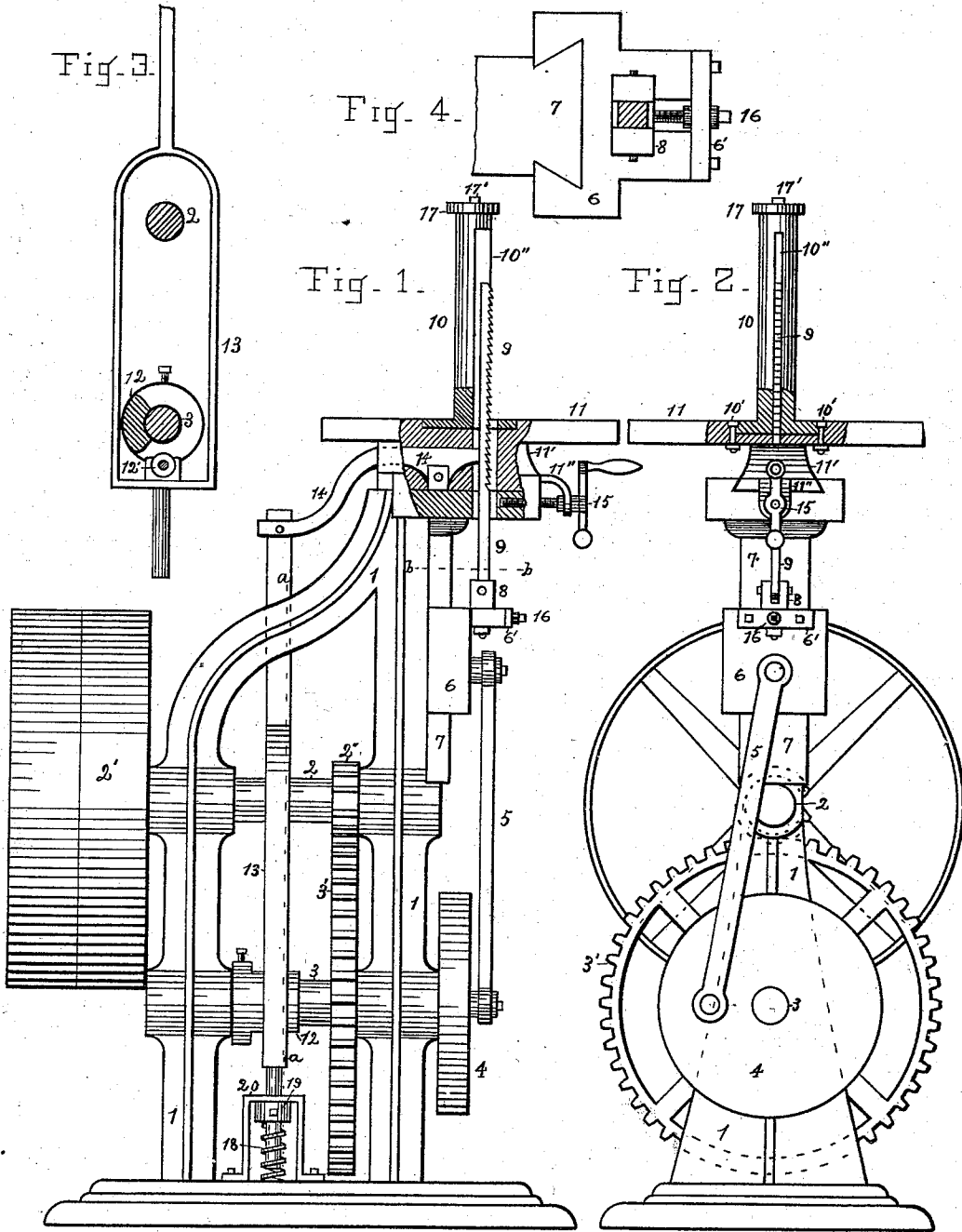


(No Model.)

O. C. & A. M. LITTLE.
KEY SEAT CUTTING MACHINE.

No. 406,525.

Patented July 9, 1889.



Witnesses.

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UNITED STATES PATENT OFFICE.

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SAME PLACE.

KEY-SEAT-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 406,525, dated July 9, 1889.

Application filed April 9, 1889. Serial No. 306,593. (No model.)

To all whom it may concern:

Be it known that we, ORTON C. LITTLE and ADDISON M. LITTLE, citizens of the United States, residing at Menasha, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Key-Seat-Cutting Machines, of which the following is a specification.

