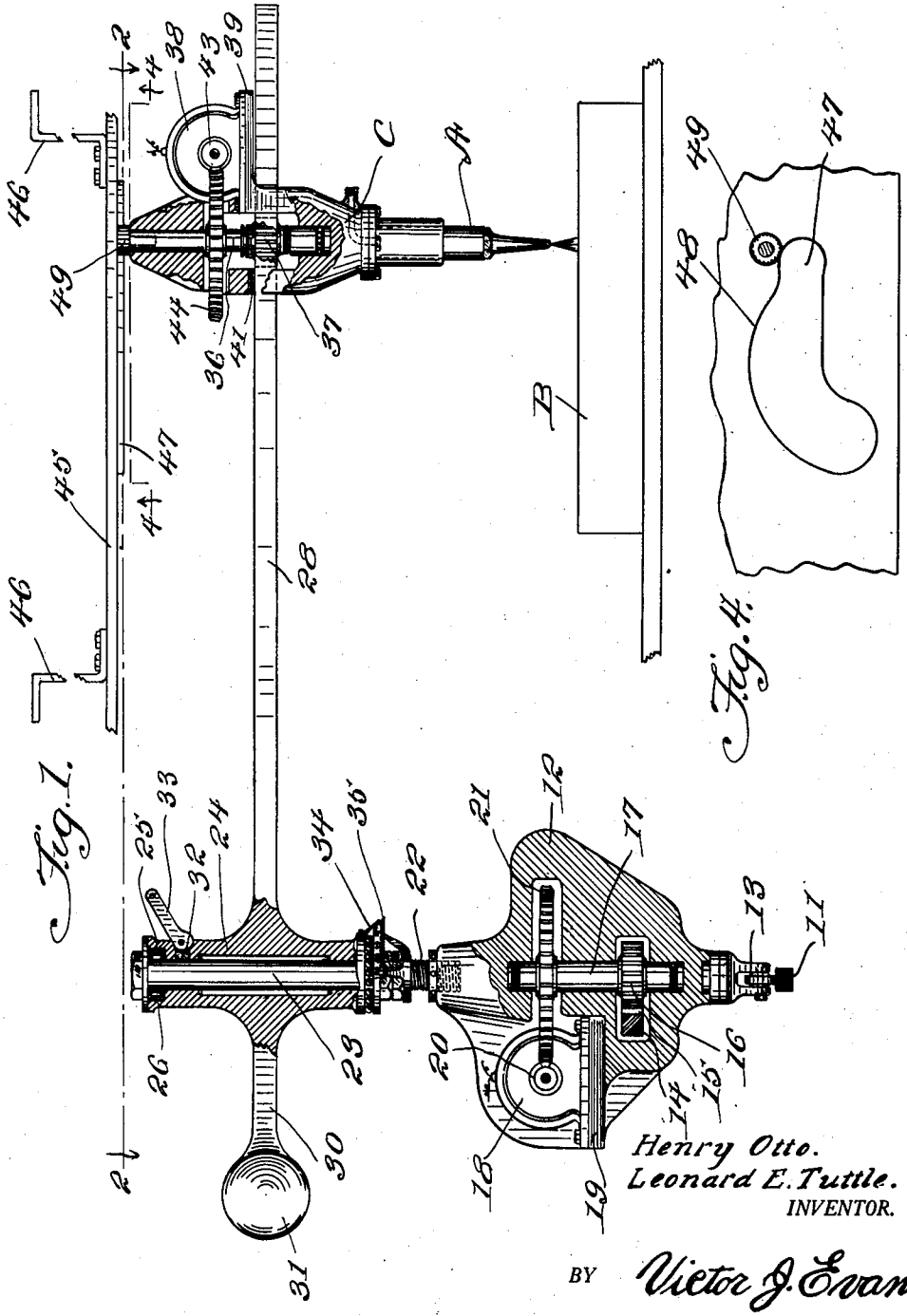
Sept. 15, 1925. 1,553,467

H. OTTO ET AL

TORCH CONTROL

Filed March 2, 1925 3 Sheets-Sheet 1

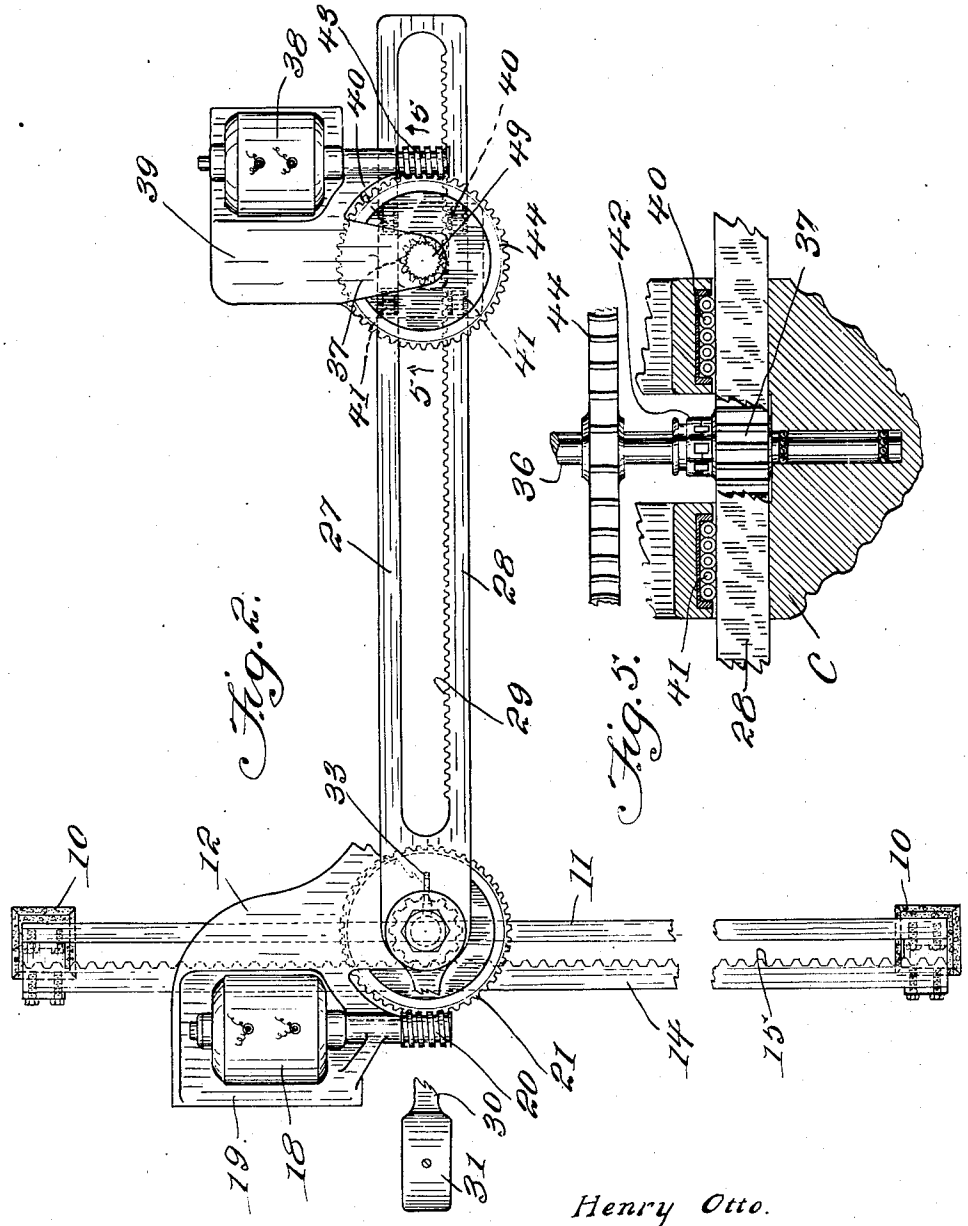


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H. OTTO ET AL

TORCH CONTROL

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Henry Otto.
Leonard E. Tuttle.
INVENTOR.

