June 18, 1946. D. W. GRAZIER 2,402,324

WORK SUPPORT

Filed Oct. 11, 1944 3 Sheets-Sheet 1

FIG. 1.

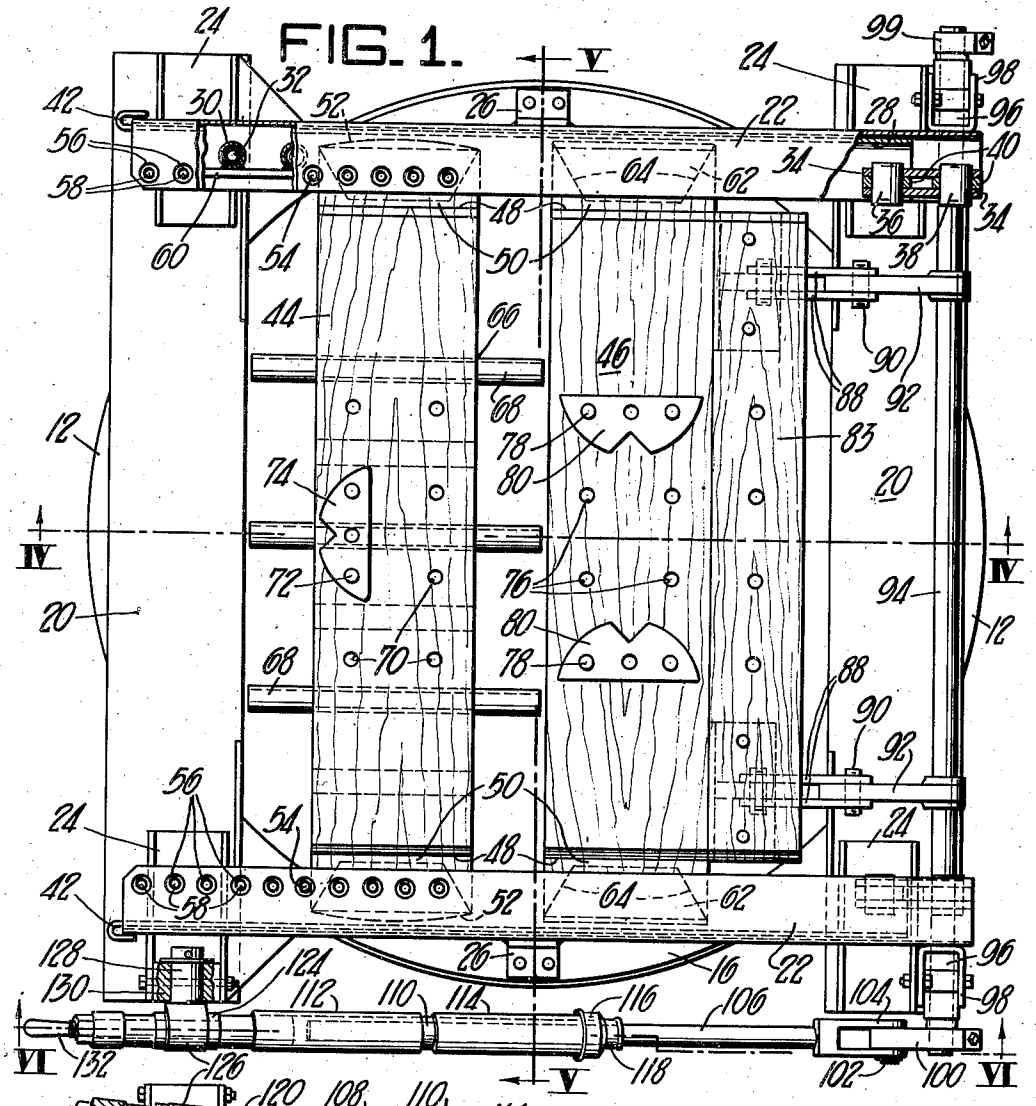
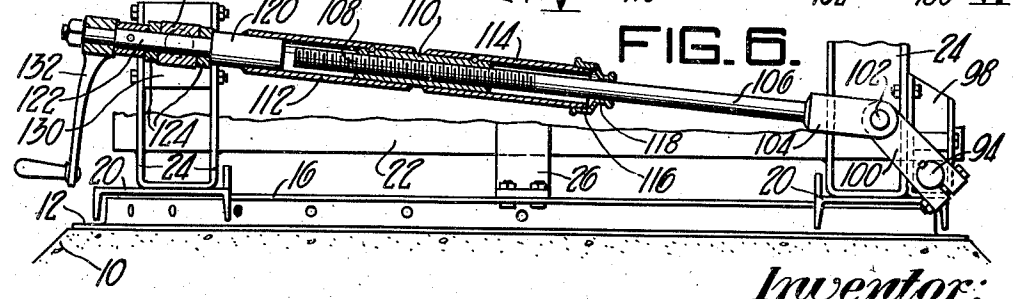


