

April 1, 1930.

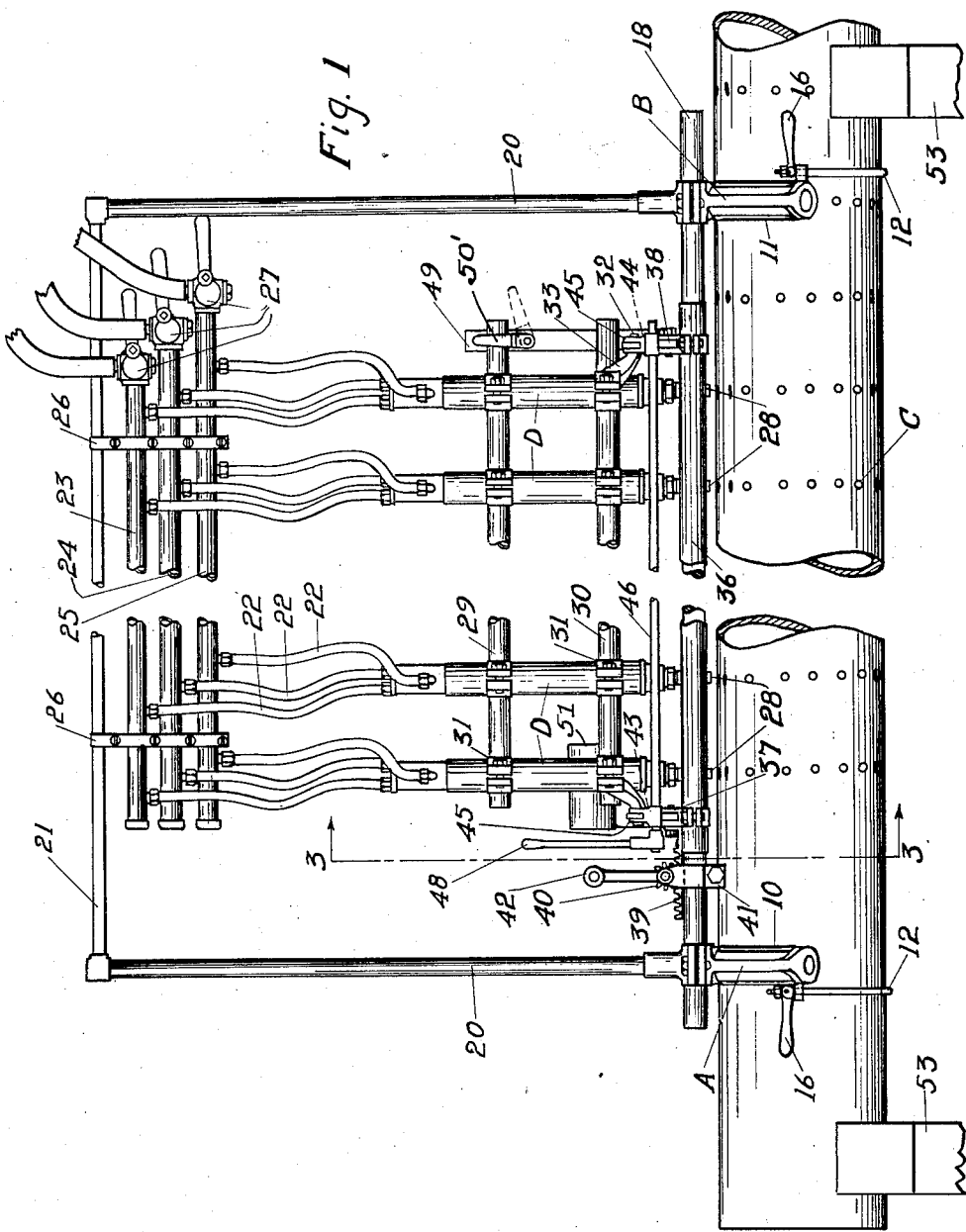
F. A. OST

1,752,690

SLOT CUTTER

Filed June 25, 1928

3 Sheets-Sheet 1



INVENTOR.

