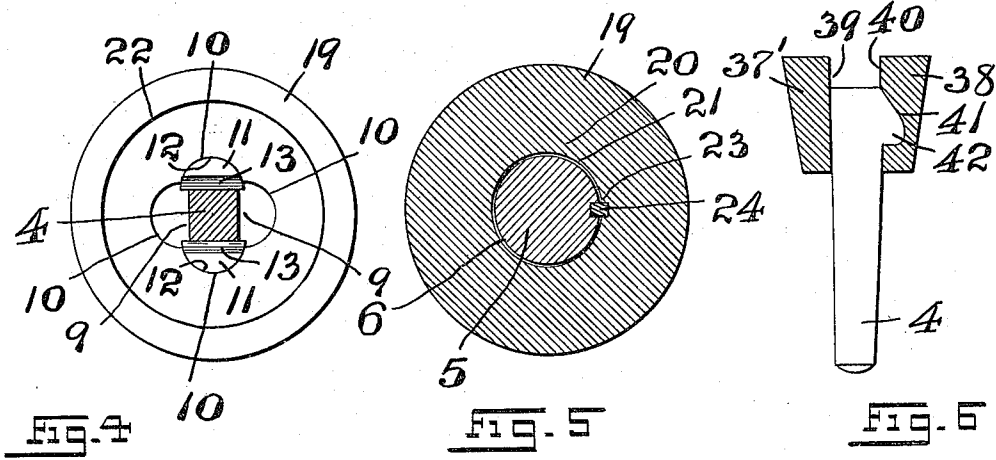
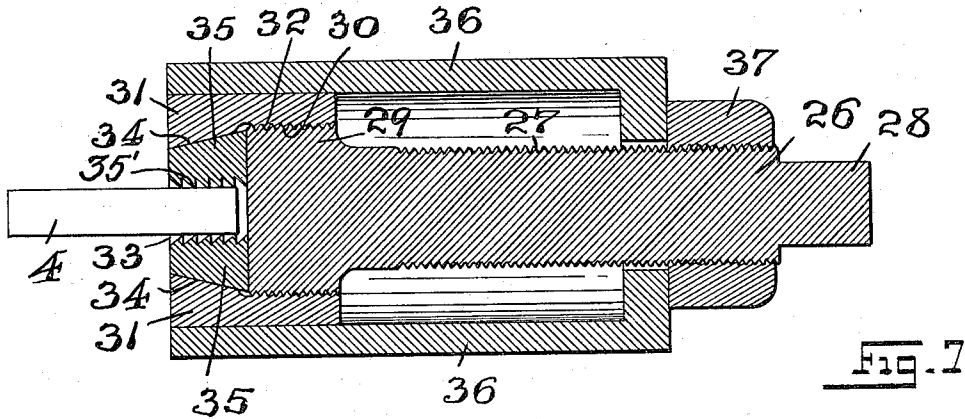
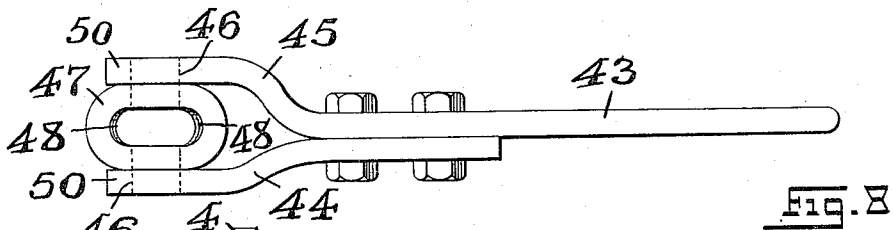
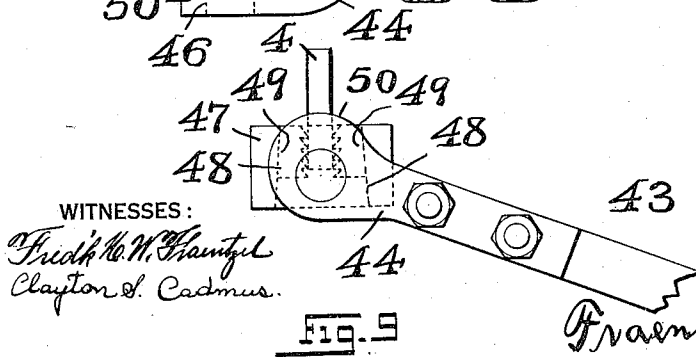


L. GOLLY.
KEY REMOVING OR PULLING TOOL.
APPLICATION FILED APR. 10, 1913.

1,155,720.