FIG. 6.



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WORK SUPPORT

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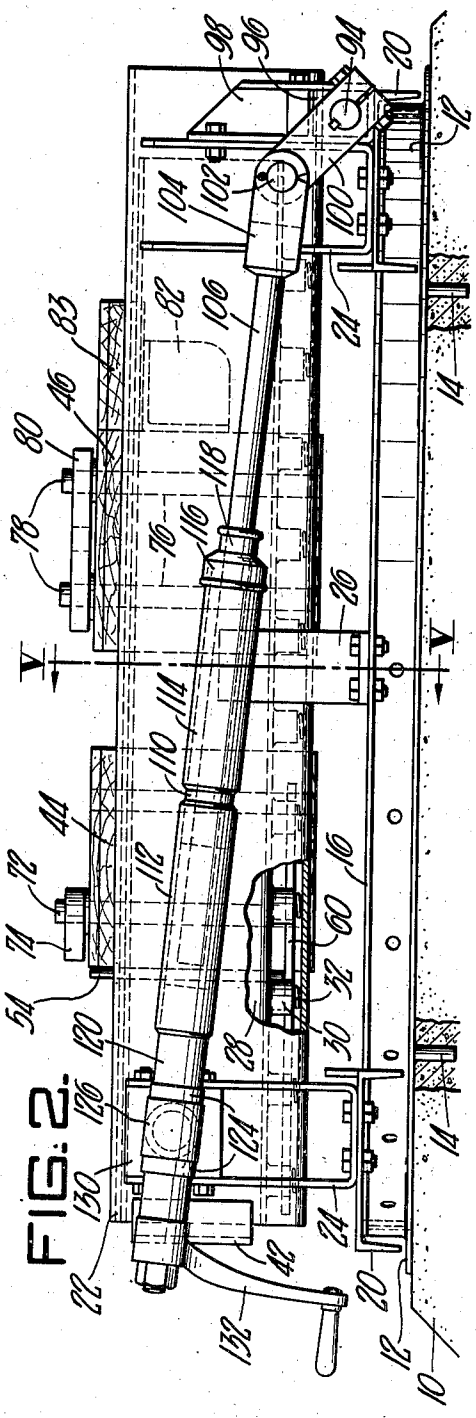


FIG. 2.

