

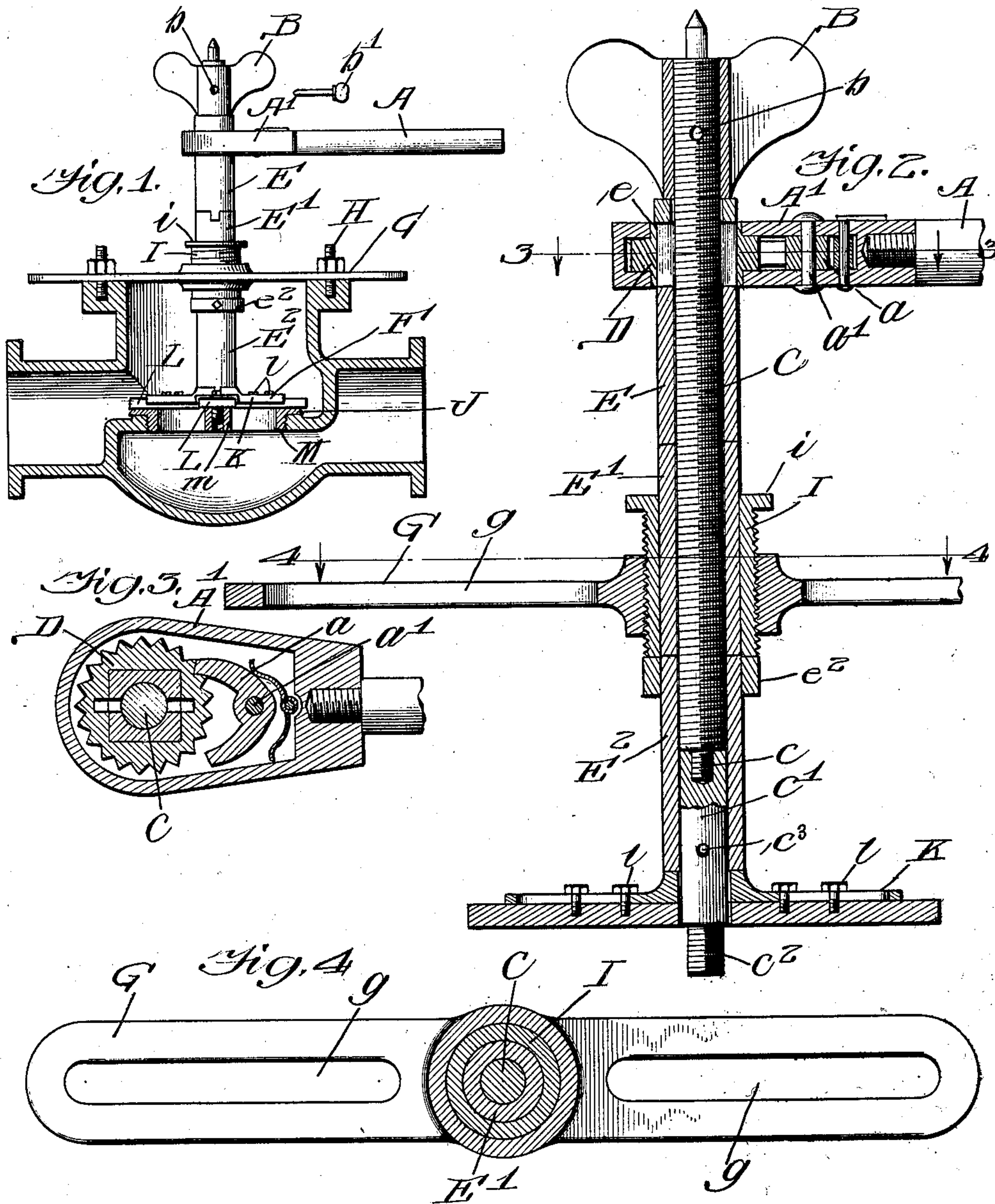
No. 842,952.

PATENTED FEB. 5, 1907.

S. M. HALL.  
TOOL FOR PREPARING VALVE SEATS.

APPLICATION FILED APR. 29, 1905.

