

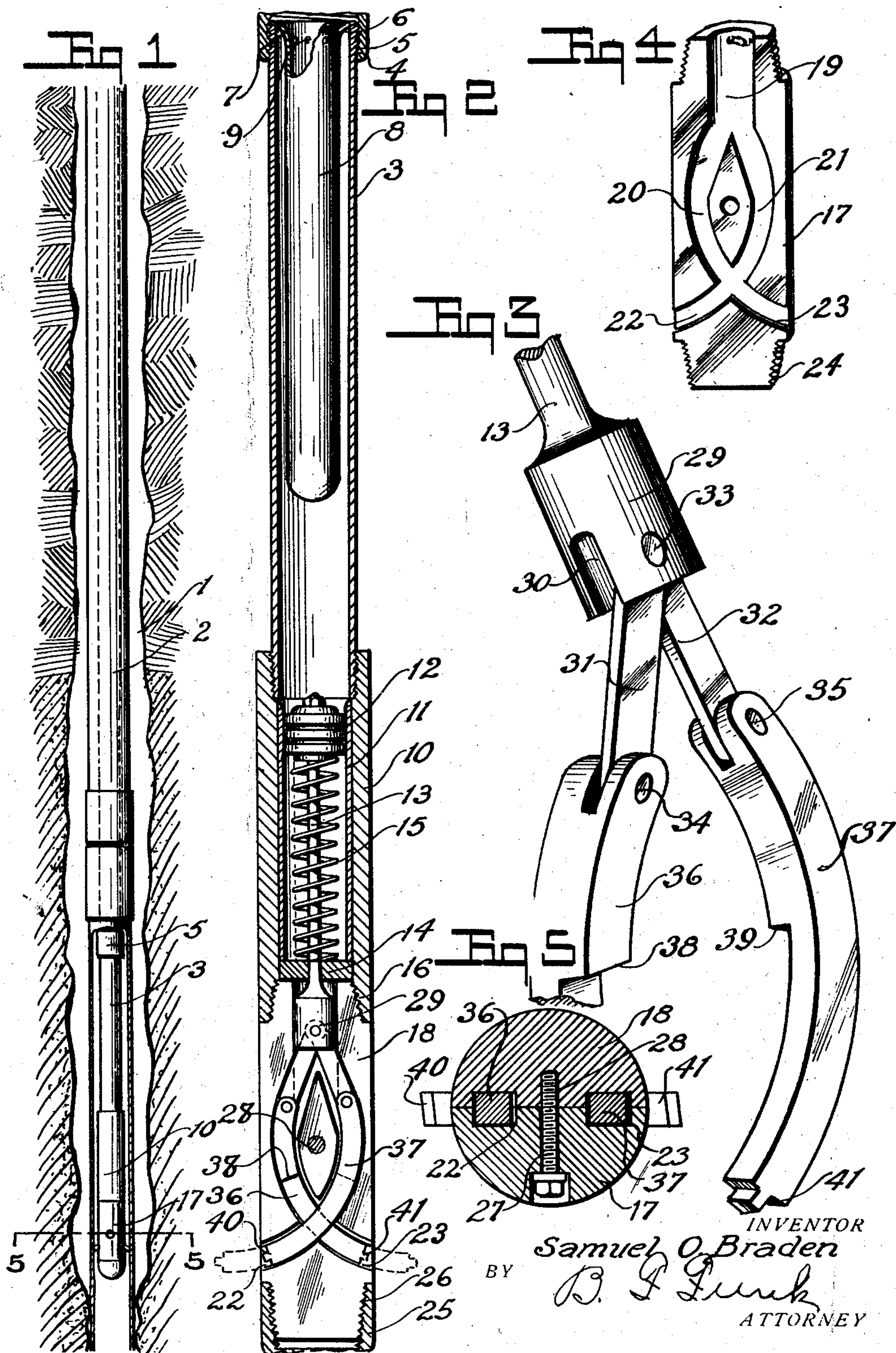
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PIPE CUTTER

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UNITED STATES PATENT OFFICE

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PIPE CUTTER

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This invention relates to pipe cutters and it is especially designed to cut pipe or tubing from the inside. There are many instances where the pipe, if cut at all, must be cut from the inside instead of from the outside, because when the pipe is in use, it is not feasible or convenient to apply the cutter to the outside of the pipe.

My invention particularly comprehends the provision of means for cutting pipe or tubing in an oil well, but in so far as the specific construction of my invention is concerned, I wish not to be limited to any particular application of the cutter.

It frequently happens that oil well pipe or tubing sticks or freezes in the hole at a considerable depth so in order to save the remaining portion of the pipe or tubing, it must be severed above the point where the freezing or sticking occurs. It is not always feasible or convenient to cut from the outside so I have provided a cutter which can be lowered into the pipe or tubing to any depth, the cutter having expanding cutting tools which, in their collapsed form, will be within the diameter of the head or stock which carries them, but which when the cutter is lowered to the proper depth can be progressively expanded into cutting positions to cut the pipe from the inside and which may be retracted when the cutting is accomplished so the cutting tool may be conveniently withdrawn from the well.