BY *Frederick A. Ost*
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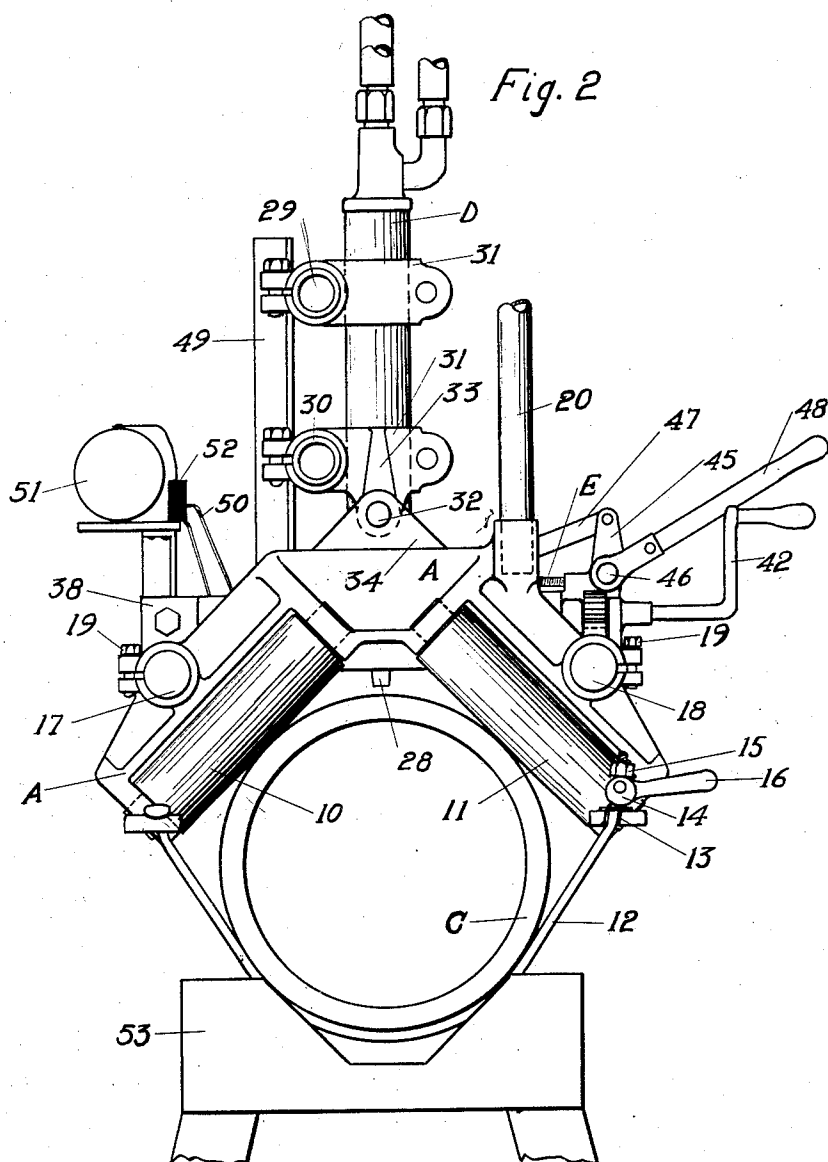
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SLOT CUTTER