2 SHEETS—SHEET 1.



Witnesses:  
Robert H. Weir  
J. B. Weir

Inventor:  
Samuel M. Hall  
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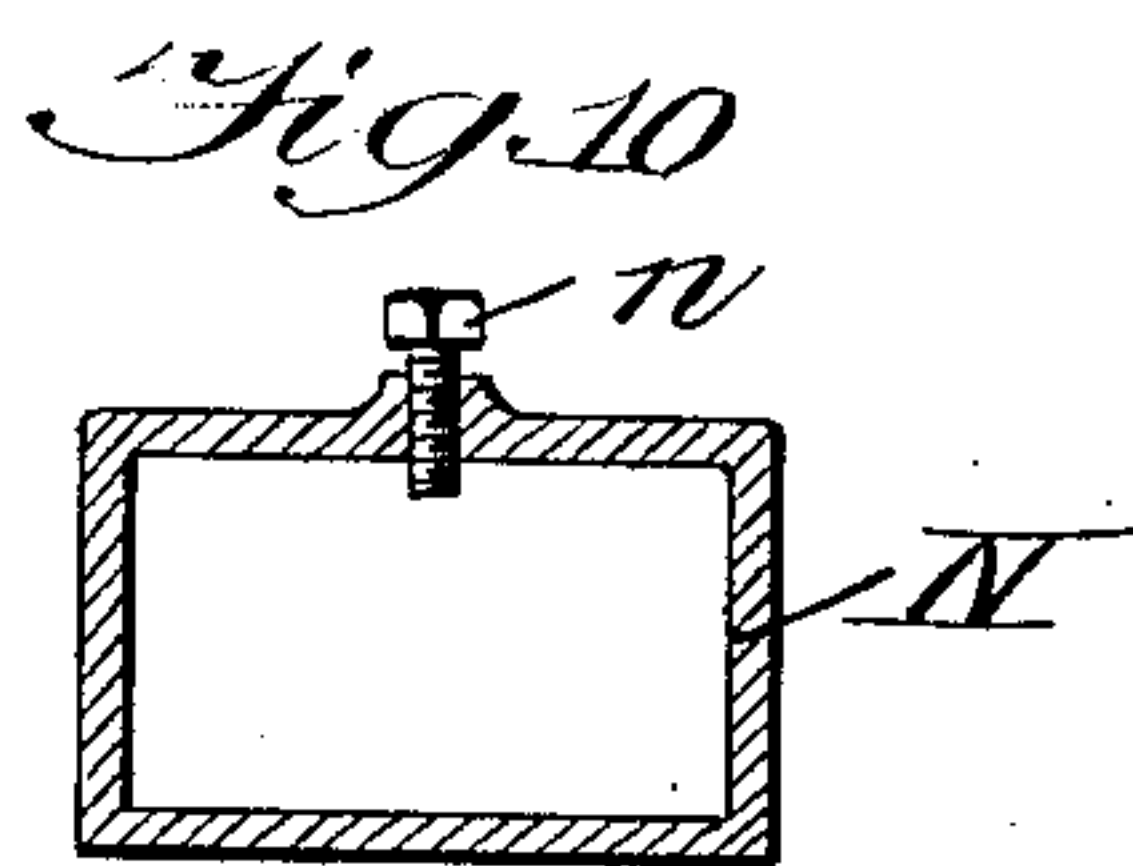
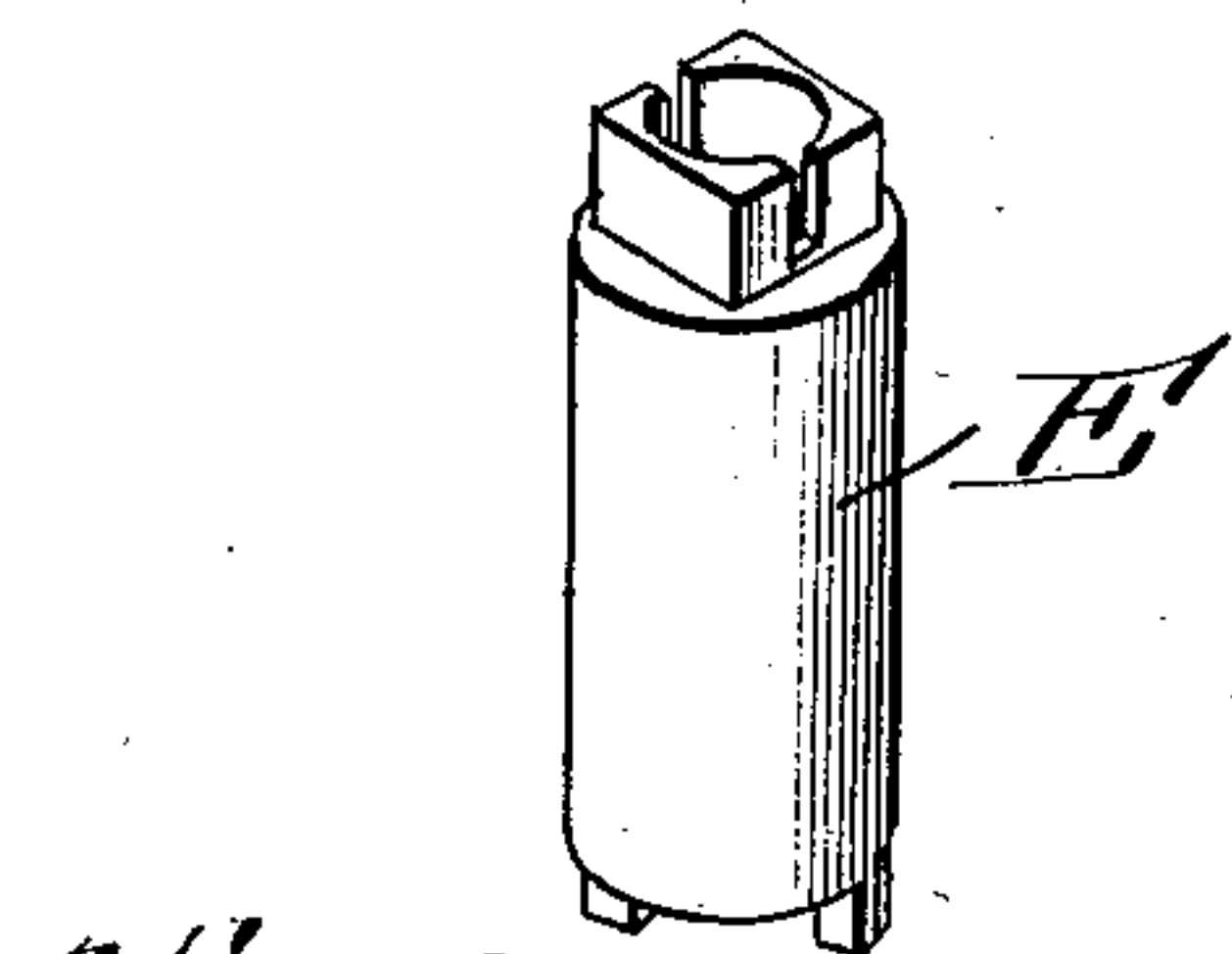
