

Oct. 14, 1941.

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2,259,168

HANDLING APPARATUS FOR FORGING BLANKS

Filed Oct. 24, 1940

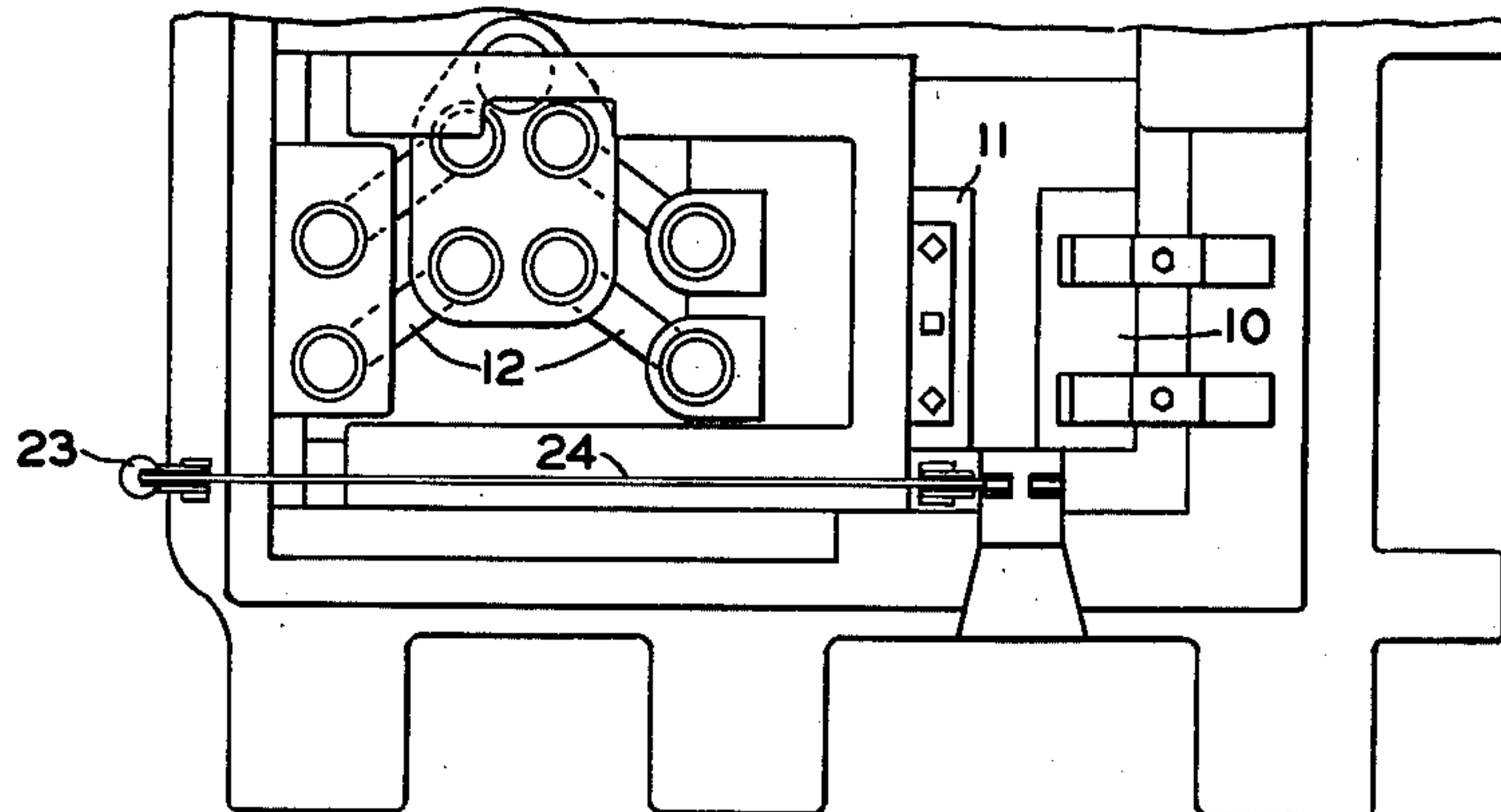


FIG. -1

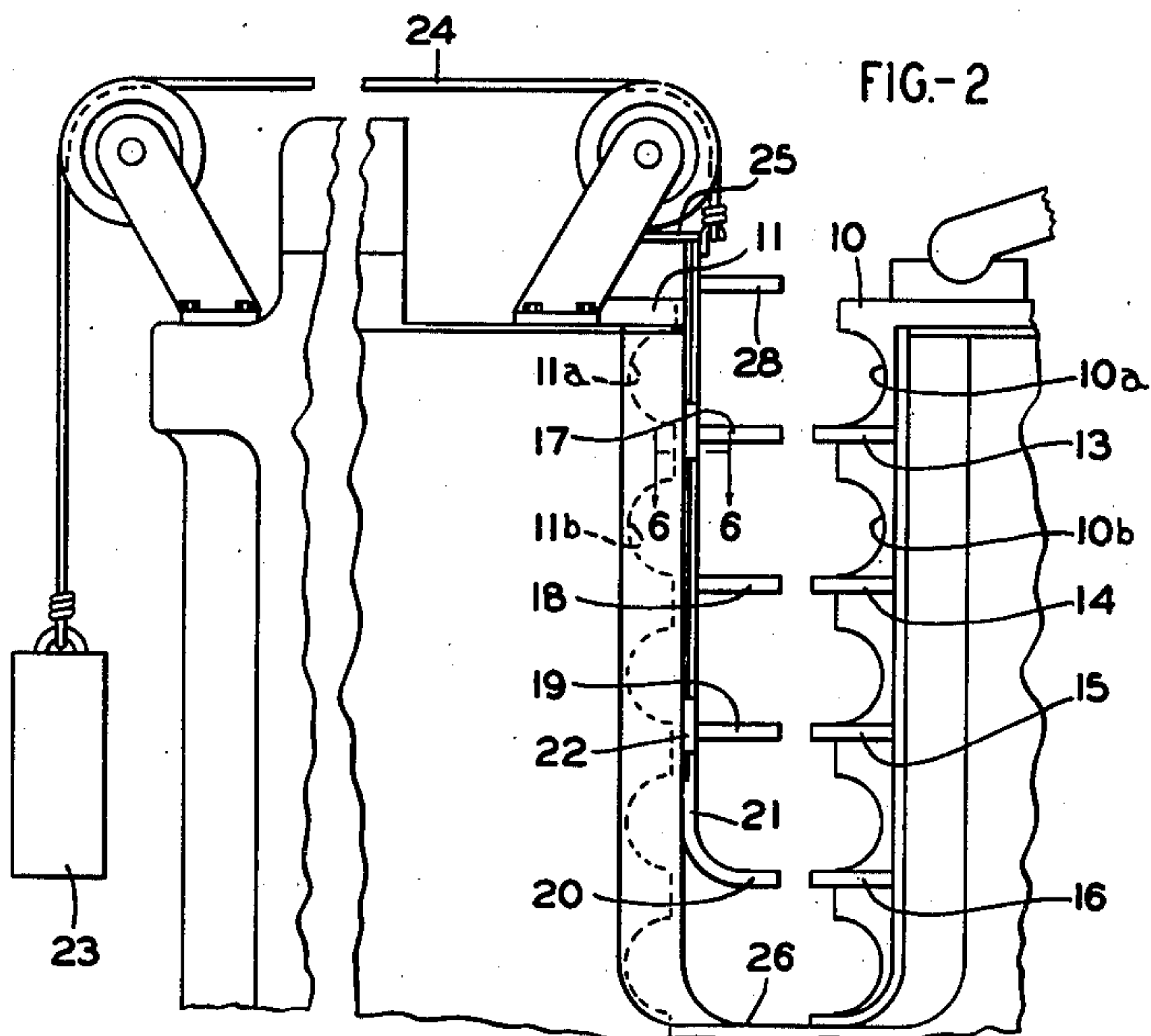


FIG. -2

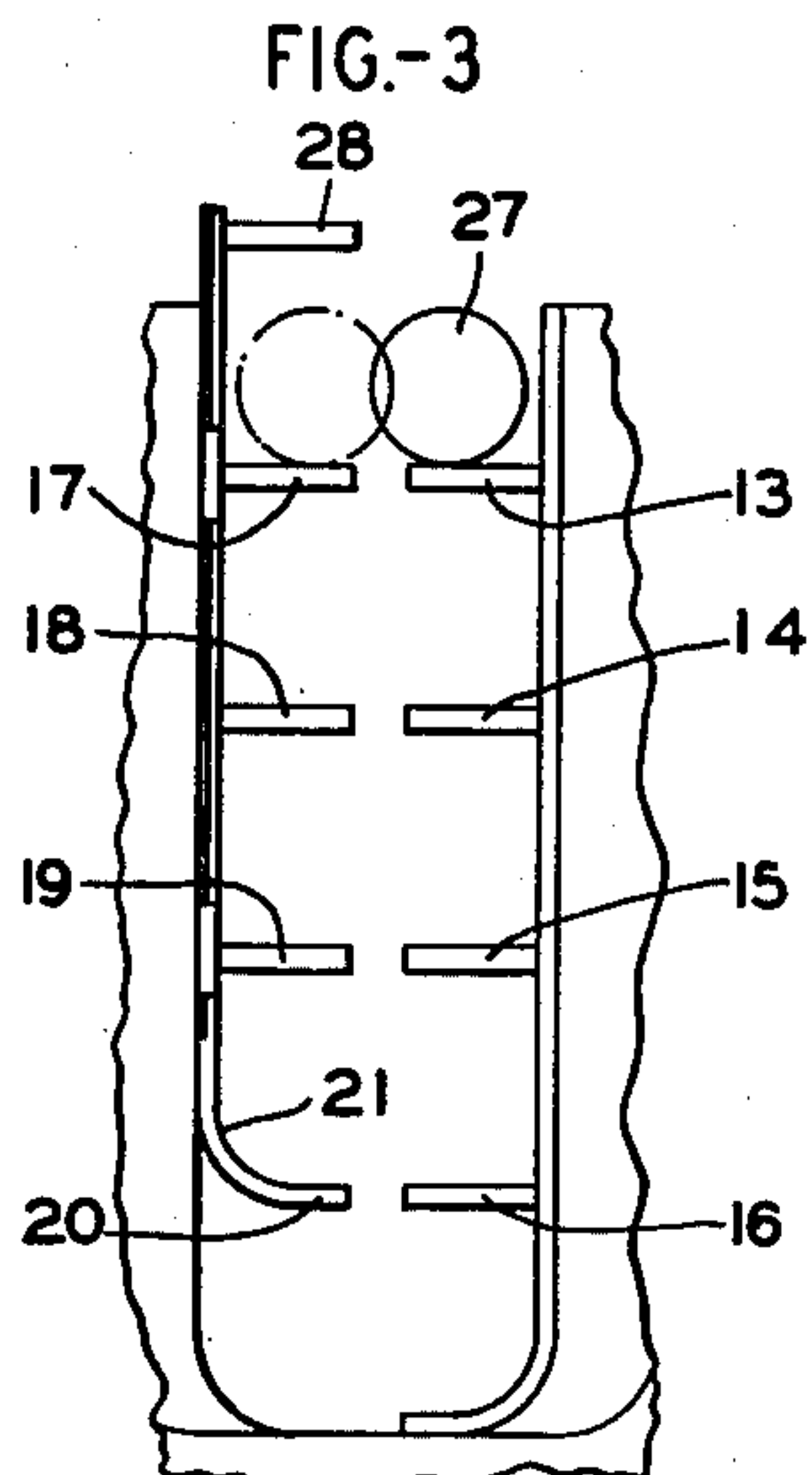


FIG. -3

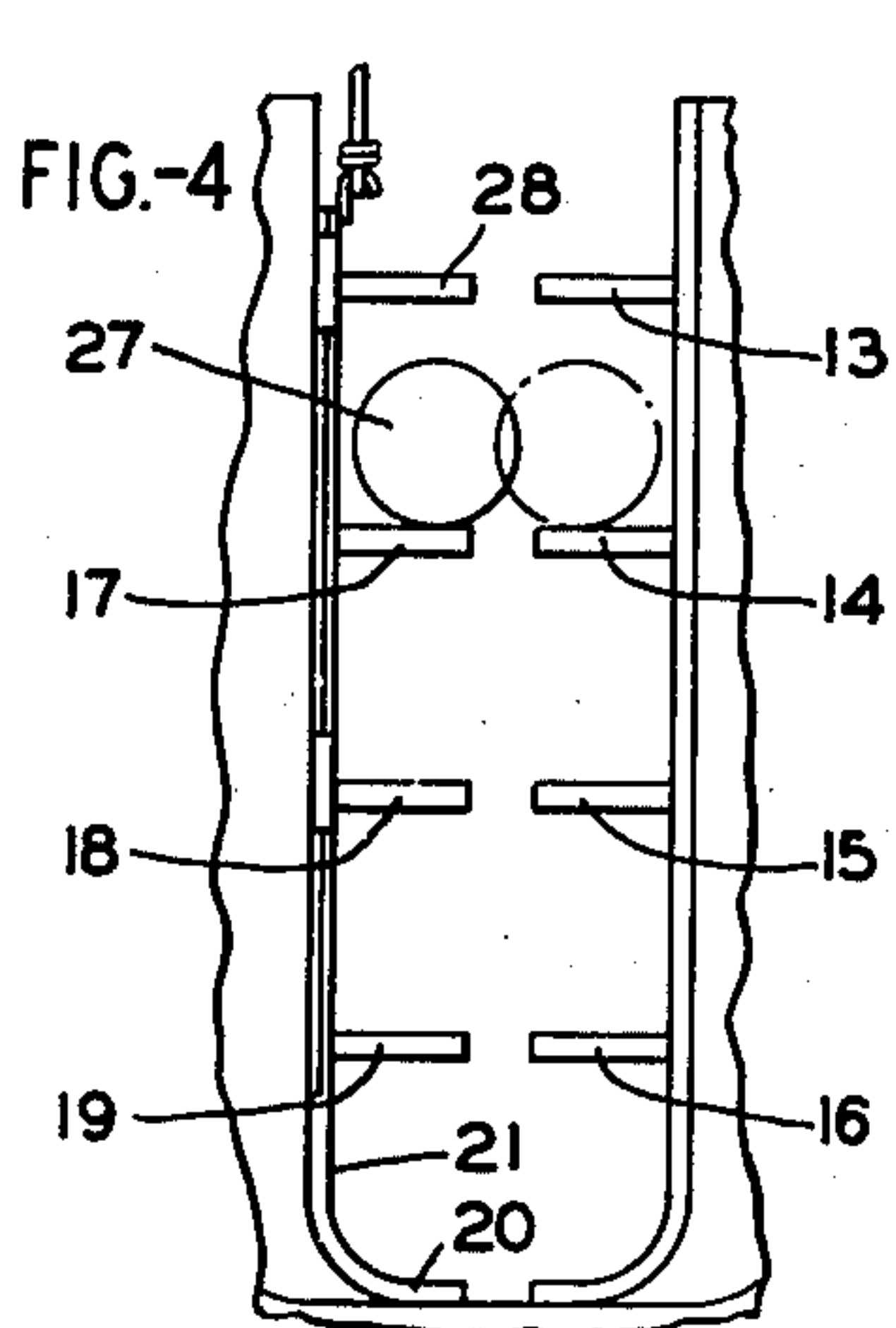


FIG. -4

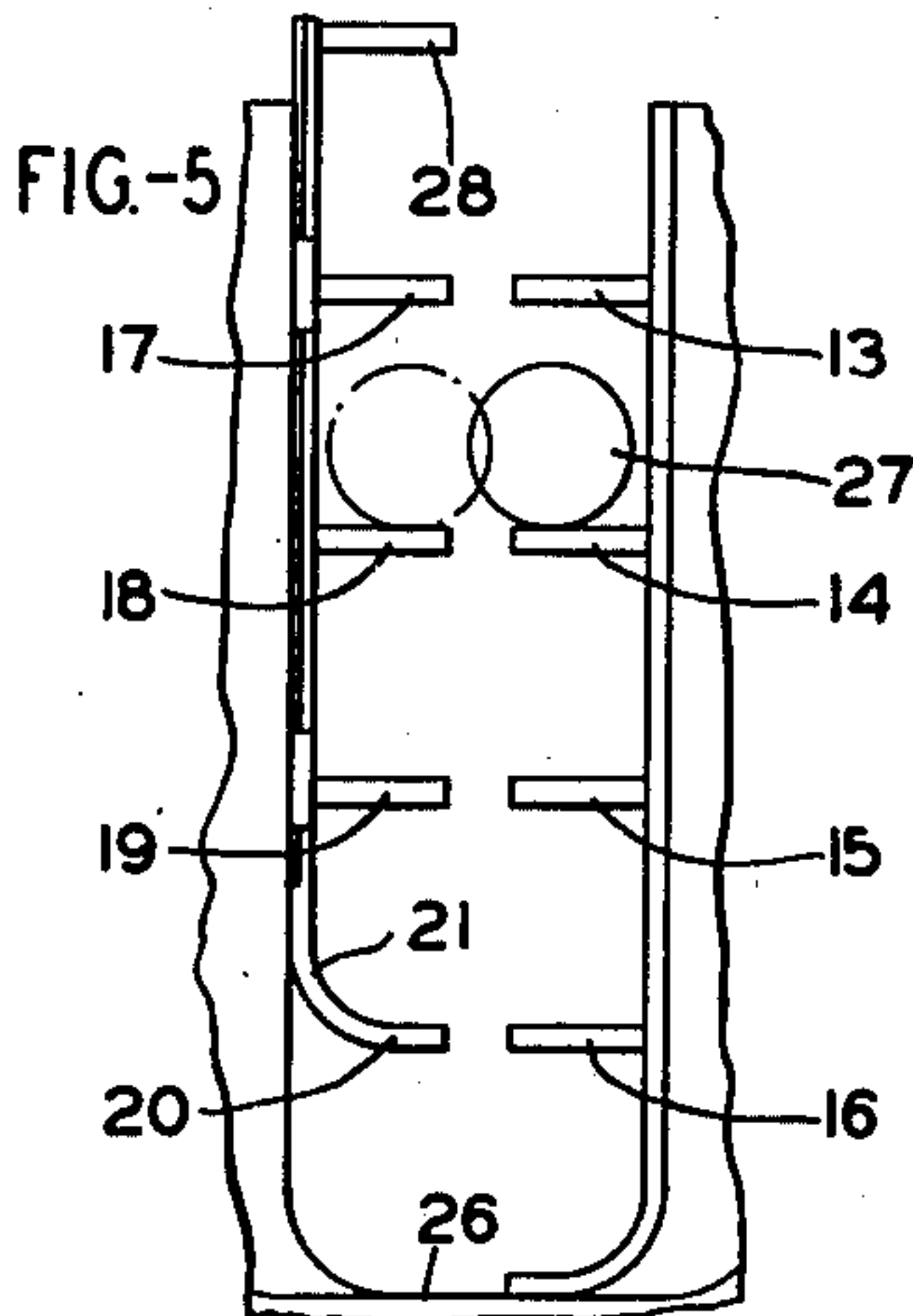


FIG. -5

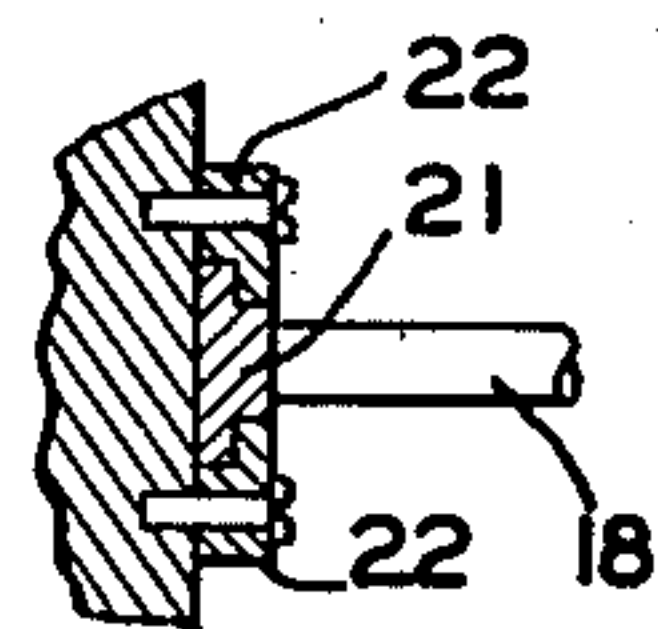


FIG. -6

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## UNITED STATES PATENT OFFICE

2,259,168

HANDLING APPARATUS FOR FORGING  
BLANKS

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Application October 24, 1940, Serial No. 362,615

6 Claims. (Cl. 78—99)