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3 Sheets-Sheet 2



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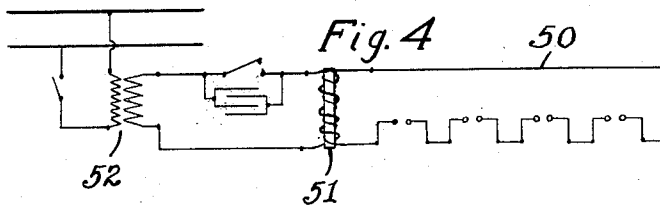
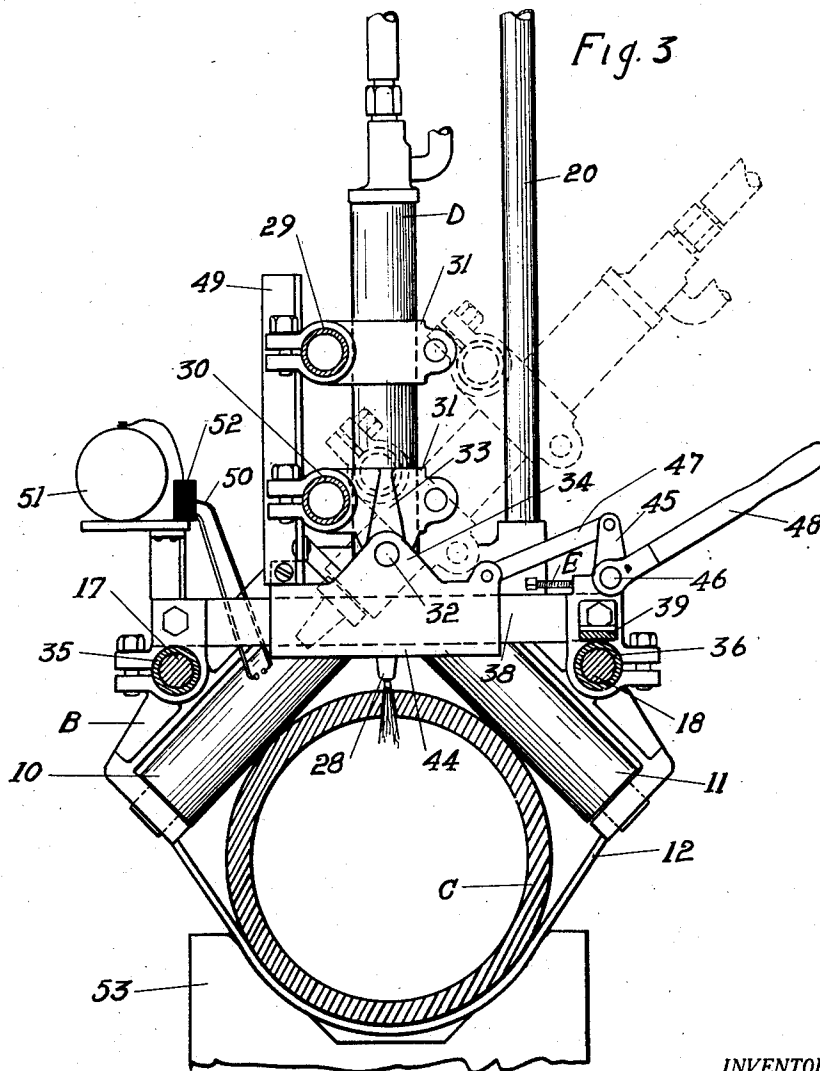
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SLOT CUTTER

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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SLOT CUTTER

Application filed June 25, 1928. Serial No. 288,222.

This invention relates to an improved device for cutting slots in a pipe or sheet of metal. More particularly this improvement provides portable means which can easily be moved from place to place and from time to time adjusted to the work, thus enabling the operator to cut slots in the field without having to transport the material in which slots are to be cut to and from a machine shop in which cutting machines have heretofore been usually permanently installed. My invention because of its simplicity makes it feasible to slot oil casing in the field and at the location of the oil well where the slotted casing is to be used which is a distinct advantage. A further object of the invention is to provide a device of the kind stated in which a plurality of cutting torches are employed for simultaneously cutting a plurality of slots and to provide means for detachably securing the device to the work and for adjusting the cutting elements either longitudinally or transversely so that slots may be cut at will, disposed either parallel with the axis of the casing or at right angles to said axis. Still further objects will be set forth in the following description.

My improvement is particularly adapted to employ in its complement of cutting torches, the improved cutting torch described in my companion application for patent, executed on the 2nd day of June, 1928, filed June 7, 1928 and bearing Serial Number 283,717, by which slots with inwardly diverging side walls and smooth edges are adapted to be cut.

