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POSITIONING AND CLAMPING TOOL

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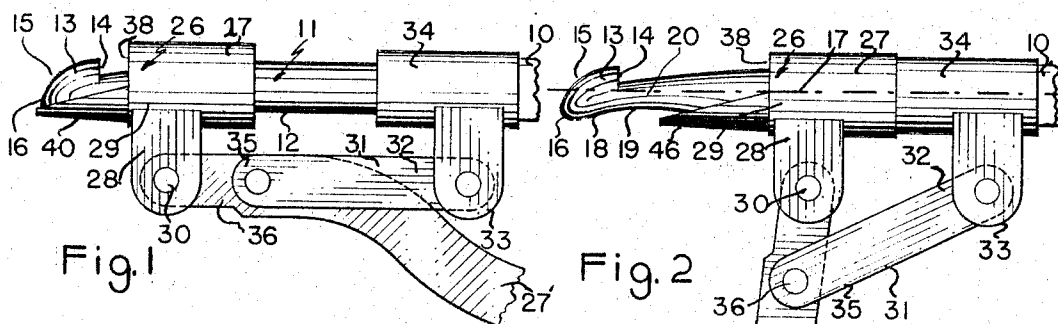


Fig. 1

Fig. 2

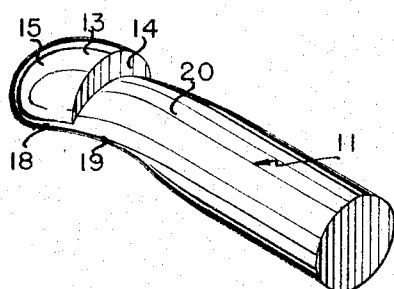


Fig. 3

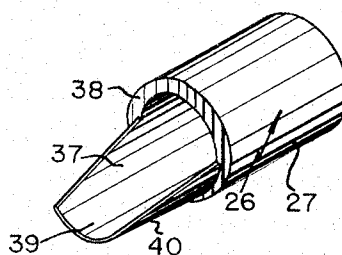


Fig. 4

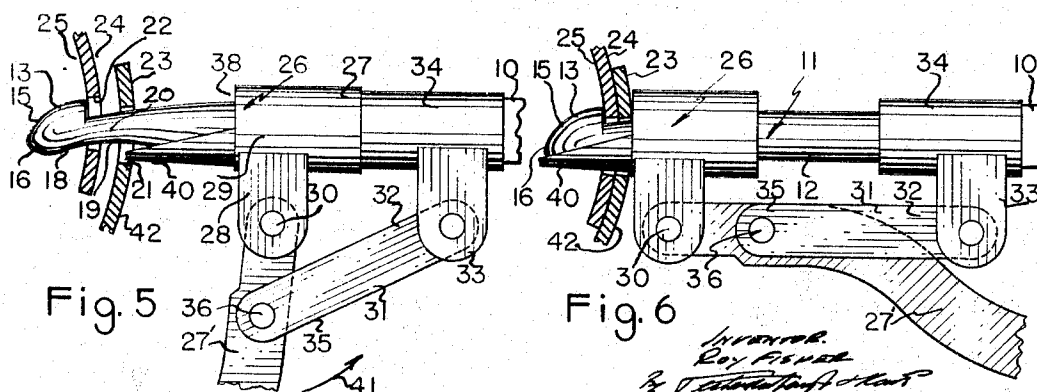


Fig. 5

Fig. 6

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POSITIONING AND CLAMPING TOOL

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1 Claim. (Cl. 29—238)

This invention relates to new and useful improvements in positioning and clamping tools for the clamping together and aligning the bolt hole apertures of adjacent overlapping plates, particularly relatively heavy gauge liner plates used in lining tunnels driven through underpasses or sub-surfaces strata and having a relatively large diameter.