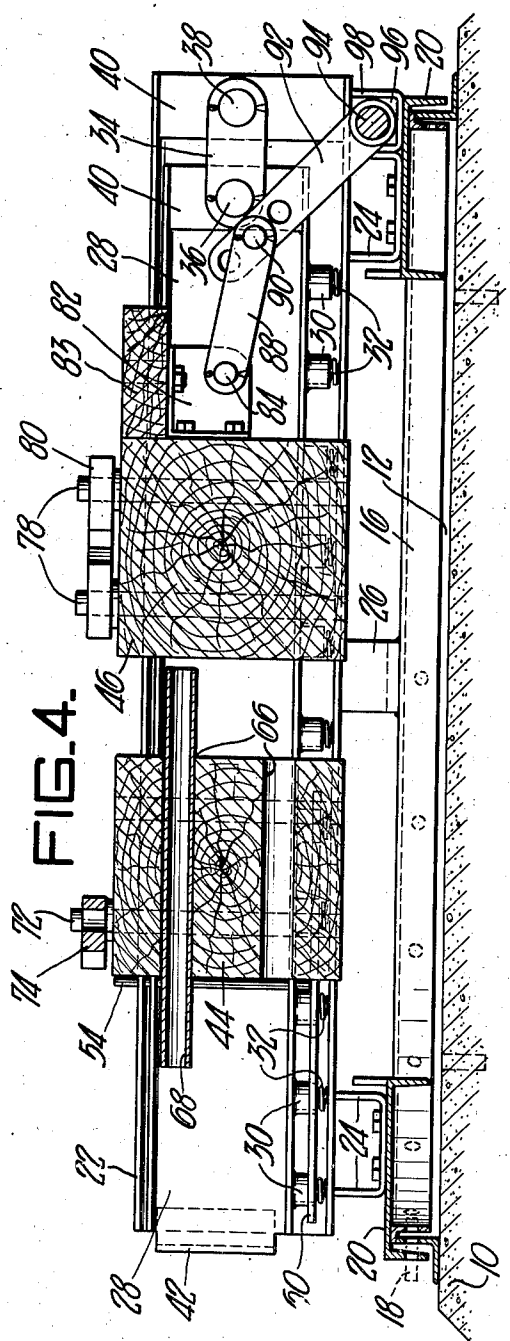


FIG. 4.

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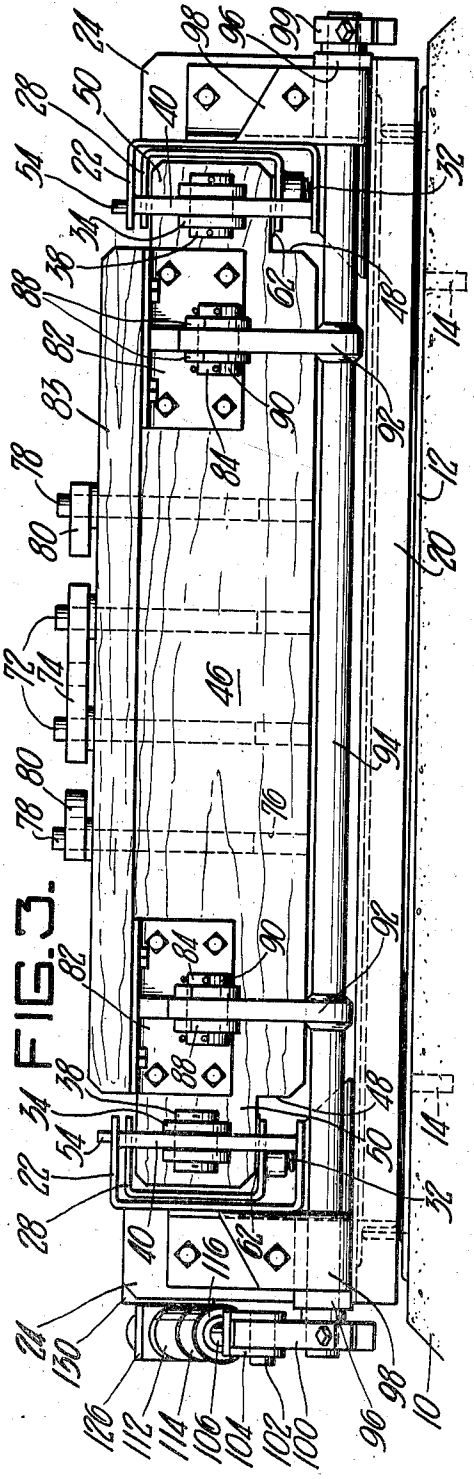


FIG. 3.