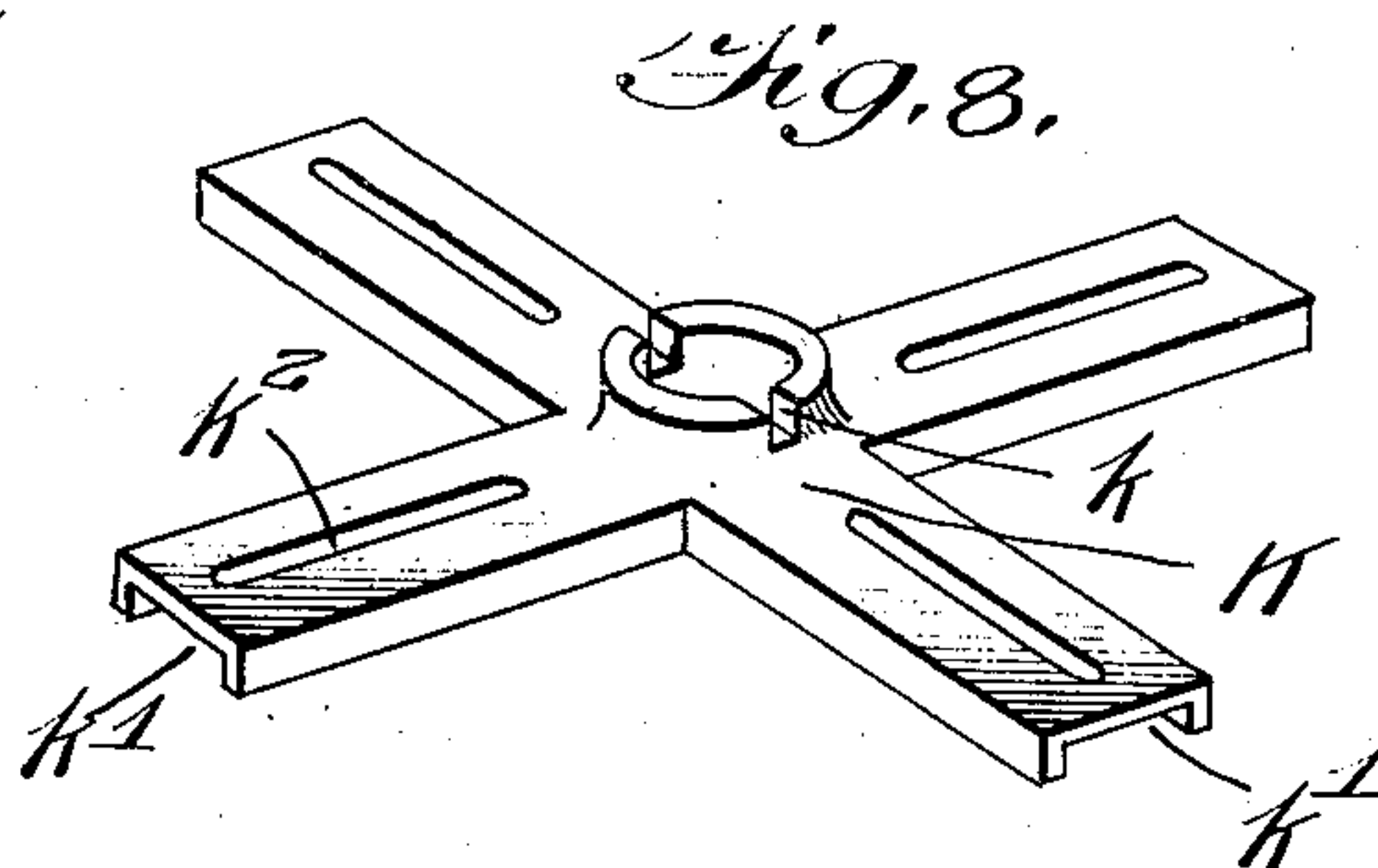
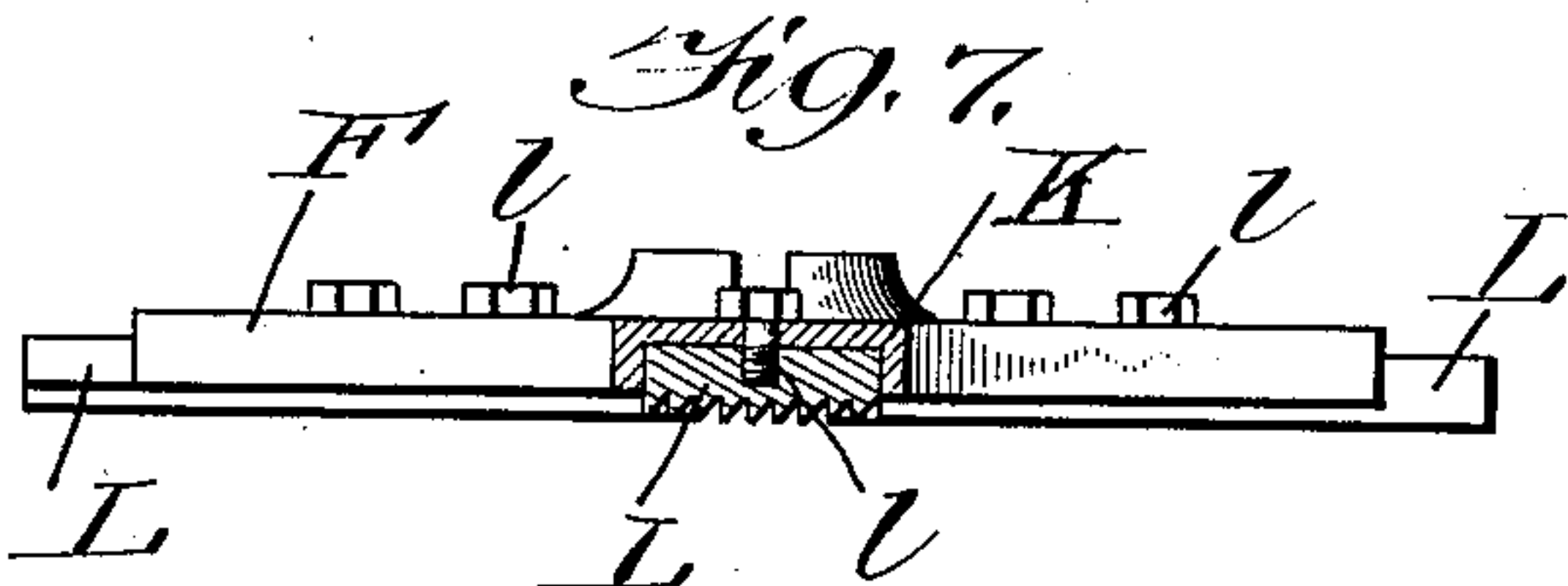