In such construction, the earth or sub-strata is excavated and a tunnel liner is inserted manufactured usually of heavy gauge corrugated steel. This liner normally consists of a plurality of rings or hoops adjacently connected together and in turn the rings or hoops are normally constructed of several arcuately curved sections also connected together circumferentially.

Due to the weight of the sections and the relatively heavy gauge metal used in the construction thereof, the preformed bolt holes are often difficult to align so that the holding or fastening bolts may be inserted.

It is conventional to use a crowbar or similar implement inserted through mating bolt hole apertures and, by manipulation, endeavor to align apertures thereby so that bolts may be inserted.

Not only is this time consuming and therefore expensive, but it does not solve the other problem normally encountered, namely, that of drawing the two portions of the plate together so that the bolt can be inserted.

The positioning and clamping tool hereinafter to be described accomplishes both of these actions simply and rapidly and with the minimum waste of time.

The principal object and essence of the invention is therefore to provide a device of the character herewithin described which can be inserted through adjacent mating bolt holes from a pair of overlapping plates, align the bolt holes, and clamp the two plates together temporarily until the fastening bolts can be inserted upon either side of the bolt hole apertures being engaged by the clamping tool.

Another object of the invention is to provide a device of the character herewithin described in which the tool when clamped in position, easily supports the weight of the plate thus facilitating the rapid erection of the liner plates within a tunnel.

Another object of the invention is to provide a device of the character herewithin described which is adapted to move the adjacent sections circumferentially to a limited amount and at the same time draw the overlapping edges together thereby accurately sizing the ring of the section to the correct circumferential size.

The foregoing object, of course, is essential as such plate normally is formed with a certain amount of inherent resiliency which is difficult to overcome when fitting adjacent sections of plate together.

Still another object of the invention is to provide a device of the character herewithin described which can be inserted and operated from the interior of the tunnel section without the necessity of providing co-operating means upon the other side of the liner plates.

A yet further object of the invention is to provide a device of the character herewithin described which is simple in construction, economical in manufacture, and otherwise well suited to the purpose for which it is designed.

With the foregoing objects in view, and such other objects and advantages as will become apparent to those

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skilled in the art to which this invention relates as this specification proceeds, my invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, reference being had to the accompanying drawings in which:

FIGURE 1 is a side elevation of one end of my device showing the device in the clamping and aligning position.

FIGURE 2 is a view similar to FIGURE 1, but showing the device in the open or bolt hole aperture engaging position.

FIGURE 3 is an enlarged fragment isometric view of the hook element per se.

FIGURE 4 is an enlarged isometric view of the wedge and clamp element per se.

FIGURE 5 is a sectional view of a portion of a pair of overlapping plates showing the tool being engaged through adjacent bolt hole apertures therein.

FIGURE 6 is a view similar to FIGURE 5, but showing the tool in the plate clamping position.

In the drawings like characters of reference indicate corresponding parts in the different figures.

Proceeding therefore to describe the invention in detail, reference character 10 illustrates an elongated fixed handle portion having a hook element collectively designated 11 formed as an extension thereof. This hook element may either be formed integrally with the handle or may be screw-threadably engaged thereon.

The hook element comprises a cylindrical shaft 12 having a bolt hole engaging head 13 formed upon the distal end thereof. A hooking surface 14 extends upwardly at right angles from the shaft 12 and this surface extends part way around the periphery of the shaft.

A downturned surface 15 extends from the vertical surface 14 terminating in a nose 16 which is situated below the center line 17 of the shaft 12 and an undersurface 18 extends from the nose upwardly towards the lower surface 19 of the shaft and it will be noted that the diameter of the shaft within the locus 20 is reduced upon the underside as illustrated in FIGURES 2 and 3.

The hook element is engageable through bolt hole apertures 21 and 22 pre-formed within a first plate 23 and a second plate 24 which are situated in overlapping relationship and are adapted to be secured together.

The hooking surface 14 engages upon the outer surface 25 of the second plate 24 forming the boundary of the aperture 22 therein as illustrated in FIGURE 5.

