May 10, 1927. 1,628,581

F. J. L. DINKEL

MULTIPLE BENDING APPARATUS

Filed June 1, 1926 2 Sheets-Sheet 1

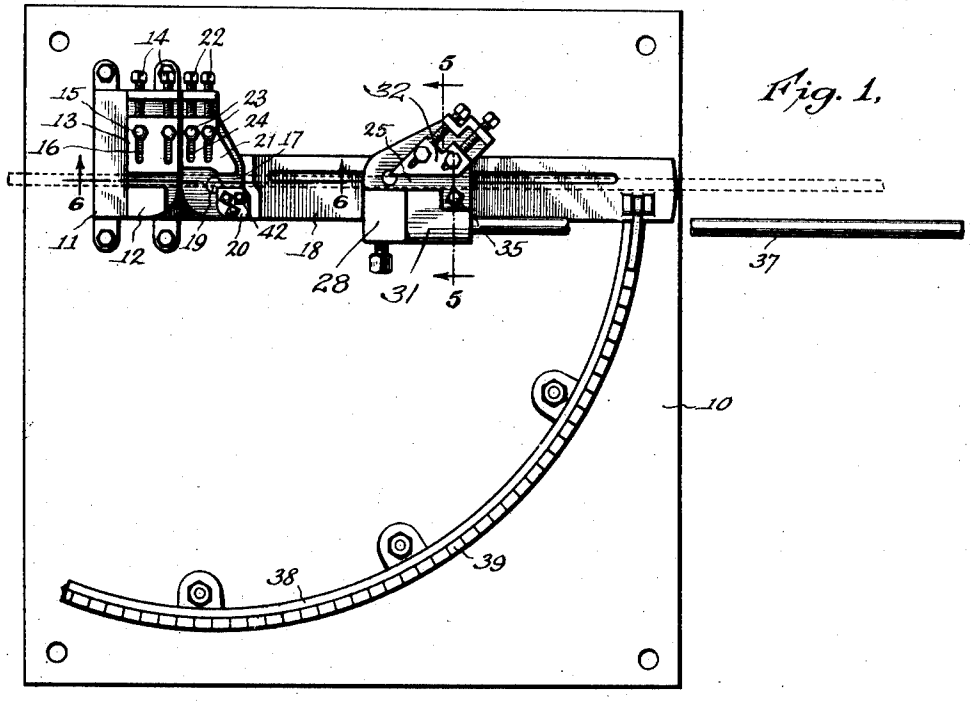


Fig. 1.

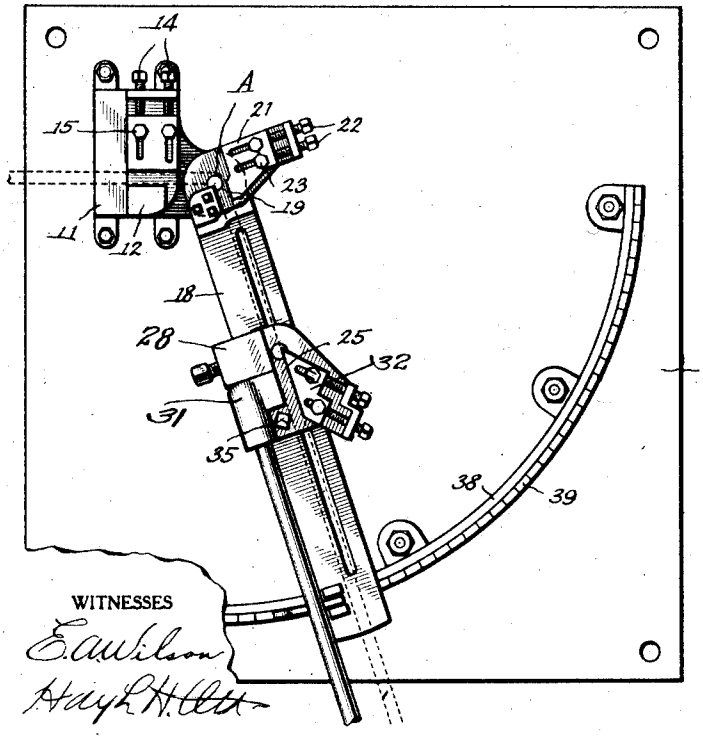


Fig. 2.

WITNESSES

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Fig. 3.