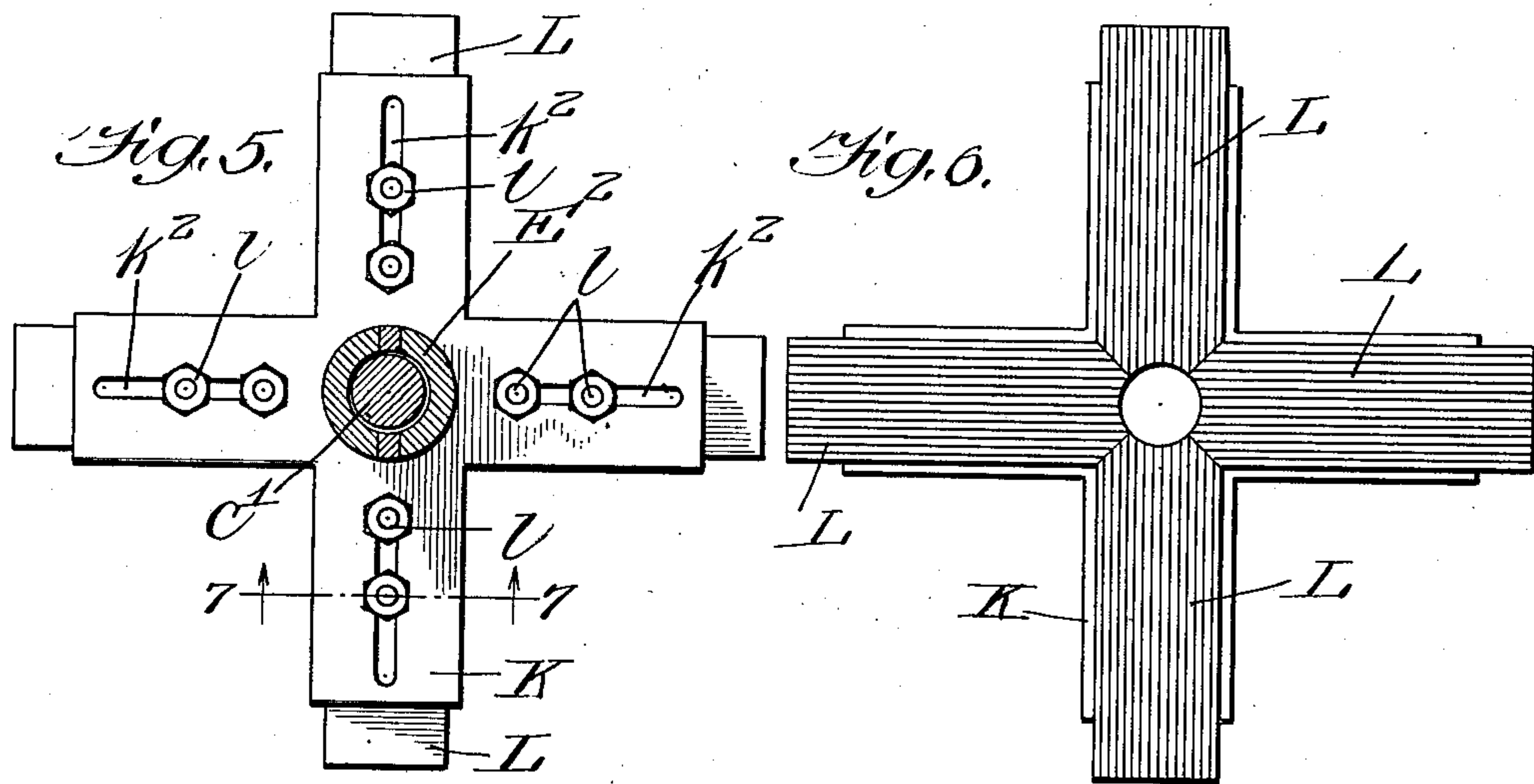
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# UNITED STATES PATENT OFFICE.