To these ends my invention comprises the features of construction and combinations of elements set forth in the following specification.

In the accompanying drawings, forming part of this specification, Fig. 1 is a side elevation of my invention, shown applied to a section of casing, such as is employed in oil wells, in position for cutting a plurality of slots disposed either longitudinally or transversely therein, a portion of the casing and of the cutting mechanism being broken away; Fig. 2 is an end elevation of the structure shown in Fig. 1, a portion of the cutting

mechanism being broken away; Fig. 3 is a section taken on the line 3—3 of Fig. 1, the broken line position indicating the manner in which the torches can be swung with their tips in juxtaposition to suitable igniting means for the gas jets used for cutting, and Fig. 4 is a diagrammatic view of the igniting means by which the gas jets issuing from a plurality of the cutting torches are simultaneously ignited.

In the drawings A and B indicate a pair of similarly constructed yoke frames, which are designed to be placed astride the work, such as a section of cylindrical well casing C. Each yoke carries a pair of antifriction rollers 10 and 11, journaled therein, which are adapted to bear upon the surface of the casing and carry the load of my improved slot cutting device. These rollers are disposed with their axes at substantially right angles and are adapted to roll longitudinally on the surface of the casing. Each yoke is adapted to be clamped to the casing by a strap or cord 12, one end of which is anchored to one side of a yoke, its body portion passing around the lower portion of the casing, and its other end passing freely through a slot 13 in the yoke and engaged by a draw cam 14, bearing below the detachable burr 15. A handle lever 16 on the draw cam is provided, by the swinging of which, the cam is made to tighten the strap 12 and hold the yoke rigidly on the casing or release the strap and permit the yoke to be moved into a new position. The two yokes are rigidly coupled together to form a main frame, by the pair of parallel longitudinal rods 17 and 18, which are clamped to the yokes by the bolts 19. Each yoke bears a standard 20 and the two standards are united to complete an overhead frame by means of the longitudinal supporting rod 21 (see Fig. 1). Thus the parts described constitute a carriage, which may be of any suitable construction and which may, when desired be moved into any desired position longitudinally and permit circumferential movement of the casing, and after such movement or adjustment clamped securely upon the work which it is desired to slot.

The function of the carriage is to adjust-

ably support a series of cutting torches D in any selected position upon the casing or other work. Each of the cutting torches may be of any suitable construction and supplied with oxygen or acetylene or both by the usual flexible tubes 22, leading from the longitudinal acetylene, pre-heating oxygen and cutting oxygen supply pipes 23, 24 and 25, which are supported by a suitable number of stirrups 26 from the rod 21. Valves 27 are provided to regulate or close the supply pipes 23, 24 and 25. Thus each valve controls the supply from each supply pipe to all of the cutting torches. Each torch may have a tip end 28 of the character set forth in my companion application filed June 7, 1928, Serial Number 283,717, by which the cutting jet is permitted to cut a slot having inwardly diverging sides and smooth marginal edges.

The series of cutting torches are held assembled in a longitudinal row and vertically at the desired height and at suitably spaced intervals upon a pair of vertically spaced longitudinal rods 29 and 30, the mode of attachment being by the use of double clamps 31, each of which is adjustably secured to one of the rods 29 and 30 and to one of the cutting torches D.

The gang of cutting torches as described may be rocked on a horizontal axis through the use of pivot connections 32, between the bosses 33, slanting outwardly from the lower end double clamp members 31 and the upwardly projecting flanges 34, as will be hereinafter described.

Mounted upon the pair of horizontal supporting rods 17 and 18 are a pair of sliding sleeves 35 and 36 and to these sleeves are rigidly secured a pair of cross arms 37 and 38. These sleeves and cross arms constitute an auxiliary frame which is slidable longitudinally upon the supporting rods 17 and 18. The travel of said auxiliary frame is controlled by a rack bar extending from the sleeve 36, a pinion 40 in mesh with the teeth of the rack bar and journaled in a split collar 41, secured to rod 18, and a handle 42 by which said pinion is turned.