Our invention relates to an improvement in key-seat-cutting machines for cutting key-seats in the hubs of pulleys and similar articles, in which a reciprocating cutting-tool having serrations upon one of its edges is used, to the method of holding the cutting-tool to the work during the feeding or downward stroke and relieving it therefrom during its return movement, to the method of feeding the cutting-tool to the work, to the method of holding the work upon the table, and also to the method of adjusting the cutting-tool for producing the desired taper of the key-seat; and the objects of our improvements are to produce a machine for the aforesaid purpose that is simple in construction, one in which the article to be operated upon is firmly secured and the key-seat invariably cut upon a plane parallel with the bore of said article, and that will produce key-seats in a series of articles, whether of the same or different bores, of such accuracy both of taper and depth that one key will fit the seat which is cut in each of said articles. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the entire machine, the central portion of the table, the lower part of the mandrel which enters the bore of the article to be operated upon, and a part of the frame-top upon which the table is movable for feeding the work to the cutting-tool being shown in section. Fig. 2 is a front elevation of the same, a like portion of the mandrel and a portion of the table-top being in section. Fig. 3 is a transverse sectional elevation upon the line *aa* of Fig. 1, showing the cam and the loop upon which it acts that produces the feeding and relief movement of the cutting-tool. Fig. 4 is a plan of the tool-holder upon an enlarged scale and in section upon the line *bb* of Fig. 1.

Similar figures of reference indicate like parts in the several views.

1 indicates the frame of the machine, which we prefer to make and have here shown as formed of a single casting. 2 is the main shaft, journaled in bearings in the frame and carrying upon its outer end pulleys 2', by which the machine is driven from any available motor; 3, a shaft journaled in the frame below the shaft 2 and driven from it by means of the pinion 2'' and spur-gear 3'. Upon the end of the shaft 3 a crank-wheel 4 is secured, having connected with it by means of the connecting-rod 5 the slide 6. 7 is a way cast integral with the frame 1, and being provided with lips upon its edges upon which the slide 6 is fitted. 8 is a socket or holder carrying the cutting-tool 9; 10, a mandrel, one of a series of interchangeable ones fitting the bore of the article to be key-seated; 11, the top or table of the machine; 12, a cam secured upon the shaft 3; 13, a loop in which said cam revolves and to which it gives a reciprocating movement; 18, a spring which produces the feed of the cutting-tool; 19, a collar upon the cylindrical extension of the loop 13 and adjustable thereon for limiting the extensibility of said spring; 14, a lever fulcrumed in the socket 1' and connected with the bar extending above loop 13; 15, a screw, turning loosely but retained in the arm 11', which extends forward from the lower part of the table. It engages with the frame 1, and by its being turned the table is moved toward and from the cutting-tool; 16, a screw journaled in the plate 6'. It enters the socket or tool-holder 8, and the turning of which adjusts the socket or tool-holder relative to its position under the free end of the lever 14, for the purpose of producing the desired taper in the key-seat.

It is evident that the taper of the key-seat can be controlled and the extra depth necessary therefor can be made at the upper or lower end of the bore by means of the position of the tool-holder 8 relative to the aforesaid end of the lever.

In practice it is preferable that the key-seat is widest at the lower end that the chips will escape more readily, the angle which the tool

makes rearwardly of a perpendicular line during its upward stroke aiding the receding movement of the tool and facilitating the escape of the chips.

5 The socket 1', in which the lever 14 is fulcrumed, is located in a position under said lever, whereby the elevation of the outer end of the lever throws its inner or free end forward upon the cutting-tool 9, and against
10 which said tool is reciprocated, while the depression of said outer end relieves the tool of its support and permits the tool to oscillate freely upon its pivotal point in the socket 8 within the limits of the groove 10''.

15 The feeding of the cutting-tool to the work is effected by means of the spring 18, which by its resiliency against the collar 19 forces the loop 13 upward, elevates the long arm of the lever 14, and consequently throws the cutting-
20 tool forward. This action of the spring upon the cutting-tool is continuous except when it is counteracted by the cam 12. At the extremity of the downward movement of the cutting-tool the cam 12 strikes the roller 12'
25 at the bottom of the loop 13, and by its action thereon relieves the back of the tool from the pressure against it of the free end of the lever 14, and thereby permitting the tool to recede from the work and to lie within the circum-
30 ference of the mandrel 10. The cam continues to hold the free end of the lever away from the cutting-tool and consequently relieves the tool from pressure toward the work until the commencement of the downward
35 stroke, when its action ceases and the spring 18 is allowed to again exert its power, giving to the tool at each downward movement thereof a degree of feed in proportion to the
40 resiliency of the spring and continuing the feed until the action of the spring is stopped by the collar 19 above the spring, which reach-
ing the top of the cage 20, limits the upward movement of the loop 13, and consequently
45 serves also as a guide within which the lower extension of the loop 13 is reciprocated.

The series of mandrels of which 10 is one are changeable, and each one and also each
50 article to be key-seated is made of the standard diameter, thereby fitting one to the other. The mandrels have a flange upon their lower end, which is adapted to fit into a recess in the upper surface of the table 11, and is retained therein by the bolts 10'. The up-
55 per side of the flange and of the table present an even surface. A groove 10'' is cut from near the upper end of the mandrel longitudinally thereof and extending through the afore-
60 said flange. They are cut in each mandrel of the series the width required for the standard key for said diameter and of the depth necessary for providing space for the cutting-
65 tool 9 within which the tool is reciprocated, the sides of the groove guiding the tool in a line perfectly parallel with the bore of the article being operated upon. The top of the frame 1 and the table 11 are cored out in a

line perpendicularly under the groove afore-
said, through which opening the tool 9 is re-
ciprocated.