This invention relates to improvements in apparatus for handling blanks movable through a plurality of spaced vertical positions while work is being done on the blank. It is particularly adapted for forging machines which operate in this manner.

One of the objects of the present invention is to provide handling apparatus of the character described which is very cheap in construction, efficient in its operation and yet requires no power means while relieving the operator of a great deal of work and fatigue.

The advantages and novel features of my improved apparatus will be apparent from the accompanying drawing and description and the essential features thereof will be summarized in the claims.

In the drawing, Fig. 1 is a top plan view of an end portion of a forging machine illustrating one use of my improved apparatus; Fig. 2 is an enlarged fragmental end view of the machine of Fig. 1; Figs. 3, 4 and 5 are diagrammatic views of the apparatus of Fig. 2, illustrating consecutive movements thereof; while Fig. 6 is an enlarged sectional view along the line 6—6 of Fig. 2.

My invention is particularly applicable to forging machines and therefore I have illustrated in Fig. 1 the die end of a forging machine of the type shown in my Patent No. 2,011,106 granted August 13, 1935, although it will be understood that my improved apparatus is applicable to other types of machines.

In the machine illustrated a fixed die is provided at 10 and a movable die at 11 which in turn is operated by the toggles 12 which are connected to the operating mechanism shown in my prior patent. Certain forging operations require a series of dies as best seen in Fig. 2 where the fixed die 10 has recesses 10a, 10b, etc., coacting with other recesses 11a, 11b, etc., in the movable die for a series of forging operations. It is customary to start the blank or workpiece in the uppermost die recesses and work consecutively to the bottom recess. My improved blank handling apparatus is for the purpose of relieving the operator of heavy lifting and turning operations generally required in moving the blank to its consecutive vertical positions.