Patented Oct. 5, 1915.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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KEY REMOVING OR PULLING TOOL.

1,155,720.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS GOLLY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Key Removing or Pulling Tools; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention has reference, generally, to improvement in machinists' tools or implements; and, the present invention relates, more particularly, to a novel and simply constructed drawing or pulling tool which is adapted to be applied to the projecting end-portion of a key, such as is ordinarily used with a shaft and a collar or the hub of a wheel mounted upon said shaft, for readily withdrawing the key from the keyway.

The present invention has for its principal object to provide a novel and simply constructed, as well as an efficiently operating key-removing or pulling tool, which is provided with adjustable gripping jaws which enables the tool to be readily applied to the projecting end-portion of the key, and permits of the key to be easily removed from the keyway, no matter how tight the key is held in place.

Other objects of this invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the present invention.

With the various objects of the present invention in view, the said invention consists, primarily, in the novel key-withdrawing tool hereinafter set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, all of which will be more fully described in the following specification, and then finally embodied in the clauses of the claims which are appended to and which form an essential part of the said specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of a key-removing or pulling tool, illustrating one con-

struction embodying the principles of the present invention, and an elevation of portions of a shaft and a wheel keyed to said shaft, said view illustrating the manner of applying the tool to the projecting end-portion of the key. Fig. 2 is a horizontal sectional representation of the tool, with the sleeve-like holding element and an operating nut omitted from said view, and a top view of the key which is to be withdrawn, said view showing the gripping keys in their relative position, prior to being forced into their gripping action with the sides of the key. Fig. 3 is a horizontal sectional representation of the complete key-withdrawing or pulling tool and a top view of the key, illustrating the gripping jaws forced into their active gripped relation with the sides of the key, just prior to the manipulation of the tool for withdrawing the key. Fig. 4 is an end view of the tool, and a transverse sectional representation of the key which is to be withdrawn, looking in the direction of the arrow *x* in Fig. 3; and Fig. 5 is a cross-section of the tool, said section being taken on line 5—5 in said Fig. 1. Fig. 6 is a detail view, showing in side elevation a key, and in horizontal section a pair of gripping jaws of a modified form. Fig. 7 is a view, similar to that represented in said Fig. 3, of a modified construction of key-removing or pulling tool, the same, however, still embodying the principles of the present invention. Fig. 8 is a top-edge view of another form of key-removing or pulling tool, the same, however, embodying the principal features of the present invention; and Fig. 9 is a side view of a portion of the key-removing or pulling tool represented in said Fig. 8.

Similar characters of reference are employed in the said above described views to indicate corresponding parts.

Referring now to the said figures of the drawings, the reference character 1 indicates a portion of a shaft, upon which is mounted a wheel 2 provided with a hub 3, the said wheel being tightly fixed upon the shaft by means of the usual key 4.

Referring now to Figs. 1 to 5 inclusive, it will be seen that the key-removing or pulling tool comprises a main rod-like element or member, as 5, a portion of which is externally screw-threaded, as at 6, and the one free end-portion of which may be of polygo-

nal shape, as at 7, for the application thereto of a wrench or other suitable holding means, for the purposes to be presently described. The other end-portion of said shank or rod-like member or element 5 is provided with a cylindrical head 8, or other suitably formed enlargement, said head or enlargement being made with a chambered or socketed part 9, formed with, preferably, inwardly tapering groove-like channels or depressions, as 10, so as to have the appearance when viewed from the end, see Fig. 4 of the drawings, of a quadrifoil configuration.