BY Victor J. Evans
ATTORNEY.

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H. OTTO ET AL

TORCH CONTROL

Filed March 2, 1925 3 Sheets-Sheet 3

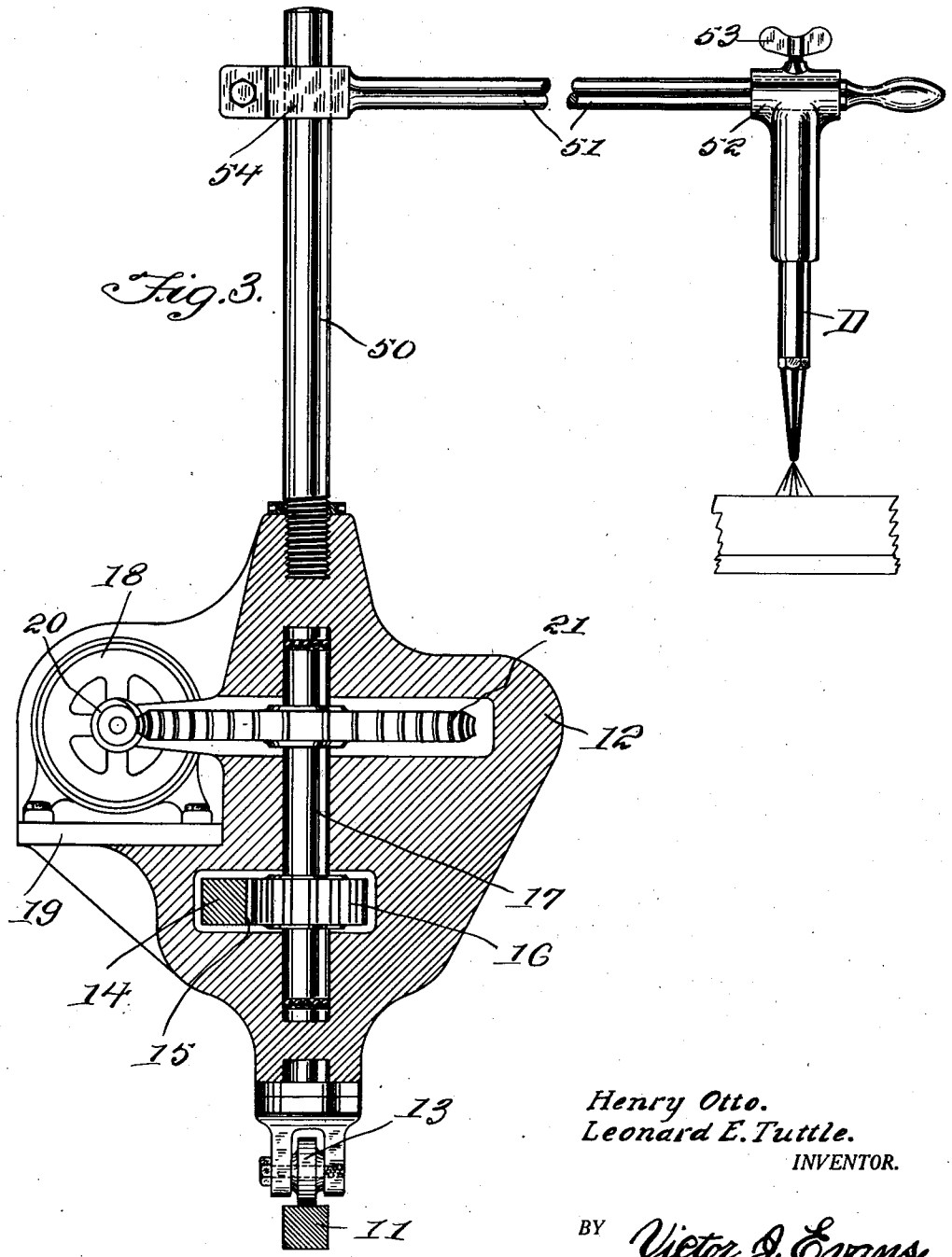


Fig. 3.

