

March 2, 1948.

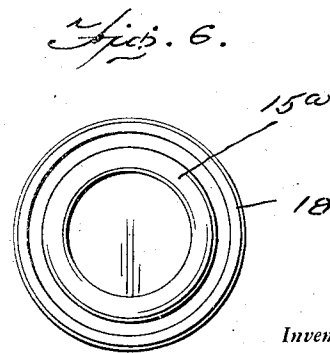
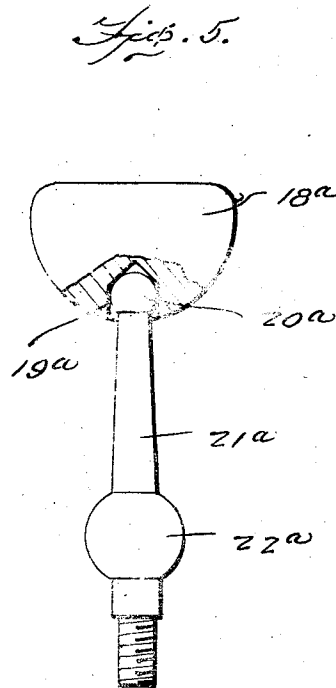
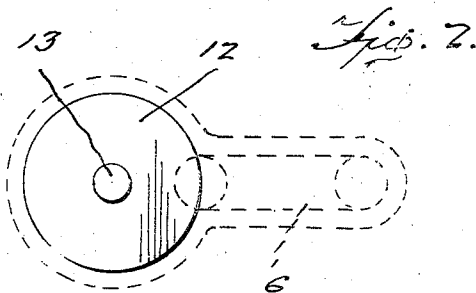
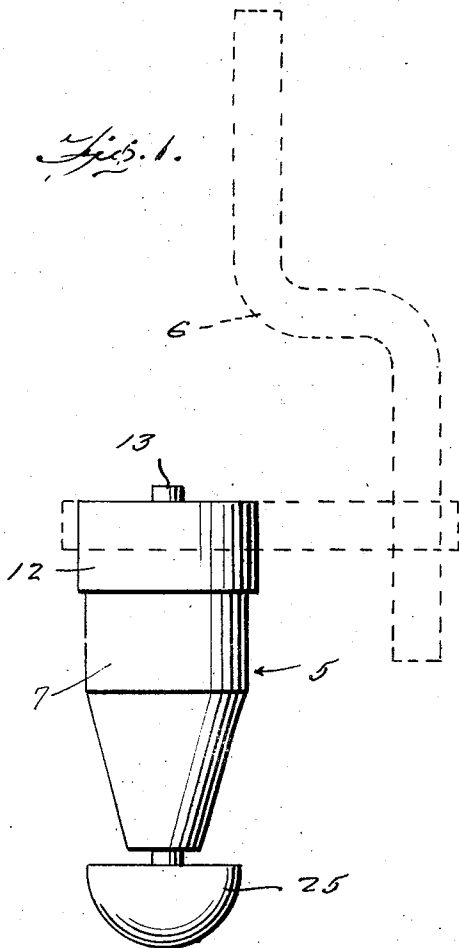
H. W. GALE

2,437,190

MANUALLY CONTROLLED TRACER

Filed July 26, 1944

2 Sheets-Sheet 1



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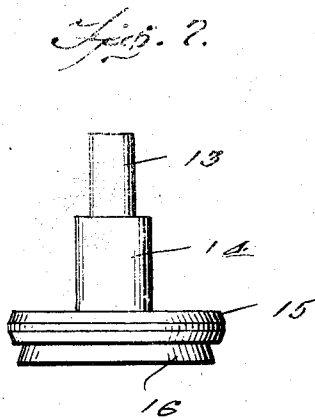
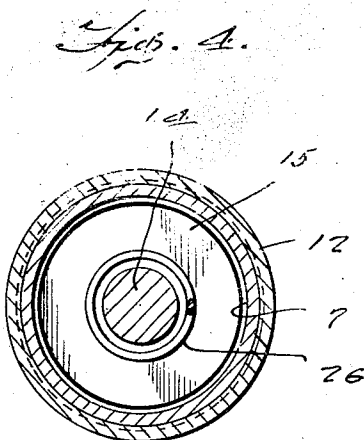
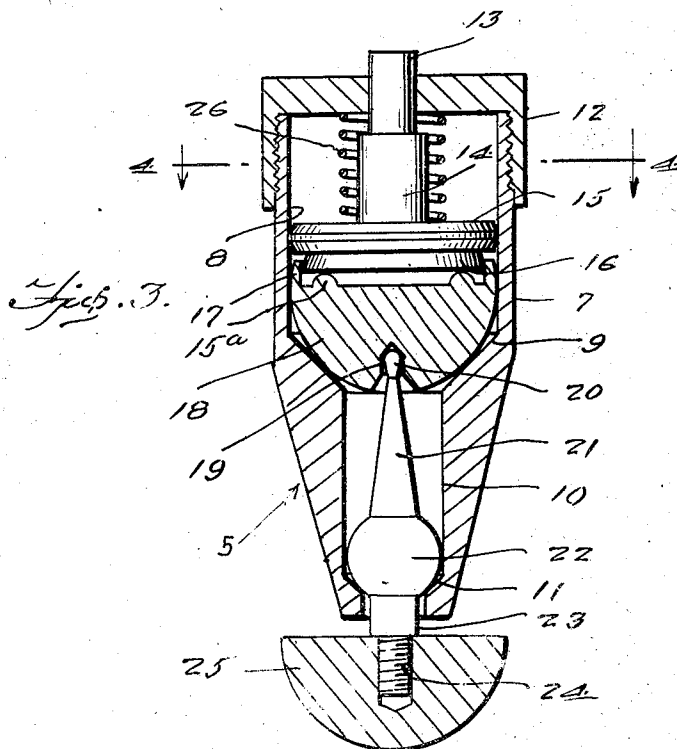
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UNITED STATES PATENT OFFICE