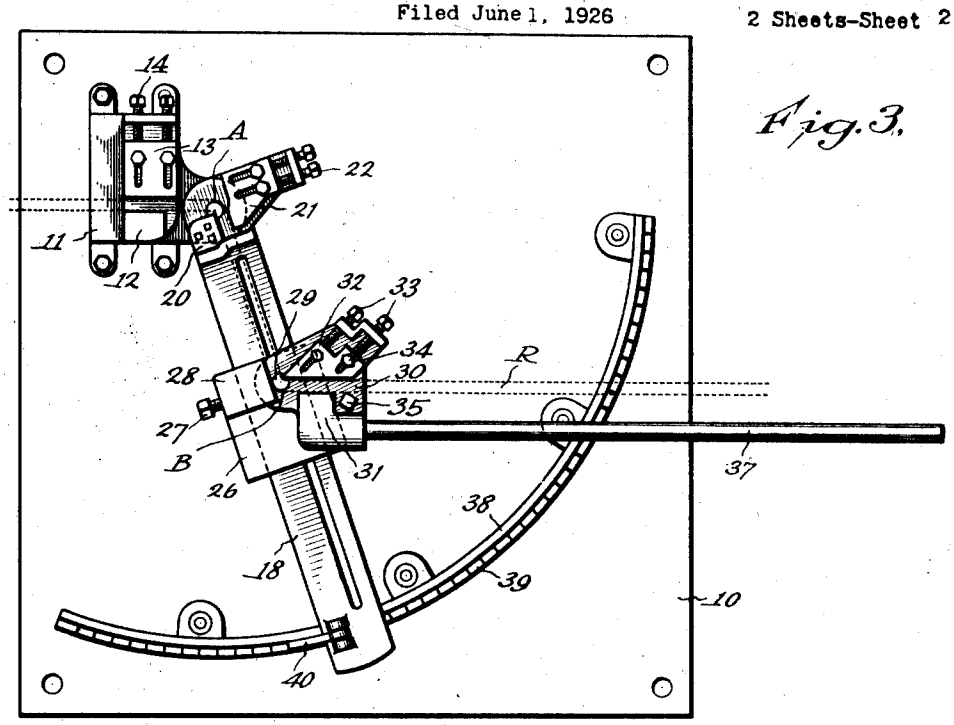


Fig. 4.

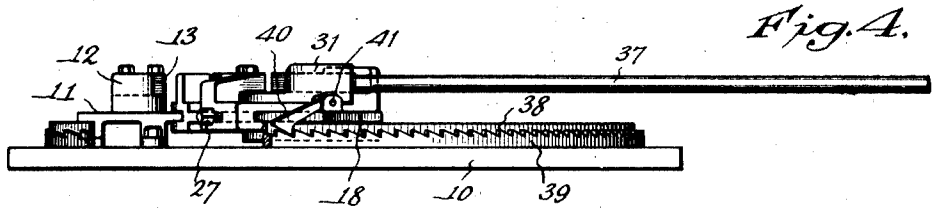


Fig. 5.

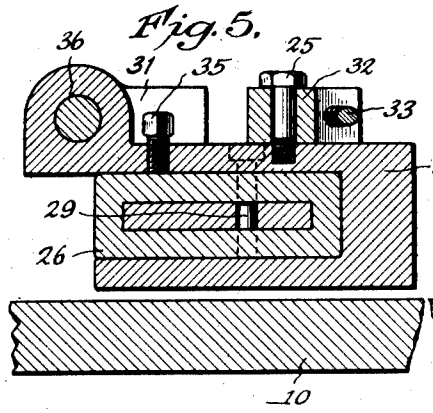
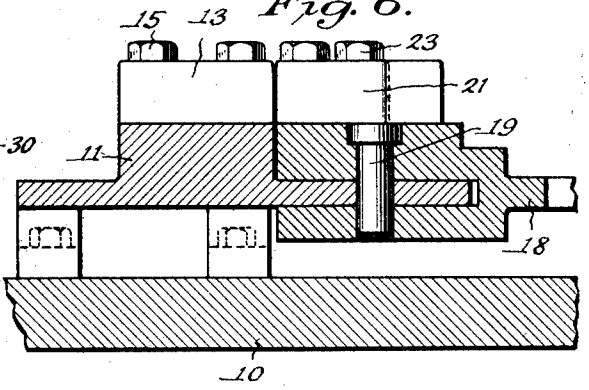


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MULTIPLE BENDING APPARATUS.

Application filed June 1, 1926. Serial No. 113,057.

This invention relates to an apparatus for bending lengths of material, the same being especially designed for the bending of reinforcing rods used in cement structures.

One of the principal objects of the present invention is to provide an apparatus for facilitating the double bending of lengths of material and particularly to provide readily adjustable means for accomplishing said double bending operation so that variations in the configuration of the bends to be made may be more readily accomplished.

