W. C. BUCKNAM.

PANTOGRAPH.

APPLICATION FILED SEPT. 29, 1913.

1,104,289.

Patented July 21, 1914.

2 SHEETS—SHEET 1.

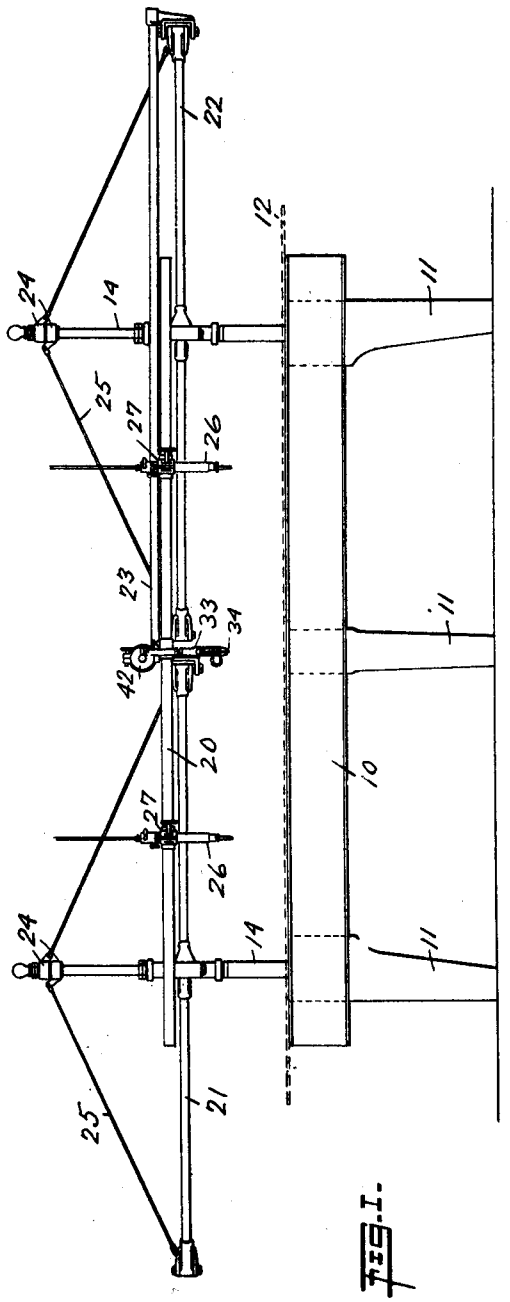


FIG. 1.

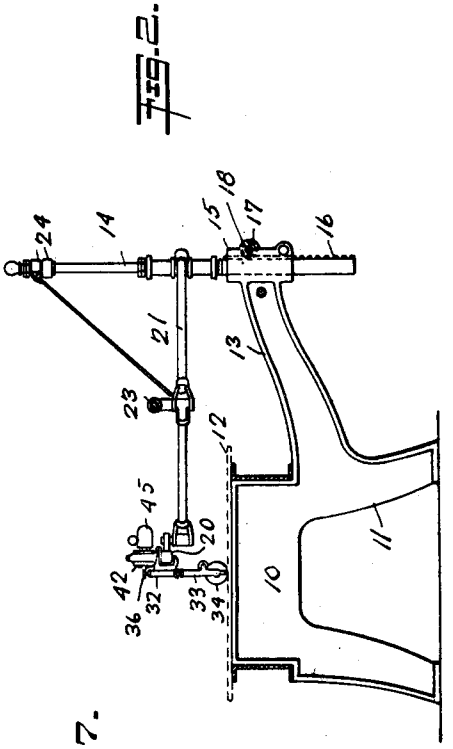


FIG. 2.