2,437,190

MANUALLY CONTROLLED TRACER

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3 Claims. (Cl. 33-169)

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This invention relates to new and useful improvements in engravers and more particularly to a novel contouring and profiling hand tracer.

An important object of the invention is to provide an engraver of the character stated which may be used with all types of lathes, milling machines and planers on work which has an irregular surface and must be fitted to a template, pattern or model.

Another important object of the invention is to provide a device of the character described whereby lighter pressures between the tracer element or unit and pattern are rendered possible so that other than metal patterns, models or the like may be utilized.

Various other important objects and advantages of the invention will become apparent to the reader of the following description.

In the drawings—

Figure 1 represents a side elevational view of the tracer or pilot, showing a holder therefor in dotted lines.

Figure 2 is a top plan view of the structure shown in Figure 1.

Figure 3 is a vertical sectional and elevational view through the device.

Figure 4 is a horizontal section on the line 4-4 of Figure 3 looking in the direction of arrows.

Figure 5 is a side elevational view, with a portion in section, showing a slightly modified form of feeler unit or means.

Figure 6 is a top plan view of the semi-spherical adapter member appearing in Figure 3.

Figure 7 is a side elevational view of the follower disk unit.

Referring to the drawings wherein like numerals designate like parts, it can be seen that numeral 5 generally refers to the improved tracer which may be supported by a suitable bracket or the like 6.

At this point, it is to be understood that this tracer or pilot is to be used in the capacity of the corresponding mechanism of the patent to Romaine, No. 2,076,865, and in conjunction with the same type of indicating instruments.

The tracer consists of a barrel 7 having a substantially large bore 8 extending inwardly from one end and merging with an annular tapered seat 9 into which opens a smaller bore 10, which, at its lower end, merges with a beveled annular seat 11, the lower end of the barrel being open, as shown in Figure 3.

The upper end of the barrel is externally threaded to engage the internal threads of a cap 12 having a central opening in the top thereof

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through which a pin 13 projects. The pin 13 projects from a shank 14 rising from a pressure and follower disk 15 which has a depending beveled skirt 16 co-acting and mating engagement with the inner perimeter of upstanding undercut annular lip 17 on a semi-spherical-shaped body 18 resting rockably on the seat 9 and which has a special socket 19 in the bottom portion thereof for receiving the reduced head 20 of an upwardly tapering stem 21 rising from a ball 22. A projection 23 depends from the ball 22 and has a reduced screw-stud 24 disposed into a semi-spherical pattern rider or feeler 25.

Instead of the reduced head 20 being located in an undercut socket 19, a body 18a (see modification in Figure 5) may be formed with a recess 19a into which a small ball head 20a can be removably disposed, this being located at the upper end of a stem 21a projecting upwardly from a ball 22a corresponding to the ball 22.

It will be noted that a coiled compression spring 26 is interposed between the disk 15 and the cap 12 for the purpose of maintaining the pressure disk 15 urged downwardly in interlapping position with respect to the body 18 and the body 18, in turn, snugly against the seat 9.

The purpose of the circumferential lip 17, since the center line of annular rib 15a falls on the center line of the body, is to hold the adapter body 18 in place and central with the main bore 8 when the body is tipped past axial center. Also the inside surface of lip 17 is so counterbored as to clear the beveled surface of skirt 16 and also serves as a stop when the body 18 is tilted to its extreme position.

The opening, socket 19, is a tapered hole merging into a straight hole bored to fit ball 20 and ending in an angle. The tapered portion of the hole is clearance for the stem 21 and it also acts as a stop when the body is revolved to its extreme position. The ball 20 is easily removed from the socket. The only difference between socket 19 and socket 19a is the tapered portion of the hole.