The invention furthermore aims to provide an apparatus of the character set forth which is comparatively simple in its construction and mode of operation, which is highly efficient in its purpose, and economical to produce.

With the above recited and other objects in view, reference is had to the following specification and accompanying drawings in which there is exhibited one example or embodiment of the invention which is in no way intended as a limitation upon the scope of the appended claims as it is to be clearly understood that variations and modifications which properly fall within the scope of said claims may be resorted to when found expedient.

In the drawings—

Figure 1 is a plan view of the device illustrating the parts in normal position and prior to the bending of the article to be bent;

Fig. 2 is a similar view illustrating the position of the parts upon the initial bending operation;

Fig. 3 is a similar view illustrating the position of the parts upon the second bending operation;

Fig. 4 is an edge view of the device as illustrated in Fig. 3, parts being broken away to disclose the underlying structure;

Fig. 5 is an enlarged fragmentary transverse sectional view taken approximately on the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary enlarged longitudinal sectional view taken approximately on the line 6—6 of Fig. 1.

Referring to the drawings by characters of reference, the bending apparatus includes a base 10 having secured thereto a fixed clamping device 11, which includes a stationary clamping jaw 12 and an adjustable clamping jaw 13, the latter being advanced toward the stationary jaw by any suitable means, such as the screws 14. The movable jaw 13 is guided by stud bolts 15 passing through slots 16 in said jaw, which stud bolts also serve as an auxiliary retaining means in addition to the screws 14. The non-adjustable movable clamping device designated generally by the reference character 17, is carried by an arm 18 which is pivoted at 19 to the fixed clamping device. The movable clamping device includes a fixed jaw 20 and an adjustable jaw 21, the latter being advanced toward the former by any suitable means such as screws 22 and guided and retained by stud bolts 23 passing through slots 24. The apparatus further includes an adjustable movable clamping device designated generally by the reference character 25, which device comprises a slide 26 longitudinally adjustable on the arm 18, with means for holding the slide in its longitudinally adjusted positions, consisting of a binding screw 27, or other equivalent device. The slide is formed with a stationary jaw 28 and the slide has pivoted thereto, at 29, a swingable plate 30 which plate is formed with a fixed jaw 31 and an adjustable jaw 32, the adjustable jaw being advanced toward the fixed jaw by any suitable means, such as screws 33, and guided and maintained in its adjusted positions by stud bolts 34 passing through slots formed therein. The plate is provided with a retaining screw 35, which may serve to lock the plate against swinging movement relative to the slide for a purpose to be hereinafter set forth. The fixed jaw 31 of the plate is provided with a socket 36 for detachably receiving an operating lever 37. The arm 18 at its free end, is supported in its movement by an arcuate supporting rail 38 formed with an arcuate ratchet segment 39 secured to the base 10 and disposed concentric to the pivot 19 of the arm. A pawl or dog 40 is pivoted on the free end of the arm at 41 for swinging movements into and out of engagement with the ratchet segment.

In use, the arm 18 is normally swung to its initial position illustrated in Fig. 1, where portions of the clamping devices 11 and 17 engage to limit its swinging movement beyond such point, thereby disposing the inner faces of the fixed jaws 12 and 20 in alinement. At the same time, the plate 30 which constitutes a part of the adjustable

movable clamping device 25, is swung so that the fixed jaw 31 is in engagement with the stationary jaw 28 of the slide 26, thereby disposing the inner face of the fixed jaw 31 in alinement with the inner faces of the fixed jaws 12 and 20.

Where a similar double bending of a number of rods is to be accomplished, the retaining screw 35 is loosened to allow for the swinging movement of the plate 30 relative to the slide. The slide is initially adjusted on the arm 18 toward or away from the non-adjustable movable clamping device 17, by loosening the screw 27 and tightening the same after the adjustment is made. The operator then places the rod indicated by the dotted line at R, between the fixed and movable jaws and adjusts the same until a snug clamping fit is provided. In effecting the bending operation, the rods are placed between the fixed and adjustable movable clamping jaws 12 and 13, 20 and 21, and 31 and 32, respectively, with the pawl or dog engaging the ratchet segment. The operator, by means of the lever 37, swings the arm to the desired position for making the initial bend indicated at A in Figs. 2 and 3. By swinging the lever 37 in the opposite direction, the plate 30 will be swung independently of the arm and slide to make the second bend at the point B illustrated in Fig. 3. This is accomplished due to the fact that the dog or pawl 49 prevents a reverse swinging movement of the arm 18 and the slide which is attached thereto. After the bending operation, the bent rod is removed and the parts swung to the normal position illustrated in Fig. 1, by disengaging the pawl or dog.