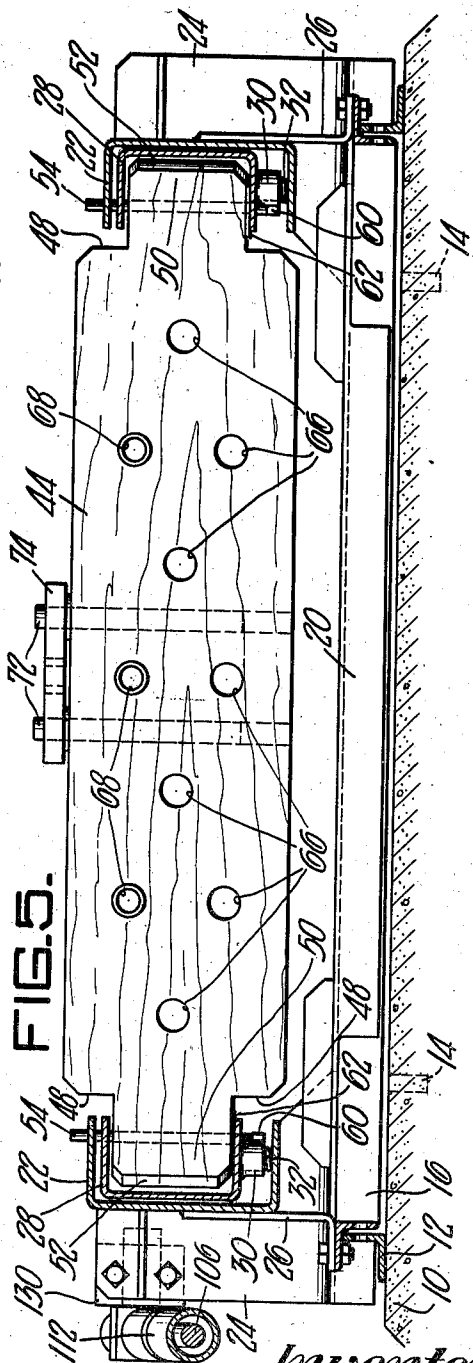


FIG. 5.

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Patented June 18, 1946

2,402,324

UNITED STATES PATENT OFFICE

2,402,324

WORK SUPPORT

Doré White Grazier, Johnstown, Pa., assignor to Carnegie-Illinois Steel Corporation, a corporation of New Jersey

Application October 11, 1944, Serial No. 558,183

5 Claims. (Cl. 51—216)

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This invention relates to structural features of design and arrangement of supports for holding large workpieces such as castings or forgings which require that chipping, rough grinding operations, or the like, be performed thereon.

Among the objects of the invention are to provide a single compact unit equipped with means for resiliently and adjustably supporting or holding parts of various size and shape requiring processing such as hand or machine cutting, finishing or grinding; to provide work holding means which can be quickly and easily shifted to various angular positions during a processing operation on the work; to provide a fixture of rugged design capable of easy manipulation by relatively unskilled labor; and to so construct and arrange the coacting instrumentalities shown and described that they efficiently perform the functions set forth.

For a more comprehensive understanding of all aspects of the invention, reference should be made to the following detailed disclosure, the accompanying drawings, and the appended claims.

In the drawings:

Figure 1 is a plan view of a practical embodiment of the invention with parts broken away to improve the illustration.

Figure 2 is a front elevation of Figure 1.

Figure 3 is an end elevation as viewed from the right of Figures 1 and 2.

Figure 4 is a vertical section on line IV—IV of Figure 1.

Figure 5 is a vertical section on line V—V of Figures 1 and 2.

Figure 6 is a detail section on line VI—VI of Figure 1.

Referring in detail to the embodiment of the invention illustrated, reference numeral 10 represents a floor or foundation on which there is mounted a base ring 12 of angle section carrying depending pins or projections 14 which enter suitable positioning holes in the foundation. The upright flange of the base ring forms a rotatable mounting for an annular ring 16 of angle section. The upright flanges of the nested angular rings 12 and 16 are each provided with a plurality of spaced holes which are adapted to receive positioning pins 18 which thus serve to hold the ring 16 and parts supported thereby in various desired positions of angular adjustment.