Mounted to travel transversely upon the cross arms 37 and 38 are a pair of slides 43 and 44 and upon each of said slides one of said flanges 34 is formed bearing the pivot connections 32 for the gang of cutting torches. Transverse motion is imparted to the slides 43 and 44 by means of crank arms 45 mounted upon a longitudinal shaft 46, which in turn is journaled in the cross arms 37 and 38 and by the connecting links 47 and the handle 48 which is secured to said shaft 46 to rock the latter.

In this manner the gang of cutting torches, while in vertical position with their tips directed down in operative position to project cutting jets against the surface of the casing C or other work, may be moved longi-

tudinally by turning the handle 42 to permit the jets cutting a plurality of longitudinal slots in the casing simultaneously or if desired may be moved transversely by swinging the handle 48 to permit the jets cutting a plurality of transverse slots simultaneously.

The split collar 41 may be used as a stop for the sleeve 36, to define the travel of the auxiliary frame in one direction and the length of slots cut longitudinally by the cutting torches. In a somewhat similar manner a set screw E, adjustable in the cross arm 38, against which the longitudinal rods 29 and 30 are adapted to strike, serves to limit the movement of the gang of cutting torches in one direction and the length of slots cut transversely in the casing. The stop 49 mounted upon slide 44 and detachably engaging rod 29 by catch 50' serves to assist in supporting the cutting torches in vertical position, in which position they are intended to be held while performing the function of cutting both longitudinal and transverse slots. The torches may be tilted at will into the position indicated by broken lines in Fig. 3 for igniting the jets of gas issuing from the tips. For this purpose an electrical circuit 50 is arranged on the main frame with a series of spark gaps in position to ignite the jets when the cutting torches are tilted as described. The ignition circuit is connected with the usual spark coil 51 and transformer 52 and is adapted to be operated by any convenient source of electrical current.

Operation: Assuming that it is desired to slot the section of casing C, said section is mounted upon supports such as 53 and the device is placed with its yokes A—B mounted astride the casing in the desired position. It is then fastened in place by tightening its straps 12. The cutting torches are then tilted to ignite the jets of gas and returned to upright position. The handles 42 or 48 are then operated to cause the jets to cut either longitudinal or transverse slots as desired. The yokes are then released and the carriage slid ahead to a new position and the cutting operation repeated. This operation is continued until the desired length of the casing has been slotted. The yokes are then released and the casing turned a half revolution and the operation repeated. By cutting opposite portions of the casing in this manner, uneven expansion and warping of the casing is prevented. The casing acts as a guide, longitudinally for the carriage. Opposite pairs of series of slots are cut around the casing until the casing is completely slotted at the desired intervals. It will be understood that the casing is prepared in advance of the use of my improved slot cutter with small starting holes to admit the jet of oxygen in the usual manner, said holes being spaced and positioned where the slots are to be cut and that the cutting torches in my improved device are adjusted

by hand to register with these starting holes.

Should it be desired to produce this improvement for either cutting longitudinal or transverse slots alone, that portion of the mechanism designed for the function not used may be eliminated and the machine thus simplified.

The device is light in weight, simple in construction and easy to operate, thus commending itself to field service, without the necessity of transporting casing to a specially equipped shop, with accompanied increased expense.

In accordance with the patent statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth, within the scope of the following claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device for cutting slots in a metal object, comprising, in combination, a portable carriage adapted to be adjusted astride the object to be slotted, means for holding the carriage and the object in position, an auxiliary carriage slidable longitudinally on the portable carriage, a number of cutting torches in series formation longitudinally of the object mounted upon said auxiliary carriage with their orifice tips in juxtaposition to the object to be slotted, and means for moving said auxiliary carriage to permit the jets issuing from said tips cutting longitudinal slots in said object.