Henry Otto.
Leonard E. Tuttle.
INVENTOR.

BY Victor J. Evans
ATTORNEY.

Patented Sept. 15, 1925. 1,553,467

UNITED STATES PATENT OFFICE.

HENRY OTTO AND LEONARD E. TUTTLE, OF TOPEKA, KANSAS.

TORCH CONTROL.

Application filed March 2, 1925. Serial No. 12,793.

To all whom it may concern:

Be it known that we, HENRY OTTO and LEONARD E. TUTTLE, citizens of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented new and useful Improvements in Torch Controls, of which the following is a specification.

This invention contemplates the provision of means for automatically controlling the movements of an acetylene torch, such as used for cutting metals and the like.

In carrying out this invention, we provide means for the above mentioned purpose, which can be regulated to cause the torch to cut a straight line either in a longitudinal or transverse direction, or to direct the torch along a predetermined irregular course for the purpose of cutting an opening or piece of any desired shape or contour.

The nature and advantages of the invention will be better understood when the following detailed description is read in connection with the accompanying drawings, the invention residing in the construction, combination and arrangement of parts as claimed.

In the drawings forming part of this application, like numerals of reference indicate similar parts in the several views, and wherein:

Figure 1 is a side elevation partly in section showing an acetylene torch positioned with relation to the work, and the means employed for automatically controlling the movements of the torch.

Figure 2 is a view taken on line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is an enlarged sectional view of the longitudinal controlling arrangement for cutting a straight line in a longitudinal direction, and a modified construction of means for supporting the torch.

Figure 4 is a sectional view taken on line 4—4 of Figure 1.

Figure 5 is a sectional view taken on line 5—5 of Figure 2.

Referring to the drawings in detail, A indicates generally an acetylene torch or the like of any well known construction, while B represents a piece of metal, which the torch is employed to cut. The torch A includes a supporting structure indicated generally at C and to which the torch is secured in any desired manner.

The means employed for automatically controlling the movements of the torch, so that the metal or work B can be cut along any predetermined straight or irregular line without the assistance of an attendant or operator is shown in the drawings as the preferred embodiment of the invention, and it is of course to be understood that such changes may be made as fall within the scope of the appended claims.

This means comprises a supporting structure which preferably includes uprights 10 upon which is supported a horizontal bar 11. A casting 12 is mounted to move along the said bar 11, and as clearly illustrated in Figure 3, the lower end of this casting is provided with a roller 13, which travels along the bar 11 in a manner and for a purpose to be hereinafter described. Also supported by the uprights 10 is a bar 14 formed with rack teeth 15 along one of its longitudinal edges, and these teeth mesh with a small pinion 16 carried by the shaft 17 which is arranged vertically or at a right angle to the bar 14. The shaft 17 is journalled in the casting 12, and is rotated through the instrumentality of an electric motor indicated at 18 which is supported upon a suitable platform 19 forming part of the casting 12 as clearly shown in Figure 2. The shaft of this motor projects beyond one end thereof and is provided with a worm gear 20 which meshes with the gear 21 carried by the shaft 17, and of considerably greater diameter than the pinion 16. The motor 18 is of the reversible type, and therefore can be operated to rotate the shaft 17 to move the latter in either direction along the rack bar 14. There are various ways of mounting the shaft 17 for this purpose, and consequently, we do not limit ourselves to the structure hereinabove described.