Parallel channel girders 20—20 are secured to the horizontal flange of the ring 16, the inner flanges of the girders being notched out to interfit and outer segmental portions of the top flange of ring 16 being cut off to make a snug fit between the downwardly disposed flanges of the said girders.

Supported jointly by the adjustable angle ring 16 and the girders 20 there is a pair of channel supports 22 which are securely connected by

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brackets 24 and 26 to the girders and the supporting ring.

Nested between the upper and lower flanges of the channel supports 22—22 is a pair of floating channels 28—28 having secured to the lower flanges thereof shell-like housings 30 for retaining springs 32 which rest upon the lower flanges of the channel supports 22. Thus the several springs 32 jointly constitute a resilient or yielding support for the floating channels 28. One end of each of the channels 28 is connected by links 34 and pins 36 and 38 with a respective bracket plate 40 spanning the space between the upper and lower flanges of each channel 22. At the ends of the channel 28, opposite the link-connected ends, the web portions thereof are extended and bent around to hook-like form as indicated at 42 in Figures 1 and 4, the extremities of the hook-like portions overlapping the outer faces of the webs of the channel supports 22. The link connection and overlapping hook portions 42 thus connect the floating channels 28 with the supports 22 in a manner to limit their endwise movement and yet permit relative vertical movement.

Spanning the space between the floating channels 28—28 is a pair of work-supporting or holding members 44 and 46 which in the embodiment of the invention illustrated take the form of heavy wood timbers whose ends are notched out as indicated at 48 to provide tongue-like extensions 50 to enter the space between the upper and lower flanges of said channels 28. The member 44 is normally adapted to be fixedly secured to the floating channels 28 but means are provided for adjusting it in various inclinations to suit the requirements of the work to be held. For this purpose each end of the timber 44 is arcuated as indicated at 52. For adjustably positioning the member 44 there are provided removable pins 54 which are adapted to pass through selected ones of a series of holes 56 and 58 formed respectively in the flanges of the channels 22 and 28. The pins serve as stops for the tongue extensions 50. The lower extremities of the pins 54 are adapted to rest loosely on a stop bar 60 which in the embodiment of the invention illustrated is welded or otherwise secured to the spring housings 30 carried by the lower flanges of the channels 28. As thus arranged, it is apparent that the member 44 may be held in a position at right angles to the channels 28 as shown or at various other angles by merely selecting appropriate holes in the flanges of channels 22 and 28 for engagement with the pins 54.

Wear plates 62 are secured to the underside of the tongues 50. The ends of these plates are cut off at an angle as indicated at 64 to facilitate the scraping off or ejection of dirt or foreign matter accumulating on the upper face of

the lower flange of the channel 28 upon adjusting movement of the member 44.

A plurality of holes 66 are drilled in the member 44 for the accommodation of rods or tubes 68 which are adapted to form supports for various workpieces at different elevations, it being understood that the holes 66 may be located at varius elevations to suit the shape of the particular piece to be held or supported.

A series of vertical holes 70 are also provided in the timber 44, these being adapted to accommodate rods 72 passing through gripping elements 74 which are thus adapted to be variably positioned on the member 44 to make firm engagement with parts of the work to be held. The member 46 is also provided with holes 76 for engagement with pins 78 adapted to pass through similar gripping elements 80.

Brackets 82 secured to the outer upright face of the member 46 support a self-like extension 83 of the member 46. Said brackets carry pins 84 connected by links 88 which in turn are connected by pins 90 with levers 92 secured to a rock shaft 94 which when turned by mechanism to be presently described is adapted to shift the clamp member 46 toward or from its mating member 44. The lever 92 as illustrated has a number of holes formed therein at different radial distances from the shaft 94 to provide flexibility of throw so as to adapt the apparatus for changes in proportion to suit requirements in the handling for a wide variety of sizes of workpieces.