SAMUEL M. HALL, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO  
THOMAS CULLEN, OF CHICAGO, ILLINOIS.

## TOOL FOR PREPARING VALVE-SEATS.

No. 842,952

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed April 29, 1905. Serial No. 258,124.

*To all whom it may concern:*

Be it known that I, SAMUEL M. HALL, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Tools for Preparing Valve-Seats, of which the following is a specification.

The object of my invention is to provide a tool for seating and reseating valves and the preparation of valve-seats generally.

One of the particular objects of my invention is to provide a simple and highly-efficient tool for accomplishing this purpose and to so construct the parts as to make the tool readily adjustable to work of various dimensions and readily adaptable to the various different forms of pipe in which it is necessary to form or modify the valve-seat.

A further and more particular object of my invention is to construct a valve-seating tool in which the parts are so assembled as to make the tool adaptable to use with various forms of dies for cutting the face of the valve-seat and to construct the tool in such manner that these various dies may be readily removed and others substituted whenever it becomes necessary for any purpose to change the character of the die used.

These and other particular objects of my invention will appear more clearly from the drawings and from the specification, as hereinafter stated.

In the accompanying drawings, Figure 1 is a sectional view of a valve of the general character upon which my invention is designed to operate, together with a view in elevation of the tool attached to this valve, and showing in a general way the manner in which the tool operates. Fig. 2 is a sectional view in elevation of the tool, showing the assembling of its various parts. Fig. 3 is a sectional view of the tool along line 3 3 in Fig. 2. Fig. 4 is a sectional view upon the line 4 4 in Fig. 2, showing the guide-bar as shown in section in Fig. 2. Fig. 5 is a view of the upper surface of the cutter-head. Fig. 6 is a view of the lower surface of the cutter-head with one form of the dies inserted. Fig. 7 is a sectional view on line 7 7 in Fig. 5, showing the manner in which the cutter-head is adapted to hold the various dies which it may be necessary to use. Fig. 8 shows the cutter-head in perspective. Fig. 9 is a detail of the

outer sleeve, showing by its various parts one of the means for adapting the tool to various sizes of work. Fig. 10 shows a sectional view of a device designed as a guide to be used on the outer end of the dies or milling-tools when the valve-seats have extraordinarily large openings.