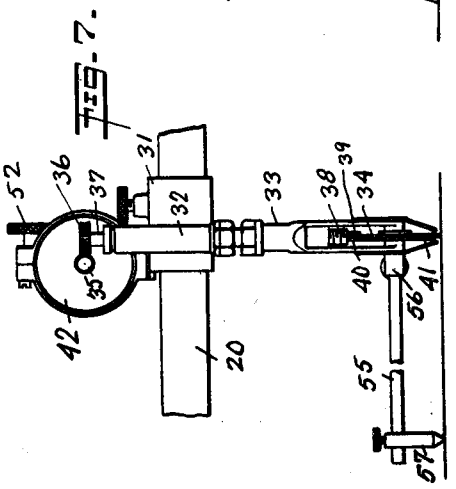


FIG. 7.

WITNESSES

G. R. Thomas

E. Greenberger.

INVENTOR

Worthy C. Bucknam

BY

L. C. Landenberg

ATTORNEY

W. C. BUCKNAM.

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2 SHEETS—SHEET 2.

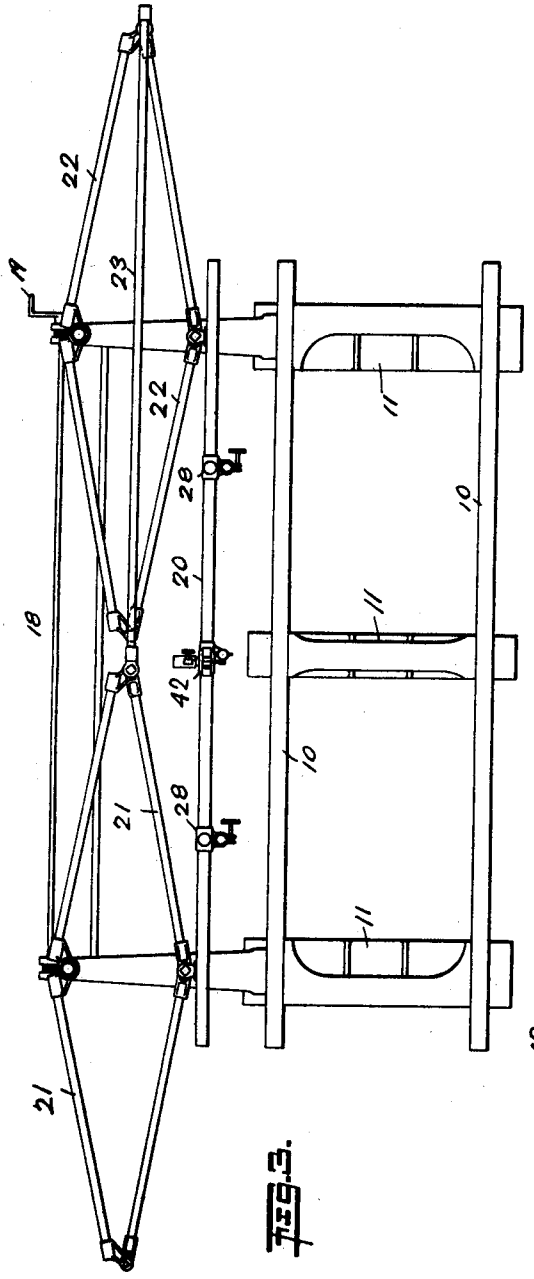


FIG. 3.

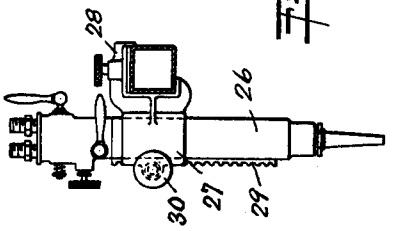


FIG. 6.

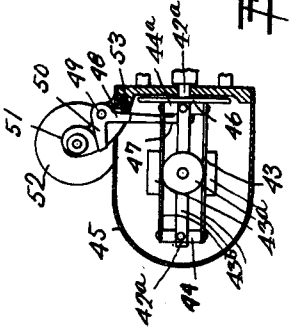


FIG. 5.

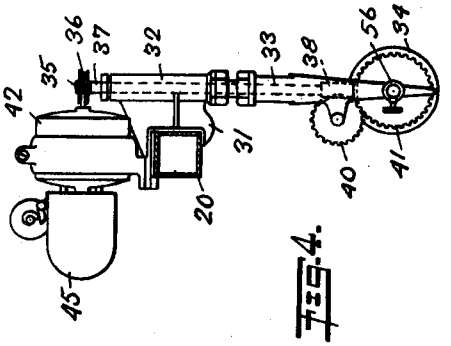


FIG. 4.