It will be noted in Figure 5 that ball 20a is located by a circular center line passing through the center of annular rib 15a and also ball 22a is located similarly by a circular center line drawn through the center of the corresponding radius of body 18a. This radius is tangent to the circumference and above the center of the body 18a.

The pressure disk for the design shown in Figure 5 is not shown but is similar to 15 excepting that it has no skirt 16.

It will be noted that the skirt 16 rides on radius 15a.

A lathe job, for example, which has an irregular shaped hole, one that flares out like a bell, would be machined in this manner: The work, of course, would be held in a chuck and the required surfaces finished before machining the curve in the hole. A templet made of a flat piece of metal or wood, having the same contour as the bell-shaped hole, is fastened horizontally on some stationary part of the lathe and lined up so that its curve will be in the same relative position as the curve to be cut in the hole. The hand tracer is fastened to that part of the carriage of the lathe which holds the cutting tool. Any movement of the hand tracer or instrument. The instrument is also fastened in such a manner that the tracer or feeler 25 will touch the curved surface of the templet. As the tracer touches the templet, the plunger moves out and registers on an indicator (not shown) registering in thousandths of an inch. The exact amount it moves out is determined by the operator and the dial is set on zero. As the cutting tool is feeding in and the tracer approaches and touches the templet, the operator waits until the hand on the indicator reads zero. Then, by hand, he moves the cutting tool away from the work a few thousandths of an inch and this process is continued until the full cut has been made or completed. This is a typical contouring operation. Contouring operations are also often made on the other machines above mentioned.

This instrument is only used with an indicator, registering in thousandths of an inch, a dial indicator being preferred. The tracer is free to move in all directions causing the plunger to move out. The indicator is fastened to the bracket shown, or one similar to it. It will be noted that any side pressure on the tracer causes a rocking motion of the rocker 18. An upward pressure permits the entire slidable and turnable unit to move up within the barrel.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

1. A tracer of the class described comprising a longitudinally elongated, centrally bored barrel having a reduced portion at its lower end provided with an annular beveled seat, the upper portion of the bore being circumferentially enlarged and the intermediate portion being provided with an annular beveled seat merging into said reduced portion, an adapter body of general semi-spherical form located in the upper portion of the bore and engaging the adjacent beveled seat, a spring-pressed end thrust pressure unit mounted in the upper portion of the bore and engaging the adapter, a stem having its major portion located in the reduced portion of the bore, its upper end universally connected with the central portion of said member, and its intermediate portion provided with a ball-joint element engageable with the beveled seat at the outer end of the reduced part of the bore, said stem projecting beyond said barrel to accommodate a detachable tracer element.

2. A tracer of the class described comprising a centrally bored, longitudinally elongated barrel, the lower portion of the barrel being reduced in diameter and provided with an annular beveled seat and the upper portion enlarged and the intermediate portion merging into a beveled annular seat adjoining the reduced and enlarged portions of said bore, a longitudinally and axially rotatable stem located in the reduced portion and provided with a ball-joint element engaging the seat in the reduced portion of the barrel, said stem projecting outwardly beyond said barrel and carrying a semi-spherical feeler, a semi-spherical adapter member rockably and shiftably engaging the beveled seat in the intermediate portion of the bore, the upper end of said stem having a universal connection with the lower central portion of said member, the upper end portion of said member having an annular bead semi-cylindrical in cross-sectional form, and a marginal upstanding lip projecting above said bead, said lip having its inner peripheral edge undercut, a removable cap on the upper end of said barrel, an end-thrust unit in the upper portion of the bore comprising a shank extending up through the cap, and a disk-like head on the lower end of said shank, said head riding movably against the adjacent wall portion of the bore and being provided with a reduced bevel-edged skirt, said skirt telescoping into the upper portion of said member and resting on said bead with its beveled surface co-acting with the undercut inner peripheral surface of said lip, together with a coiled spring surrounding said shank and resting on the disk at one end and against the cap at the opposite end.

3. As a new article of manufacture and as a component part of a hand tracer of the class described, a semi-spherical adapter member adapted to be rockably and shiftably mounted in a cylindrical barrel in contact with a supporting seat in said barrel comprising a semi-spherical body provided on its flattened end with an annular rib, said rib being semi-cylindrical in cross-sectional form and arranged concentrically at a point inwardly of the outer marginal edge of the body, said outer marginal edge being provided with an endless annular upstanding lip, this projecting above and beyond said rib, and said lip having its inner peripheral edge undercut, the central portion of the under crown of the convex portion of the body being provided with a socket to accommodate a ball joining element on a tracer carrying stem.

HAROLD W. GALE.

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