In Fig. 1, A is the handle of the tool by which the rotation of the dies is accomplished.

B is a thumb-screw threaded upon the inner shaft C of Fig. 2 and shows the means by which the handle A is held in engagement with the ratchet-wheel D of Fig. 3.

E, E', and E<sup>2</sup> show the various sections of the sleeve surrounding the inner shaft C. These form the connecting or power-transmitting device between the handle A and the cutter-head K.

The sleeve E is provided at its upper end with a square shank e, which is inserted in the ratchet-wheel D. The handle A is provided in its socket A' with a ratchet dog or pawl a, pivoted at a' and adapted to engage the ratchet-wheel D, thus imparting rotary motion thereto in either direction, as may be desired. The sleeve E, E', and E<sup>2</sup> is surrounded by a second sleeve I, threaded upon its outer surface and adapted to engage in the threaded bur of the guide-bar G of Fig. 4. The sleeve E<sup>2</sup> is provided at its upper end with a collar e<sup>2</sup>, which rests against the lower end of the outer sleeve I and provides a means for adjusting to the distance between the guide-bar G and the face of the valve-seat J, thereby affording a means for adjusting the tool to valves of various dimensions. The sleeve I is provided with a knurled flange i, thus affording a means for adjusting its position within the guide-bar G. The sleeve E<sup>2</sup> is provided at its lower end with lugs e<sup>3</sup>, adapted to engage any suitable sockets k of the cutter-head K, thereby affording a power-transmitting connection between the handle A and the cutter-head K. The cutter-head K is provided on its lower surface with grooves or guideways k', in which are placed the milling-tools or dies L. The milling-tools or dies L are held in the desired position by bolts l, which are engaged in suitably-provided slots k<sup>2</sup> in the cutter-head K and are adapted to adjustment radially in the cutter-head K.

The threaded inner shaft C is provided at



its lower end with a threaded lug  $c$ , adapted to engage in the inner shaft  $C'$ . The inner shaft  $C$  is also provided at its lower end with a threaded lug  $c^2$ , adapted to engage in the threaded bur  $m$  of the central portion of the valve-seat  $M$ .

$N$  of Fig. 10 represents a guide attachment for the dies or milling-tools, designed to be attached to their outer ends for the purpose of holding them rigid when there is no central portion  $m$  to the valve-seat. This guide attachment  $N$  (shown here as a square collar) is provided with a set-bolt  $n$ , by which it may be rigidly attached to the dies or milling-tools, thus holding the dies in place in the guideways  $k'$ . Another method of using this guide attachment  $N$  is to so construct it that it will set over the entire arm of the cutter-head  $K$  and be rigidly attached to the arm of said cutter-head and adjusting this guide attachment  $N$  in such a way that it will rest upon the inner face of the annular part of the valve-seat  $M$ .

It will thus readily be observed that I provide means for adjusting and adapting my invention to almost all possible shapes, sizes, and descriptions of valves which come within the work of a steam-fitter. By adjustment of the thumb-screw  $B$  the cutter-head  $K$  can be adjusted to the face of the valve and its pressure thereon regulated at the will of the operator, and by inserting the pin  $b'$  in the opening  $b$ , provided in the threaded inner shaft  $C$ , the threaded lug  $c$  can be engaged with the lower inner shaft  $C'$ , and by providing a suitable pin to engage the opening  $c^2$  the inner shaft  $C'$  may be backed off and another lower shaft  $C'$ , provided with a suitable threaded lug  $c^2$ , may be substituted for the purpose of adapting the thread and dimensions of this lower threaded lug  $c^2$  to fit the threaded bur  $m$  of the various valve-seats upon which it may be desired to operate. Another means for adjustment is provided for in the outer sleeve  $I$ , by which adjustments can be secured, and the pressure of the dies or milling-tools  $L$  upon the face of the valve-seat  $M$  may be regulated. The guide-bar  $G$  is provided with slots  $g$ , adapted to engage suitable bolts  $H$ , by which the entire tool is attached to the valve upon which it is desired to operate, the slots being long enough to afford lateral adjustment to valves of various shapes and dimensions.