70 A mandrel adapted to fit the bore of the article to be key-seated is bolted upon the table, the cam 12 brought into engagement with the roller 12' by turning the shaft 3 partially
75 around, thereby allowing the cutting-tool 9 to fall back within the circumference of the mandrel. The article is then placed upon the mandrel and secured thereon by means of the collar 17 and bolt 17', additional collars being
80 applied as the length of the hub of the article in comparison with that of the mandrel demands. The pulley 2' is then revolved, giving to the cutting-tool a reciprocating movement through the movement of the slide 6, the spring
85 18 producing a degree of feed at each downward movement of the cutting-tool in proportion to the width of cut and the hardness of the metal being cut, until the action of the elasticity of the spring is limited by the collar
90 19 reaching the upward limit of its movement. The aforesaid collar can be adjusted vertically upon the shaft which extends below the loop 13, thereby increasing or diminishing the throw of the free end of the lever
95 14, and consequently the depth to which the cutting-tool will cut. Previous to revolving the pulley 2' for putting the machinery in motion, the above adjustment should be made, and also the desired taper given to the key-
100 seat, by properly locating the socket or tool holder 8, when any desired number of articles can be successively key-seated, each one being an exact duplicate of the others in depth, width, and taper, and without further adjustment of the parts named. Should a greater depth of
105 key-seat be required than the limit of the spring's movement will permit, the table 11 can be moved backward by the operator's turning the screw 15 and moving the work toward the cutting-tool until the desired depth is reached.
110 It is seldom necessary to practice the latter method, except upon some special work, the resiliency of the spring being sufficient for the work required.

We do not claim a reciprocating cutter hav-
115 ing teeth upon one of its edges, neither do we one reciprocated within a groove in a guiding-rest and having a long feeding and a short relief movement to the backing therefor, as such is shown in a patent granted to C. A.
120 Lanphere, December 9, 1884; but

What we do claim, and desire to secure by Letters Patent, is—

1. In a key-seat-cutting machine, the combination, with a mandrel adapted in diameter
125 to enter the bore of the hub to be grooved, the mandrel having a longitudinal groove therein adapted to receive a cutting-tool, and means for its reciprocation therein, of a slide carrying a socket or holder, and the aforesaid cut-
130 ting-tool being pivoted therein, said socket or holder being adapted for adjustment upon the slide and producing thereby the taper of the key-seat, substantially as described.

2. In a key-seat-cutting machine, a cutting-tool adapted for a reciprocating movement therein, said tool being pivoted in a socket or holder, and the socket or holder adapted for adjustment for producing the taper of the key-seat, in combination with a lever, against one end of which said cutting-tool is reciprocated, said end of the lever being pressed against the cutting-tool and the feed thereof produced by the resiliency of a spring during its downward movement, and the spring relieved from pressure thereon during its return movement by the action of a cam or other like positive movement, substantially as described.

3. In a key-seat-cutting machine, the combination, with a reciprocating cutting-tool, of a lever fulcrumed in the rear of said tool and its free end arranged to press against the back thereof for producing the feed to said tool, a spring arranged to provide for said pressure, and a cam to relieve the pressure upon the tool during the return movement thereof, substantially as described.

4. In a key-seat-cutting machine, the combination, with a mandrel adapted in diameter to enter the bore of the hub to be grooved, the mandrel having a longitudinal groove therein adapted to receive a cutting-tool, of a reciprocating cutting-tool and a movable backing therefor, said backing being pressed against the tool, and the feed of said tool produced during its downward or cutting movement by the resiliency of a spring, and relieved from said pressure upon its return movement by the action of a cam or other like positive movement, substantially as described.

5. In a key-seat-cutting machine, the com-

bination, with a mandrel adapted in diameter to enter the bore of the hub to be grooved, the mandrel having a longitudinal groove therein adapted to receive a cutting-tool reciprocative in said groove, said tool being pivoted in a socket or holder arranged for adjustment for producing the taper of the key-seat, of a lever fulcrumed in the rear of said tool, the free end thereof arranged for pressure against the back of said tool by the resiliency of a spring during the downward or cutting movement of the tool and thereby producing the feed thereof, and also arranged for being relieved of said pressure upon the tool during its return movement by the action of a cam or other like positive movement, substantially as described.

6. In a key-seat-cutting machine, the combination of the frame 1, having the crank-shaft 3, arranged for revolution therein, the crank-wheel 4, connection-rod 5, slide 6, table 11, arranged for horizontal movement on the frame aforesaid, a mandrel secured to the table and movable therewith, said mandrel having a groove longitudinally thereof, and a cutting-tool 9, adapted for reciprocation therein, the socket 8 and means for its adjustment upon the slide 6, for the purpose of producing the desired taper in the key-seat, the lever 14, fulcrumed in the socket 1', the loop 13, cam 12, spring 18, means for limiting the movement of the spring, and the cage 20, all arranged and operating substantially as described.

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Witnesses:

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