WITNESSES

G. P. Thomas

E. Fraenberger

Worthy C. Bucknam INVENTOR

BY J. B. Landenberg

ATTORNEY

UNITED STATES PATENT OFFICE.

WORTHY C. BUCKNAM, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO DAVIS-BOURNONVILLE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PANTOGRAPH.

1,104,289. Specification of Letters Patent. Patented July 21, 1914.

Application filed September 29, 1913. Serial No. 792,323.

To all whom it may concern:

Be it known that I, WORTHY C. BUCKNAM, a citizen of the United States, and a resident of Marion, Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Pantographs, of which the following is a specification.

In my prior Patents Nos. 1,059,271 and 1,059,329, dated April 15, 1913, I have disclosed and claimed broadly certain features of novelty relating to pantographic and blowpipe apparatus. In those patents I did not limit myself to any particular form of the pantograph itself, because, obviously, the inventions could be carried out with any suitable pantograph structure.

The present case illustrates another apparatus falling within the inventions of the aforesaid patents, and is directed more particularly to a form of pantograph suitable for use with blowpipe apparatus to effect multiple cutting, the general object being to produce a strong, simple and efficient construction for the purpose intended.

In the accompanying drawings illustrating the invention: Figure 1 is a front elevation; Fig. 2 is a central vertical transverse section, the tracer mechanism being shown in elevation; Fig. 3 is a plan view, parts being omitted; Fig. 4 is a side elevation of the mechanically propelled tracer; Fig. 5 is a vertical section showing the speed regulator, the said section being taken in the plane of the armature shaft of the motor, but showing the governor parts in elevation; Fig. 6 is a side elevation showing the torch and torch-holder; and Fig. 7 is a front view of the tracer with a removable radius arm.

The apparatus comprises a suitable table 10 mounted on legs 11. The table top is open in order that the cutting jets may penetrate through the work, indicated at 12 as supported thereon. From the back of the table two arms 13 project rearward and support two vertical posts 14, which are slidable in bearings 15 on the rear ends of said arms. Means are provided for effecting simultaneous vertical adjustment of these posts, and for this purpose their lower portions are shown provided with racks 16, which are meshed by pinions 17 on a common transverse shaft 18 journaled in the bearings 15 and carrying an operating crank 19 at one end. The posts are frictionally held at any degree of vertical adjustment.

A bar 20, capable of universal parallel movement over the table, constitutes the implement support, and is connected with the posts 14 by means of pivotally-jointed linkage, of a character to permit such movement. In the preferred construction the said linkage comprises two parallelograms 21 and 22. The corresponding rear joints of these parallelograms pivot upon the posts 14 and are consequently fixed as to lateral movement. Their corresponding forward pivotal joints are freely movable, and are connected by the bar 20. Another bar 23 connects two other corresponding freely-movable joints of the parallelograms, and thus constrains the assemblage to movement such that all points on the bar 20 execute the same movements.

The posts 14 are extended upward to a suitable height and carry rotary collars 24, from which stay-wires 25 extend diagonally downward and are secured to the rear members of the parallelograms, so as to brace the same.

The invention is designed more particularly in connection with gas cutting apparatus, and accordingly torches 26 are illustrated mounted on the bar 20. The construction and operation of cutting torches or blowpipes are well understood, and require no particular explanation in the present connection. The torches, of which there may be any suitable number, are mounted for vertical sliding movement in tubular holders 27 having clamping devices 28, whereby they may be attached to the bar 20 at any point and are adapted to be easily applied and removed. The torches are removable and replaceable in their holders, and are shown provided with mechanical adjusting means, in the form of racks 29 on the torches, to be meshed by pinions on the shafts of knurled wheels 30.