The upper end of the casting 12 is provided with a threaded opening to accommodate the threaded extremity 22 of a shaft 23 which is arranged above and in axial alignment with the shaft 17. Arranged at a right angle to this shaft 23 is a frame including a tubular or sleeve like portion 24 which receives the shaft 23, and which portion is enlarged at both ends and shaped to receive suitable bearing race 25 in which is arranged bearings 26. This frame further includes spaced parallel arms 27 and 28 respectively, the inner longitudinal edge of the latter mentioned arm being formed with

teeth 29 for a purpose to be hereinafter described. The frame is provided with an extension 30 having a knob or handle 31, by means of which the frame may be turned upon the shaft 23 to arrange the frame at any particular angle across the work, and subsequently locked or held fixed relatively to the shaft 23 by means of a suitable fastening means. As shown in this specific instance, the fastening means for this purpose includes an element 32 which is adapted to frictionally engage the shaft 23, and actuated by a cam shaped lever 33. Carried by the lower end of the sleeve like portion 24 of this frame is an indicating finger or pointer 34 adapted to move about a graduated arc 35, so that the operator can quickly and conveniently arrange the frame at any desired angle with relation to the work.

Arranged between the spaced parallel arms of the frame is a shaft 36 which has its lower end associated with the supporting structure C of the acetylene torch A. The shaft 36 is arranged parallel with the shaft 17 above referred to, and is mounted for movement longitudinally of the frame. For this purpose the shaft 36 is provided with a pinion 37 which meshes with the teeth 29 of the arm 28 of said frame, and moves along the frame incident to the rotation of said shaft. For the rotation of the shaft, we preferably employ an electric motor indicated at 38 of the reversible type, the motor being arranged upon a platform 39 which forms part of the supporting structure C for the torch. This structure C rests upon the arms 27 and 28 of the frame, and on roller bearings 40 and 41 of any desired make or construction. This shaft is also provided with a clutch 42, and manifestly by disengaging the said clutch, the pinion 37 is rendered inoperative, so that the structure C may be held stationary by a locking element of any desired construction for cutting the metal in a straight line. The shaft of the motor 38 projects beyond one end thereof and is equipped with a worm gear 43 which meshes with a worm gear 44 carried by the shaft 36, and of a greater diameter than the pinion 37 associated with the same shaft.

The operation of the invention thus far described is as follows:

The torch A together with its supporting structure C is of course associated with the shaft 36 in the manner shown and described, and the torch is then capable of being moved in either a longitudinal or transverse direction with relation to the work B, by using either the motor 18, or the motor 38. For instance, if it is desired to cut the work B along a straight transverse line, the motor 18 is operated to move the shaft 17 along the rack bar 14, and inasmuch as this shaft moves the casting 12 together with the frame associated with the shaft 23, the torch is consequently moved along the work in the same direction. The motor 18 can be operated to move the shaft 17 in either direction along the rack bar 14. Inasmuch as the frame is susceptible of pivotal movement on the shaft 23, it is necessary to hold the frame fixed with relation to the shaft while the work is being cut along a straight line, and this can be readily accomplished by operating the locking lever 33 above referred to.

If it be desired to cut the metal or work along any angle, it is only necessary to swing the frame upon the shaft 23 as a pivot, until the frame is arranged at the desired angle with relation to the work, which can be readily determined by means of the indicator 34 and the graduated arc 35. After the frame has been properly positioned in this manner, it is again locked with relation to the shaft 23 by means of the lever 33, thus prohibiting any further pivotal movement of the frame on said shaft.

On the other hand if it is desired to cut the material along a straight longitudinal line, it is only necessary to put the motor 38 into operation, whereupon rotation is imparted to the shaft 36. The pinion 37 carried by this shaft meshing with the teeth 29 of the arm 28 moves the torch A in a straight line along the frame and longitudinally of the work as will be readily understood. The torch can be moved in this manner in either direction along the frame by simply reversing the motor 38. Also as above stated, the clutch 42 can be operated to disengage the pinion 37 and the structure C held stationary by a suitable locking element.