A wedge and clamp element collectively designated 26 consists of a cylindrical sleeve 27 loosely engageable upon the shaft 12 of the hook element 11 and capable of endwise movement therealong within limits.

A movable handle portion 27' is pivotally secured to a lug 28 formed upon the underside forward corner 29 of the sleeve 27, by means of pivot pin 30.

Linkage means taking the form of a link 31 is pivotally secured by the end 32 thereof to a lug 33 depending from the end 34 of the fixed handle portion 10, and by the other end 35 thereof, to the movable handle portion 27', by means of pivot pin 36.

The pivot pin 36 is positioned adjacent the pivot pin 30 so that when the device is in the position shown in FIGURE 1, the linkage locks the movable handle portion 27 and hence the sleeve 27, in the forward or plate clamping position.

The wedge and clamp element 26 also includes a wedge 37 formed integrally and extending forwardly from the end 38 of the sleeve 27, said wedge having an inner surface 39 which arcuately curved and partially embraces or surrounds the aforementioned shaft 12.

The outer surface 40 of this wedge is also arcuately curved and is engageable within the bolt hole apertures 21 and 22 after the hook element and hooking surface 14 has been engaged as hereinbefore described.

However, it should be noted that the tool can only be engaged through the bolt holes or apertures 21 and 22 when the movable handle portion 27 is in the position shown in FIGURE 2 with the wedge and clamp element 26 at the rearmost position.

When the hook element is engaged as shown in FIGURE 5, the handle 27' is moved in an arc towards the fixed handle portion 10, in the direction of arrow 41 thus engaging the wedge 37 with the apertures 21 and 22.

The inner curved surface 39 of the wedge rides up the surface 18 of the head 13 thus expanding the wedge with reference to the hook element and aligning the apertures 21 and 22.

When the movement of the handle is completed, the aforementioned end surface 38 of the sleeve 27 engages the inner surface 42 of the first plate 23 and in co-operation with the hook surface 14 of the hook element 11, draws the plates together as shown in FIGURE 6, so that bolts can then be inserted through bolt hole apertures in the plates upon each side of the bolt hole apertures 21 and 22 which are being used at this time for the clamping tool.

When these adjacent bolts are secured, the clamping tool can be removed and moved to another position.

Since various modifications can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claim without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What I claim as my invention is:

In a tool for aligning and clamping together a pair of apertured plates, the combination of a cylindrical handle having a hook at one end thereof adapted to be passed through apertures of plates to be aligned, a tubular sleeve slidable on said handle toward and away from said hook,

a wedge of an arcuate cross-section provided on the end of said sleeve facing said hook, said wedge being complementary to the handle and movable with said sleeve from a retracted position on the handle to a projected position wherein the wedge is juxtaposed to said hook for effecting alignment of plate apertures, and actuating linkage for sliding said sleeve between its retracted and projected positions and for releasably locking the sleeve in the projected position whereby aligned plates may be positively clamped between said hook and said one end of the sleeve, said linkage comprising a laterally projecting lug secured to said handle, a laterally projecting lug secured to said sleeve in longitudinal alignment with the lug of the handle, a first pivot pin carried by the lug of said sleeve, an actuating lever having one end thereof mounted on said first pivot pin, a second pivot pin carried by the lug of said handle, a link having one end thereof mounted on the second pivot pin, and a third pivot pin connecting the other end of said link to said lever at a point adjacent to first pivot pins whereby actuation of said lever may slide said sleeve between its retracted and projected positions, said first and second and third pivot pins being in longitudinal alignment when said sleeve is in its projected position whereby to positively lock the sleeve against retraction.

References Cited

UNITED STATES PATENTS

2,136,875	11/1938	Blanc	85—5
2,175,318	10/1939	Rosenberry	85—5
2,321,518	6/1943	Rossmann	85—1
2,446,030	7/1948	Tunnard-Moore	85—5
2,464,543	3/1949	Modrey	85—5 X

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