Propelling and tracing mechanism is also attached to and shiftable along the bar 20, and is shown as supported on a bracket 31, similar to the devices 28. For more detailed illustration and description of mechanism of this character reference may be had to my prior patents aforesaid. Briefly stated, bracket 31 has a tubular vertical bearing 32, in which the stem of a swiveled tracer support 33 is rotatable. The thin wheel tracer

34 is mounted in the lower part of this swiveled support and is driven by suitable gearing, such as a worm 35 meshing with a worm wheel 36 on a vertical shaft 37, the latter passing downward through the bearing 32 and tracer support 33 and provided at its lower end with a worm 38 meshing with a worm wheel 39 compounded with a spur gear 40, which latter meshes with a gear 41 fixed to the shaft of the tracer. The whole is preferably driven by an electric motor 42 mounted on the bracket 31 and having the worm 35 mounted on its armature shaft. For a more detailed illustration of a tracer mechanism of this general character, reference may be had to my prior patents above mentioned.

The motor is shown provided with a speed regulator for controlling the speed at which the jets of the several blowpipes are propelled relatively to the work. The said regulator comprises a centrifugal governor 43 mounted on a rearward extension 42^a of the armature shaft inside a casing 45. The said governor consists of weights 43^a mounted on flexible spring arms 43^b, which latter are secured at their opposite ends to heads 44 and 44^a. The head 44 is fixed to the shaft extension 42^a, while the head 44^a is slidable on this shaft when the weights move outward under centrifugal force, thus bowing the spring arms. A brake disk or rim 46 is secured to the movable head 44^a for cooperation with a suitable complementary friction member 47, the said member being adjustable relatively to the friction disk by virtue of its mounting on an arm 48 fulcrumed at 49 and having an angular extension 50 engaged by a cam 51 on the shaft of a knurled operating wheel 52. By rotating this wheel, and thereby shifting the member 47, the tracer may be set for any speed of movement desired. The extension 50 is held against the cam 51 by a suitable spring 53. In action, when the motor is started, the governor weights move outward, thus causing the friction disk 44 to contact with the member 47 in such manner as to prevent the motor exceeding the speed which has been predetermined by the adjustment effected by the wheel 52.

It will be understood that all of the torch nozzles may be caused to travel in duplicate paths above the work by setting the mechanically-propelled tracer in motion and guiding it in the desired manner by manually turning the swiveled support 33. For the purpose of making circular cuts, an attachable radius arm 55 is inserted into a socket 56 on the support 33, in axial alinement with the wheel 34. This radius arm carries a center 57, which is adjustable along the arm so as to vary the diameter of the circles that may be cut. When this center engages a punch mark in the work or other underlying surface, the tracer is constrained to travel in a circular path and the torches are caused to move in the same manner. It will be obvious that this circular cutting attachment may be employed with the form of pantograph shown in my prior patents, or with any other pivotally-jointed universally-movable structure.

What I claim as new is:

1. A pantographic apparatus, comprising, in combination, a table constituting a work-support, vertical posts mounted at the back of said table, mechanism for effecting simultaneous vertical adjustment of said posts, a transverse bar constituting an implement support, and linkage connecting said bar with said posts with capability of universal, parallel movement over said table.

2. A pantographic apparatus, comprising, in combination, a table supported on uprights and constituting a work-support, arms projecting rearward from said table, vertical members vertically adjustable in said arms, mechanism for effecting simultaneous vertical adjustment of said members, universal parallel movement linkage supported by said members, and a transverse bar carried by said linkage for movement over said table.

3. Pantographic apparatus, comprising a suitable primary support, pivotally-jointed parallelograms having corresponding joints fixed to the support, a bar connecting two corresponding freely-movable joints of the parallelograms, and another bar connecting two other freely-movable joints thereof and constituting an implement support.

4. The combination with a pantographic structure, of a swiveled tracer support thereon carrying a tracer wheel and mechanism for driving the same, said tracer support also having a lateral socket, and a radius arm with center attachable to said socket, substantially as described.

In witness whereof I have signed my name in the presence of two subscribing witnesses.

WORTHY C. BUCKNAM.

Witnesses:
GEORGE LEE STOCKETT,
GEO. E. PRICE, Jr.