Slidably disposed in the oppositely located channels or depressions 10 are suitably formed gripping jaws, as 11, which are of tapering configuration, as represented in Figs. 2 and 3 of the drawings, and arc-shaped upon their backs, as at 12, corresponding to the curvature of the channels or depressions 10, so as to properly fit into and register with the said channels or depressions, which, as will be evident, serve as guides for the proper adjustment of the said gripping jaws 11. Upon their opposite faces, projecting into the chambered or socketed part 9 of the head or enlargement 8, the said jaws 11 are preferably provided with suitably formed gripping serrations or teeth 13. The said gripping jaws 11 may be also provided with suitably formed socket-like depressions, as 14, which are in alinement with inclined and internally screw-threaded screw-receiving portions 15 with which the head or enlargement 8 is also provided. In each screw-receiving portion 15 is a screw 16 provided with a slotted head 17, or other suitable means, for the manipulation of the screws, each screw being also provided upon its opposite end-portion with a reduced shank-like member or stud 18 which may be made to enter the socket-like depressions 14 of the gripping jaws, to move said jaws forwardly from the positions indicated in Fig. 2 of the drawings, into their initial gripping positions represented in Fig. 3, prior to the withdrawal of the key 4, to cause the serrations or teeth 13 to be brought into positive gripping or biting relation with the opposite flat faces of the key end-portion of the key 4 projecting from the face of the hub 3 of the wheel 2 and the end of the shaft 1. This having been accomplished, a chambered sleeve-like holding element, as 19, which is preferably cylindrical in shape, the said element 19 having at one end a flange 20 formed with a guiding opening 21, and the chambered portion of said element 19 being also made cylindrical, is slipped over the previously-mentioned main rod-like element or member 5, with the open end-portion 22 arranged over the cylindrical head or enlargement 8, as shown more particularly in Figs.

1, 3, 4 and 5 of the drawings. To prevent any rotary motion of the sleeve-like element 19 upon the said rod-like member 5 and head 8, the flange 20 is provided at its guiding opening 21 with a key-way, as 23, see Fig. 5, which is fitted over a key 24 with which a portion of the rod-like element or member 5 is provided, the said parts being arranged in such a manner so that the said sleeve-like member or element is adapted to be moved longitudinally upon the said rod-like member 5 and its head 8. The parts hereinabove described having been brought into the positions represented in said Fig. 3 of the drawings, with the gripping jaws in their gripped relation with the sides of the key 4, a nut 25, or other suitably formed actuating device, is screwed upon the screw-threaded portion of the rod-like member 5 which projects outside of the flanged part 20 of the sleeve-like holding element 19. By continuing to screw the nut 25 against the flange 20 of the member or element 19, the end portion 22 of said member or element 19 is forced, in the direction of the arrow *y*, against the face of the hub 3 of the wheel 2, thereby causing a corresponding pulling movement of the rod-like member or element 5 and its head 8, as well as of the gripping jaws 11, in the direction indicated by the arrow *x*, resulting in the easy extraction of the key 4 from its holding relation with the shaft 1 and wheel 2, no matter how securely the said key may be held fast in its key-way.

In Fig. 7 of the drawings, I have represented a modified construction of key-withdrawing or pulling device, made upon the same principle as the construction of tool illustrated in said Figs. 1 to 5 inclusive, and hereinabove described. In this construction, the tool comprises a main rod-like member or element 26, a portion of which is externally screw-threaded, as at 27, and the one free end portion of which may also be of polygonal shape, as at 28, for the application thereto of a wrench or other suitable means for turning said rod-like member or element 26. The other end of said shank or rod-like member or element 26 is provided with a head or enlargement 29, which is externally screw-threaded, as at 30. Suitably screwed upon this screw-threaded portion of the head or enlargement 29, by means of an internally screw-threaded part 32 of a cylindrical, or other suitably formed sleeve 31, said sleeve 31 being made with a chambered or socketed part 33, formed with, preferably, four inwardly tapering groove-like channels or depressions, as 34, which also have the appearance, when viewed from the end of the tool, of a quadrifoil configuration.