My invention includes a series of fixed rests 13, 14, 15, 16 spaced in proper position to hold a work blank successively in the die recesses 10a, 10b, etc. Preferably, to obtain the greatest advantage from my invention, these fixed rests are in vertical alinement and spaced equal distances apart. Coacting movable rests are provided as

indicated at 17, 18, 19 and 20. These rests are mounted as a unit on a slide member 21 which as best seen in Fig. 6 is mounted in a slide-way 22 for vertical sliding movement. It will be noted that the rests 17 to 20 are spaced apart at the same distances as the fixed rests 13 to 16.

Preferably means is provided for biasing the movable rests and the slide 21 upwardly. While this might be accomplished by a spring or other means, I prefer a counterweight 23 connected by a cable 24 over suitable guide pulleys to the top of the slide 21. Preferably also this counterweight will be slightly less than sufficient to counterbalance the slide 21 and its associated rests plus the blank being worked upon.

Stop means is provided at 25 limiting the upward movement of slide 21 so that a movable rest 17 is substantially horizontally alined with a fixed rest 13. Bottom stop means is provided at 26 limiting the movement of slide 21 to the distance between consecutive vertical rests so that when the slide is in its lower position as indicated in Fig. 4, the rest 17 is alined with the rest 14 which is the first fixed rest below 13.