In event it is desired to use the device for a single bending, the plate 30 is secured against swinging movement by disposing the same in the normal position illustrated in Fig. 1 and tightening the retaining screw 35 so that independent swinging movement of the plate with respect to the slide and arm 18 is prevented. At the same time, the pawl or dog 40 is swung upwardly to a position out of engagement with the ratchet teeth where it is prevented from gravitationally falling into engagement by the lever 37. Under this arrangement, the rod or work R is placed between the respective jaws of the clamping device as illustrated in Fig. 1 and the desired bend at the point A is made. When the bent rod or work is removed, it is only necessary to swing the lever in a reverse direction, which due to the clamped relation of the plate with the slide, effects the return movement of the arm 18.

If desired, a suitable abutment may be adjustably associated with the rail 38 or the base to gage the swinging movement of the arm 18 where a number of similarly bent rods are to be produced.

It will be noted that as a feature in the assembling of the device, the pivot 19 is retained in place by the superposition of a portion of the fixed jaw 20 of the clamping device 17 over the head of the pivot, and for this purpose the fixed jaw 20 is removably associated with the arm by screws or any other suitable fastening devices 42. Also the pivot 29 is retained in place by the superposition of a portion of the movable jaw 32 of the clamping device 30 over the head of the pivot when the complete apparatus is to be transported. Ordinarily the pivots are gravitationally maintained in place as the base 10 is arranged in a horizontal position when in use.

What is claimed is:

1. A bending apparatus, including a fixed work-clamping device, a swingable non-adjustable work-clamping device pivoted adjacent the fixed work-clamping device, and an adjustable work-clamping device carried by and swingable with respect to the swingable non-adjustable clamping device.

2. A bending apparatus, including a fixed work-clamping device, a swingable non-adjustable work-clamping device pivoted adjacent the fixed work-clamping device, an adjustable work-clamping device swingable with respect to the swingable non-adjustable clamping device, and means for preventing retrograde swinging movement of the swingable non-adjustable clamping device when swinging the adjustable swingable clamping device in a reverse direction.

3. A multiple bending apparatus including a base having a fixed work-clamping device thereon, a movable non-adjustable work-clamping device mounted adjacent to the fixed work-clamping device, an adjustable work-clamping device mounted on the non-adjustable work-clamping device for relative movement with respect thereto and inter-engageable means on the movable non-adjustable work-clamping device and the base for preventing retrograde movement of the movable non-adjustable device upon movement of the adjustable device in a reverse direction.

4. A multiple bending apparatus including a base having a fixed work-clamping device comprising a pair of relatively adjustable jaws, a swingable non-adjustable work-clamping device pivoted adjacent the fixed work-clamping device comprising a pair of relatively adjustable work-clamping jaws, an adjustable work-clamping device swingable with respect to the swingable non-adjustable work-clamping device comprising a pair of relatively adjustable jaws, and inter-engageable means on the base and on the swingable non-adjustable work-clamping device for preventing retrograde swinging movement of the swingable non-adjustable work-clamping device when swinging the

adjustable work-clamping device in a reverse direction.

5. A multiple bending apparatus including a base having a fixed work-clamping device comprising a pair of relatively adjustable jaws, a swingable non-adjustable work-clamping device pivoted adjacent the fixed work-clamping device comprising a pair of relatively adjustable work-clamping jaws, an adjustable work-clamping device swingable with respect to the swingable non-adjustable work-clamping device comprising a pair of relatively adjustable jaws, and inter-engageable means on the base and on the swingable non-adjustable work-clamping device for preventing retrograde swinging movement of the swingable non-adjustable work-clamping device when swinging the adjustable work-clamping device in a reverse direction, said latter means consisting of a fixed arcuate ratchet segment carried by the base and a pawl engageable therewith carried by the movable non-adjustable work-clamping device.

6. A multiple bending apparatus, comprising a base, a stationary clamping unit on the base, including fixed and adjustable jaws for engaging and holding one end of the work, a swingable arm pivoted adjacent the stationary unit, a clamping device secured to the pivoted end of the arm, a slide longitudinally adjustable on the arm having a stationary jaw, means for retaining the slide in adjusted relation, a plate pivoted on the arm for swinging movement, a clamping device on the plate including fixed and adjustable jaws, the fixed jaw engaging the stationary jaw of the slide for limiting the swinging movement of said clamping device, means for locking the plate against swinging movement and releasing the same for swinging movement, an arcuate ratchet concentric with the arm pivot, a pawl adjacent the free end of the arm engageable with the ratchet, and a lever detachably associated with the plate for operating the device, as and in the manner specified.

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