Now, in addition to controlling the torch for cutting the material along a straight line in either a longitudinal or transverse direction, the automatic controlling means for the torch is further designed to cause the latter to follow any desired irregular course, with a view of cutting an opening or piece of material of any predetermined outline. For this purpose, we employ an electro magnetic table 45 equipped with suitable handles 46, which table when energized holds the templet 47 fixed to the underside thereof, and it is of course manifest that a templet of any particular shape or outline can be used to cut an opening in the material, or a piece of material of corresponding shape. In Figure 4, we have illustrated one of such templets wherein it will be noted that said templet is formed with a compound curved surface 48. A toothed wheel 49 is secured to the upper end of the shaft 36 and is held in contact with the templet 47 when the table is energized. Consequently, when the frame including the parallel arms 27 and 28 respectively, is released from the locking lever 33, and the motor 38 put into operation, the said frame swings about the shaft 23 as a

pivot, pursuing an irregular course which is defined or controlled by the shape of the templet 47. The toothed wheel 49 is caused to follow the outline of the templet used, and in this way the material is cut along a predetermined irregular line, to cut an opening in the material or a piece therefrom corresponding in shape to the contour of said templet. It is only necessary to start the motors to accomplish the desired results, the movements of the torch being controlled in the manner described, thus eliminating the necessity of employing an attendant or operator for this purpose.

At times it may be desirable or necessary to cut a large number of pieces of material along a straight line, without changing the arrangement of things to cut the material along any other line. Under these and similar conditions, we contemplate the use of the structure shown in Figure 3 for supporting the torch indicated generally at D. When using the structure shown in Figure 3, the shaft 50 is screwed into the socket in the casting 12 after the shaft 23 has been separated therefrom, the shaft 50 supporting a bar 51 which projects laterally or at a right angle from the shaft 50 as shown. The torch and its supporting structure indicated generally at D includes a sleeve like member 52 which is slidably mounted on the bar 51, so that the torch can be moved toward and away from the shaft 50 to space it the requisite distance from the latter. The torch is held fixed with relation to the shaft 51 by tightening the thumb screw 53. It might here be stated that the shaft 50 as well as the rod 51 can vary in length and cross sectional configuration without departing from the spirit of the invention, although the shaft 50 and rod 51 are preferably ribbed to prevent turning of the sleeve like member 52 and the rod 51 or the clamp 54 on the shaft 50. The same means hereinabove described including the motor 18 and the worm gear 21 is utilized to move the shaft 50 together with the casting 12 longitudinally of the rack bar. It is obvious that when the shaft 50 is used as illustrated in Figure 3, use of the shaft 23, the frame including the spaced parallel arms 27 and 28, and all the other structures supported by these arms are dispensed with.

While it is believed that from the foregoing description, the nature and advantages of the invention will be readily apparent, we desire to have it understood that we do not limit ourselves to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

Having thus described the invention, we claim:

1. The combination with a cutting torch, of a supporting frame therefor, means whereby said frame is mounted for both sliding and pivotal movements, said torch being supported on the frame for longitudinal movement thereof, means for automatically sliding said frame to cut the work on a straight line in a transverse direction, means for automatically moving a torch within the frame and cutting the work on a straight line in a transverse direction, and means for automatically moving said frame upon its pivot to control the movements of the torch over an irregular predetermined course.

2. The combination with a cutting torch, of a supporting frame therefor, a horizontally disposed rack bar, means for supporting said frame for movement in a horizontal plane along said bar, means for moving said frame in either direction along said bar, said torch being capable of sliding movement along said frame, means for automatically controlling the movements of said torch with relation to said frame and in a plane at a right angle to said bar, said frame being mounted for pivotal movement, and electro magnetic means for automatically controlling the pivotal movements of said frame to cause the torch to cut the work along any irregular predetermined course.

3. The combination with a cutting torch, of a supporting frame therefor, a shaft supporting said frame for pivotal movement, means including a motor for rotating said shaft, horizontally disposed rack bar, a pinion carried by said shaft and meshing with said bar whereby said frame and torch can be moved along the bar in a horizontal plane, said torch being mounted on the frame for movement longitudinally thereof and in a plane at a right angle to said bar, means for automatically controlling the movements of said torch on the frame in either direction, and electro magnetic means for automatically controlling the pivotal movements of said frame to cause the torch to follow a predetermined irregular course.

In testimony whereof we affix our signatures.

HENRY OTTO.
LEONARD E. TUTTLE.