The operation of my improved apparatus will now be apparent from a consideration of Figs. 3, 4 and 5. The workman grasps the blank 27 (which is generally round but not necessarily so) and supports the same upon the rest 13 for a forming operation between the dies 10 and 11 and more particularly the recesses 10a and 11a thereof. Upon the completion of this operation and the opening of the dies 10 and 11, the operator moves the blank from the full line position of Fig. 3 to the dot-dash position there indicated supported upon the rest or pin 17. The weight of the blank with or without a downward push by the operator is sufficient to move the slide 21 and its associated rests to the position of Fig. 4. The blank 27 is then moved by the operator from the full line position of Fig. 4 to the dot-dash position indicated. The forging machine then closes the dies 10 and 11 to cause a forming operation between the recesses 10b and 11b on the blank then in the dot-dash position of Fig. 4. Meanwhile with the blank resting on pin 14, the counterweight 23 has moved the slide 21 upwardly to the position of Fig. 5. The rest 18 is now opposite the rest 14 and upon completion of the second forging operation the operator moves the blank from the full line position of Fig. 5 to the dot-dash line position thereof, whereupon the slide 21 is moved downwardly until it engages the stop 26 which alines pin 18 with pin 15 after which the blank may be returned to the fixed



rest 15 for the third forging operation. By this manipulation the blank may be moved consecutively through a number of vertical positions with a minimum amount of effort on the part of the operator.

If desired, an extra pin 28 may be provided on slide 21 spaced above pin 17 by the same uniform spacing as the rest of the pins. This pin 28 will receive bars from the furnace as they are rolled down a suitable conveyor and the first downward motion of slide 21 will then place pin 28 opposite pin 13 so that the bar may be rolled onto pin 13 for the first forging operation.

What I claim is:

1. A blank transfer structure comprising vertically spaced fixed rests, a movable rest mounted for vertical movement, means biasing said movable rest upwardly, stop means providing an upper limit of movement of said movable rest to substantially the same horizontal plane as an upper one of said fixed rests, stop means providing a lower limit of movement of said movable rest to substantially the same horizontal plane as a lower one of said fixed rests, and said movable rest when in the same horizontal plane with one of said fixed rests forming a practically continuous horizontal support for movement of said blank.

2. A blank transfer structure comprising a plurality of fixed rests vertically spaced at equal distances, a movable unit carrying a plurality of rests vertically spaced at distances equal to the spacing of said fixed rests, said unit being mounted for vertical movement, stop means providing an upper limit of movement of said unit with one of its associated rests in substantially the same horizontal plane as one of said fixed rests, stop means providing a lower limit of movement of said unit with the same one of its associated rests in substantially the same horizontal plane as the fixed rest next below said one rest, and an associated rest on said movable unit when in the same horizontal plane with one of said fixed rests forming

a practically continuous horizontal support for movement of said blank.

3. A blank transfer structure comprising aligned vertically spaced fixed rests, a movable rest mounted for vertical movement in substantially the same vertical plane as said fixed rests, stop means providing an upper limit of movement of said movable rest substantially in horizontal alignment with an upper one of said fixed rests, stop means providing a lower limit of movement of said movable rest substantially in horizontal alignment with a lower one of said fixed rests, and said movable rest when in horizontal alignment with one of said fixed rests forming a practically continuous horizontal support for movement of said blank.

4. The combination of claim 3 including counterweight means biasing said movable rest upwardly, said counterweight being slightly less than sufficient to counterbalance said movable rest and said blank.

5. A blank transfer structure comprising aligned fixed rests vertically spaced predetermined equal distances apart vertically aligned coacting rests spaced apart at the same equal distances, means mounting said coacting rests for movement as a unit vertically in the same vertical plane as said fixed rests, stop means providing an upper limit of movement of said unit with one of said coacting rests substantially horizontally aligned with one of said fixed rests, means limiting downward movement of said unit to said predetermined distance, and a fixed rest and a coacting rest when in horizontal alignment forming a practically continuous horizontal support for movement of said blank.

6. The combination of claim 5 including counterweight means biasing said unit upwardly, said counterweight being slightly less than sufficient to counterbalance said unit plus a blank.

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