It will thus be seen that I provide a tool for preparing and operating upon valve-seats which is readily adaptable to various forms of valves, highly efficient in its operation, and makes it possible to prepare or repair valve-seats without removing the valve from the machine to which they are attached.

It will readily appear that by my construction of the sleeve  $E$ ,  $E'$ , and  $E^2$  in interchangeable sections I provide a tool in which the guide-bar  $G$  may be shifted longitudinally

with respect to the shaft  $C$ , accordingly as the dimension of the valve to be operated requires this guide-bar to be near or far from the cutter-head  $K$ . If the dimensions of the work require or if it be more convenient to operate, the position of the guide-bar and the section of the sleeve  $E^2$  may be interchanged with the position of the handle  $A$  and the section  $E$ , as now shown in Fig. 2. Then, too, in case it is desired for any reason to use the tool without the guide-bar  $G$  the operator can by providing an external bearing for the upper end of the shaft  $C$  use the thumb-screw  $B$  for adjusting the pressure of the cutter-head upon the valve-seat, and by means of the interchangeable sections  $E$ ,  $E'$ , and  $E^2$  the handle  $A$  may be brought as near the cutter-head as is possible or convenient to work, and thus reduce to a minimum the liability of wrenching the tool out of perpendicular to the plane of the valve-seat.

What I claim as my invention is—

1. A tool for preparing valve-seats comprising an axial shaft adapted to be secured to a valve, a series of interlocking sections surrounding said shaft whereby the range of operation of said tool may be varied, a cutter-head rotatable about said shaft, and means for imparting rotary motion through the interlocking sections to said cutter-head.

2. A tool for preparing valve-seats comprising an axial shaft adapted to be secured to a valve, longitudinally-adjustable means for securing said shaft to a valve, a series of interlocking sections surrounding said shaft, a cutter-head rotatable about said shaft, arranged to receive motion from said sections, and means adapted to be connected with said sections for imparting rotary motion to said cutter-head.

3. A tool for preparing valve-seats comprising an axial shaft adapted to be secured to a valve, longitudinally-adjustable means for securing said shaft to a valve, a series of interchangeable sections surrounding said shaft, means for interlocking said sections together, a cutter-head rotatable about said shaft, arranged to receive motion from said sections, and means adapted to be connected with said sections for imparting rotary motion to said cutter-head.

4. A tool for preparing valve-seats comprising an axial shaft adapted to be secured to a valve, longitudinally-adjustable means for securing said shaft to a valve, a series of interchangeable sections surrounding said shaft, means integral with said sections for interlocking said sections together, a cutter-head rotatable about said shaft, arranged to receive motion from said sections, and means adapted to be connected with said sections for imparting rotary motion to said cutter-head.

5. A tool for preparing valve-seats comprising an axial shaft adapted to be secured



to a valve, longitudinally-adjustable means  
for securing said shaft to a valve, a series of  
interchangeable sections surrounding said  
shaft, means integral with said sections for  
5 interlocking said sections together, a cutter-  
head rotatable about said shaft arranged to  
receive motion from said sections, milling-  
tools fixed in said cutter-head, and means  
adapted to be connected with said sections  
10 for imparting rotary motion to said cutter-  
head, said sections constituting power-trans-  
mitting connection between said means and  
said cutter-head.

6. A tool for preparing valve-seats com-  
15 prising an axial shaft adapted to be secured

to a valve, a sectional sleeve, and a cutter-  
head mounted to turn about said shaft, mill-  
ing-tools adjustably secured to said head,  
the sections of said sleeve and cutter-head  
being provided with interchangeable inter- 20  
locking means, one of said sections being  
modified to receive devices for imparting ro-  
tary motion to said cutter-head.

Signed by me at Chicago, Cook county,  
Illinois, this 15th day of April, 1905.

SAMUEL M. HALL.

Witnesses:

THOMAS CULLEN,  
ALBERT J. SAUSER.