In order to understand my invention reference should be had to the accompanying drawings in which:

Fig. 1 is a vertical sectional view through a well containing pipe or tubing in which my invention is applied.

Fig. 2 is a vertical longitudinal sectional view through the cutting tool.

Fig. 3 is an enlarged fragmentary perspective view of the head, the cutter bars and the links connecting the cutter bars to the head.

Fig. 4 is a perspective view of one member of the cutter bar guide or casing and

Fig. 5 is a cross-sectional view through the guide or casing.

Referring now to the drawings by numerals of reference, 1 designates the oil well

and 2 the tubing therein. Within the tubing 2, I may lower the cutting tool. It is shown as consisting of a tube 3 having a threaded end 4 to receive a collar 5 by means of which it may be fastened to a tube suspended from the top of the well so that it may be introduced into and removed from the well. Resting upon the end 6, of the tube 3, is a flange 7 of the depending tubular trap 8 which may catch any solids gravitating from the top of the well. The trap 8 is provided with openings 9 through which fluid pressure may pass into the tube 3.

Fastened to the lower end of the tube 3 is an elongated collar 10 having a lining therein, indicated at 11. Movable longitudinally in the lining is a piston 12 having a stem 13 projecting through the end 14 carried by the member 10. A coil spring 15 surrounding the piston rod or stem 13 has one end bearing against the piston 12 and the other against the block or end 14, the expansive force of the spring tending to normally force the piston to the upper end of the collar or guide 10. The collar or guide 10 is internally threaded at 16 to receive the two threaded ends of the members 17 and 18 of the cutter bar guide. The members 17 and 18 are duplicates, only one being shown in Figure 4. Each member has a bore 19 communicating with arcuate cutter bar guide grooves 20 and 21, the ends of the grooves terminating in openings 22 and 23 in the wall of the guide. The lower end of each member 17 and 18 is provided with a threaded portion 24 to receive a thimble 25 so that when the two members 17 and 18 are screwed into the conical threaded portion 16 and the thimble 25, having a conical threaded portion 26, is screwed on to the conical threaded portion 24 of the members 17 and 18, the cutter bar guide or housing will be joined together. The members 17 and 18 may be additionally secured together by a transverse bolt 27 extending through one of the members and engaging a threaded recess 28 in the other member.

On the end of the piston rod 13, within the bore 19, is a receptory head 29 having a bifurcated end 30 in the bifurcation of which are the ends of the two links 31 and 32 fas-

tened to the head 29 by the pin 33. The lower ends of the links 31 and 32 are loosely connected at 34 and 35 to the segmental or arcuate cutter bars 36 and 37 which lie in the guide grooves 20 and 21 and which are provided with shoulders 38 and 39 to contact one with the other of the bars to limit their expanding movements. The outer ends of the bars 36 and 37 have cutters 40 and 41 adapted to project through the openings 22 and 23 in the guide consisting of the members 17 and 18. Any appropriate cutter may be carried by the ends of the bars 36 and 37, but I have indicated simple forms of cutting tools on the ends of the bars 36 and 37 merely by way of illustration.

When it is desired to cut the pipe or tubing, the tool is lowered into the well, inside the tubing, where it will be suspended from a string of hollow rods or pipe until it reaches the proper depth. Then fluid pressure will be introduced through the hollow rods or pipe forcing the piston 12 against the spring 15, forcing the cutter ends (which up to this time are within the guide) out through the openings 22 and 23 to contact with the pipe to be cut. Then the tool, through the medium of the supporting hollow string of rods or pipe, will be turned or rotated from the top of the well to perform the cutting operation, it being understood during all this time fluid pressure is being exerted against the piston 12 to maintain the cutters in intimate contact with the pipe. When the cutting operation has been completed, fluid pressure will be relieved on the piston so that the spring can retract the cutters within the tool housing, permitting the tool to be withdrawn from the well.

From the foregoing it will be apparent that the pipe can be conveniently cut from the inside, that the tool can be introduced into a pipe having an internal diameter substantially equal to the external diameter of the tool, that the cutting can be efficiently performed and the tool can be conveniently withdrawn after the cutting operation.

What I claim and desire to secure by Letters Patent is:—

1. An internal pipe cutter comprising a guiding member having intersecting arcuate guiding grooves, overlapping arcuate cutter bars in the grooves having cutting edges projectable through the guiding member and an actuating member for simultaneously actuating the cutter bars.

2. An internal pipe cutter comprising a guiding member having intersecting arcuate guiding grooves, overlapping arcuate cutter bars in the grooves having cutting edges projectable through the guiding member, an actuating member for actuating the cutter bars to project their ends through the guiding member and means for retracting said bars within the guiding member.

3. An internal pipe cutter comprising a guiding member having intersecting arcuate guiding grooves, a pair of overlapping arcuate cutter bars in the grooves, the ends of which are projectable through the guiding member, links secured to the cutter bars, a head to which the links are fastened and means for actuating the head to project the ends of the bars through the guiding member.

In testimony whereof I affix my signature.
SAMUEL O. BRADEN.