The rock shaft 94 is journaled in suitable bearing blocks 96 carried by brackets 98 which are conveniently bolted to upstanding flanges of certain of the brackets 24 which support the channels 22. A suitable thrust bearing and a collar 99, secured to the shaft, prevents endwise movement thereof. Secured at one end of the rock shaft 94 there is an arm 100 which is connected by pin 102 with the clevis end 104 of a rod 106 having a screw-threaded portion 108 which engages a nut 110 having sleeve members 112 and 114 secured thereto. The sleeve member 114 has a cap 116 screwed on the lower end thereof, which cap has a hub portion 118 making a working fit with the rod 106. The cap is adapted to retain grease or other lubricant.

Keyed or otherwise secured to the upper extremity of the sleeve 112 is a stub shaft 120 having a reduced journal portion 122 carrying thrust bearings 124. The journal portion 122 is rotatable in a bearing block 126 having a stud portion 128 swiveled in a block 130 bolted or otherwise secured to the upstanding flanges of one of the brackets 24 which supports one of the channels 22. A hand crank 132 is keyed and bolted to the upper extremity of the stub shaft. As thus arranged, it is clear that by turning the crank in an appropriate direction the rock shaft 94 can be operated so as to cause the work holding member 46 to be forcibly moved into engagement with work supported on or engaged by the member 44.

While not limited thereto, the above described combination and arrangement of parts are particularly well suited for holding large castings, forgings, and the like of intricate or irregular shape which require chipping, rough grinding, or similar finishing operations thereon to suit them for ultimate use. It has been established in practice that the provision of a resiliently mounted work support of the character herein described and claimed not only permits faster cutting and more uniform work but also greatly relieves the muscular shock and resulting fatigue imparted to the operator by the action of the chipping hammer, grinding wheel or similar processing tool.

While I have described in considerable detail a preferred embodiment of the invention which an actual reduction to practice has proven to be highly desirable, it is to be understood that various modifications may be made by those skilled in the art without departure from the invention as defined in the appended claims.

I claim:

1. An adjustable work-supporting means of the character described, comprising a base member adapted to be mounted on a fixed foundation, an adjustable member rotatably supported for movement about a substantially vertical axis on the base member, means for selectively locking the said base and said adjustable member in various positions of angular relationship, workpiece-engaging members, and means for resiliently mounting the latter on said adjustable member with freedom for limited vertical movement.

2. An adjustable work-supporting means of the character described, comprising a base member adapted to be mounted on a fixed foundation, an adjustable member rotatably supported on the base member, means for selectively locking the said base and said adjustable member in various positions of angular relationship, a workpiece-engaging member, means for securing it in various angular positions to said adjustable member, another workpiece-engaging member coacting with the one first mentioned, means yieldingly supporting said workpiece-engaging members on said adjustable member, a shaft movable with said adjustable member and operatively connected with said second-named workpiece-engaging member, and means for actuating said shaft so as to exert a holding force on the workpiece engaged by said workpiece-engaging members.

3. The apparatus of claim 1 further characterized in that at least one of said workpiece-engaging members is equipped with adjustably positionable auxiliary workpiece supports.

4. The apparatus of claim 1 further characterized in that at least one of said workpiece-engaging members is equipped with adjustably positionable auxiliary workpiece supports and with variably positionable elements for gripping the workpiece supported by said workpiece-engaging members in various desired locations.

5. An adjustable work-supporting means of the character described, comprising a base ring adapted to be pinned to a fixed foundation floor, an angle ring having a substantially vertical annular leg rotatably associated with said base ring and having a substantially horizontal annular leg to which is secured a pair of spaced cross girders, a pair of spaced longitudinal channel supports whose flanges face one another and which are fixedly secured to said girders, respective floating channel members nested between the flanges of said channel supports, resilient supporting elements interposed between said channel supports and said floating members, a workpiece-engaging member and means for locating it on said floating channel members in various angular positions, another workpiece-engaging member coacting with the latter, and means for forcing the last-named member toward the first-named one so as to cause them to jointly grip a workpiece and thus yieldingly support it on said floating channel members.

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