2. A device for cutting slots in a metal object, comprising, in combination, a portable carriage adapted to be adjusted astride the object to be slotted, means for holding the carriage and object in position, an auxiliary frame movable longitudinally on said carriage, a second auxiliary frame movable transversely on the first auxiliary frame, a longitudinally disposed series of cutting torches carried by said second auxiliary frame with their orifice tips in juxtaposition to the object to be slotted, and means for moving said auxiliary frame on said carriage to permit the jets issuing from said tips cutting a longitudinal series of slots in said object.

3. A device for cutting slots in a metal object, comprising, in combination, a portable carriage adapted to be adjusted astride the object to be slotted and movably disposed longitudinally and laterally thereon, means for holding said carriage and object in position, an auxiliary frame carried by said carriage and movable longitudinally thereon, a longitudinally disposed series of

cutting torches carried by said auxiliary frame with their orifice tips in juxtaposition to the surface of the object to be slotted, and means for moving said auxiliary frame longitudinally on said carriage to permit the jets projected from said tips cutting a series of longitudinal slots in said object.

4. A device for cutting slots in a metal object, comprising, in combination, a portable carriage adapted to be adjusted to the object to be slotted, and movably disposed transversely and longitudinally thereon, means for holding said carriage and object in position, an auxiliary frame carried by said carriage and movable transversely thereon, a longitudinal series of cutting torches carried by said auxiliary frame with their orifice tips in juxtaposition to the surface of the object to be slotted, and means for moving said auxiliary frame transversely on said carriage to permit the jets projected from said tips cutting a series of transverse slots.

5. A device for cutting slots in a cylindrical casing, comprising, in combination, a portable carriage adapted to be adjusted astride the casing to be slotted and movably disposed longitudinally and circumferentially thereon, means for holding said carriage and casing in position, an auxiliary frame carried by said carriage and movable thereon, a longitudinal series of cutting torches carried by said auxiliary frame with their orifice tips in juxtaposition to the surface of the casing to be slotted and means for moving said auxiliary frame on said carriage to permit the jets projected from said tips cutting a series of slots in said casing.

6. A device for cutting a series of slots in a cylindrical casing, comprising, in combination, a portable carriage adapted to be adjusted astride a cylindrical casing to be slotted and movably disposed thereon, means for holding said carriage and casing in position, a longitudinal series of cutting torches upon said carriage with their orifice tips in juxtaposition to the surface of said casing to be slotted, electrical means supported by said carriage for igniting the gas jets projected from said orifice tips, and means for moving said torches to permit the jets projected from said tips simultaneously cutting a series of slots in said casing.

7. A device for cutting slots in a metal object, comprising, in combination, a portable carriage adapted to be adjusted to an object to be slotted and movably disposed thereon, means for holding said carriage and object in position, an auxiliary frame carried by said carriage and movable thereon, a longitudinal series of cutting torches hung upon said auxiliary frame with their orifice tips in juxtaposition to the surface of said object to be slotted and adapted to swing away from said cutting position, electrical means carried by said structure for igniting the gas

jets projected from said orifice tips when the torches are swung away from cutting position, and means for moving said auxiliary frame on said carriage to permit the jets projected from said tips cutting a series of slots in said object.

8. A device for cutting slots in a cylindrical casing, comprising, in combination, a portable carriage adapted to be adjusted to said casing, to be slotted, and movably disposed thereon, having yokes at both ends thereof astride said casing and anti-friction elements journaled in said yokes and bearing upon the surface of said casing to permit free movement thereon, strap elements attached to said yokes and adapted to engage said casing to hold the carriage in position on said casing, and a gang of cutting torches supported by said carriage with their orifice tips in juxtaposition to the surface of said casing to be slotted, said torches being movable to permit their cutting jets cutting slots in said casing.

9. A device for cutting slots in a cylindrical casing, comprising, in combination, a portable carriage extending longitudinally above said casing and supported at each of its longitudinally disposed ends thereon, a support slidably mounted upon said carriage above said casing, and a cutting torch carried by said support with its jet tip in juxtaposition to the surface of said casing, said portable carriage being adapted to be entirely supported by said cylindrical casing during the operation of cutting slots.

In testimony whereof, I have signed my name to this specification.

FREDERICK A. OST.

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