Slidably disposed in the oppositely located channels or depressions 34 are suit-

ably formed gripping jaws, as 35, which are similar in construction to the gripping jaws 11, herein-above mentioned, said jaws being provided with suitably formed gripping serrations or teeth 35', adapted to be brought into biting or gripping relation with the opposite faces of the key 4, when the rod-like member or element 26 is turned by means of its end 28, so as to move the screw-threaded head or enlargement 29 farther into the sleeve 31, the latter being properly held, and forcing the end-face of the said enlargement or head directly against the adjacent ends of the gripping jaws 35, as will be clearly understood from an inspection of said Fig. 7 of the drawings. After these parts have been brought into their relative positions represented in said Fig. 7, a chambered sleeve-like holding element, as 36, and a nut 37, similar to the sleeve-like holding element 19 and the nut 25 described in connection with the construction of tool illustrated in said Figs. 1 to 5 inclusive, are applied to the rod-like member or element 26 and the sleeve 31, and operated in the same manner as herein-above described in connection with the construction of tool represented in said Figs. 1 to 5 inclusive for readily and quickly withdrawing the key 4 from its position with the shaft and the wheel mounted upon said shaft.

Instead of providing the key-engaging jaws with serrations or teeth, as herein-above described, I may employ with either form of tool shown in the fore-described figures of the drawings, a pair of gripping jaws 37' and 38, the jaws having a flat gripping surface 39 and the jaw 38 having a gripping surface 40 formed with a depression 41, conforming to the projecting member 42 with which some keys are provided, the said key-engaging jaws 37' and 38 being adapted to be brought into their extracting engagement with the key in the manner illustrated in Fig. 6 of the drawings.

In Figs. 8 and 9 of the drawings, I have shown a slightly different form of key-removing or pulling tool, the same, however, still embodying the principles of the present invention. The said device consists, essentially, of a handle, as 43, formed with a forked end-portion, provided by a pair of members 44 and 45. Eccentrically arranged with relation to the flat sides of the end-portions of said members 44 and 45; and suitably connected with the said end-portions, are a pair of pivot-pins 46 which extend into the space between the said members 44 and 45, and upon which pins is oscillatorily mounted an oval-shaped loop or ring-like devices, as 47, the opposite inner end-surface portions 48 of which taper, substantially as indicated, so as to receive ad-

justably therein, a pair of key-gripping jaws 49, in the manner illustrated in Fig. 9 of the drawings. In using this form of key-removing tool, after the end-portion of the key has been gripped, the cam-surface- portions 50 of the members 44 and 45 are brought against the face of the hub of the wheel upon the shaft, whereby the key is readily extracted, as will be clearly evident.

I am aware that some changes may be made in the general arrangements and combinations of the several devices and parts, as well as in the details of the construction of the said parts, without departing from the scope of the present invention as set forth in the foregoing specification and as defined in the clauses of the claim which are appended thereto. Hence I do not limit my present invention to the exact arrangements and combinations of the several devices and parts as described in the foregoing specification, nor do I confine myself to the exact details of the construction of the said parts, as illustrated in the accompanying drawings, except as required by the scope of the claims.

I claim:—

1. In a key-removing device, in combination with a socketed head and an element in the form of a container in which said socketed head is slidably disposed, a plurality of gripping jaws slidably connected with said head, means connected with said head and cooperating with said jaws for forcing them into a gripping relation with a portion of the key to be extracted and for retaining the said jaws in a positive gripped relation with the key, and means connected with said head for forcing said sleeve-like element into resisting engagement with the element in which the key is located and cooperating with said head for sliding the head and jaws interiorly within said sleeve-like element for the extraction of the key.

2. In a key-removing device, in combination with a socketed head and an element in the form of a container in which said socketed head is slidably disposed, a plurality of gripping jaws slidably connected with said head, said head being provided with screw-receiving portions, screws in said screw-receiving portions cooperating with said jaws for forcing them into gripping relation with a portion of the key to be extracted and retaining the jaws in a positive gripped relation with the key, and means connected with said head for forcing said sleeve-like element into resisting engagement with the element in which the key is located and cooperating with said head for sliding the head and jaws interiorly within said sleeve-like element for the extraction of the key.

3. In a key-removing device, in combina-

tion with a socketed head and an element in the form of a container in which said head is slidably disposed, said sleeve-like element being provided at one end with a flange and a guiding opening, a plurality of gripping jaws slidably connected with said head, means connected with said head and co-operating with a portion of the key to be extracted and for retaining the said jaws in a positive gripped relation with the key, a screw-threaded shank extending from said head longitudinally within said sleeve-like element and through and from the guiding opening thereof, and a nut upon the projecting portion of said screw-threaded shank adapted to be brought into engagement with the flange of said sleeve-like element, for forcing the latter into resisting engagement with the element in which the key is located and coöperating with said shank and head for sliding the head interiorly within said sleeve-like element for the extraction of the key.

4. In a key-removing device, in combination with a socketed head and an element in the form of a container in which said head is slidably disposed, said sleeve-like element being provided at one end with a flange and a guiding opening, a plurality of gripping jaws slidably connected with said head, said head being provided with screw-receiving portions, screws in said screw-receiving portions coöperating with said jaws for forcing them into gripping relation with a portion of the key to be extracted and for retaining the jaws in a positive gripped relation with the key, a screw-threaded shank extending from said head longitudinally within said sleeve-like element and through and from the guiding opening thereof, and a nut upon the projecting portion of said screw-threaded shank adapted to be brought into engagement with the flange of said sleeve-like element, for forcing the latter into resisting engagement with the element in which the key is located and coöperating with said shank and head for sliding the head interiorly within said sleeve-like element for the extraction of the key.

5. A key-removing device comprising a screw-threaded rod-like member provided with a socketed enlargement formed with a plurality of tapering channels of quadri-foil conformation when said enlargement is viewed from the end, tapering gripping jaws slidably arranged in some of said channels, means connected with said enlargement for sliding said jaws forwardly in said channels and coöperating with said jaws for forcing and retaining the jaws in gripping relation with portions of the key which is to be extracted, a chambered sleeve-like mem-

ber slidably mounted upon said rod-like member and its enlargement, and a nut upon the screw-threaded portion of the rod-like member adapted to be brought into engagement with said sleeve-like member for bringing the latter into resisting engagement with the element in which the key is located, said sleeve-like member coöperating with said jaws for the extraction of the key.

6. A key-removing device comprising a screw-threaded rod-like member provided with a socketed enlargement, said enlargement being provided with internally screw-threaded portions, a plurality of gripping jaws slidably arranged in said socketed enlargement, screws in said screw-threaded portions adapted to be brought into engagement with said gripping jaws for sliding said jaws forwardly and coöperating with said jaws for forcing and retaining the jaws in gripping relation with portions of the key which is to be extracted, a chambered sleeve-like member slidably mounted upon said rod-like member and its enlargement, and a nut upon the screw-threaded portion of the rod-like member adapted to be brought into resisting engagement with the element in which the key is located, said sleeve-like member coöperating with said jaws for the extraction of the key.

7. A key-removing device comprising a screw-threaded rod-like member provided with a socketed enlargement formed with a plurality of tapering channels of quadri-foil conformation when said enlargement is viewed from the end, said enlargement being also provided with internally screw-threaded portions, tapering gripping jaws slidably arranged in some of said channels, screws in said screw-threaded portions adapted to be brought into engagement with said gripping jaws for sliding said jaws forwardly and coöperating with said jaws for forcing and retaining the jaws in gripping relation with portions of the key which is to be extracted, a chambered sleeve-like member slidably mounted upon said rod-like member and its enlargement, and a nut upon the screw-threaded portion of the rod-like member adapted to be brought into resisting engagement with the element in which the key is located, said sleeve-like member coöperating with said jaws for the extraction of the key.

In testimony, that I claim the invention set forth above I have hereunto set my hand this fourth day of April 1913.

LOUIS GOLLY.

Witnesses:

THOMAS HERRON, Jr.,
WM. H. HANSEN.