Nov. 18, 1924. 1,516,338

A. C. DAMAN

JIG

Filed July 22, 1922 3 Sheets-Sheet 1

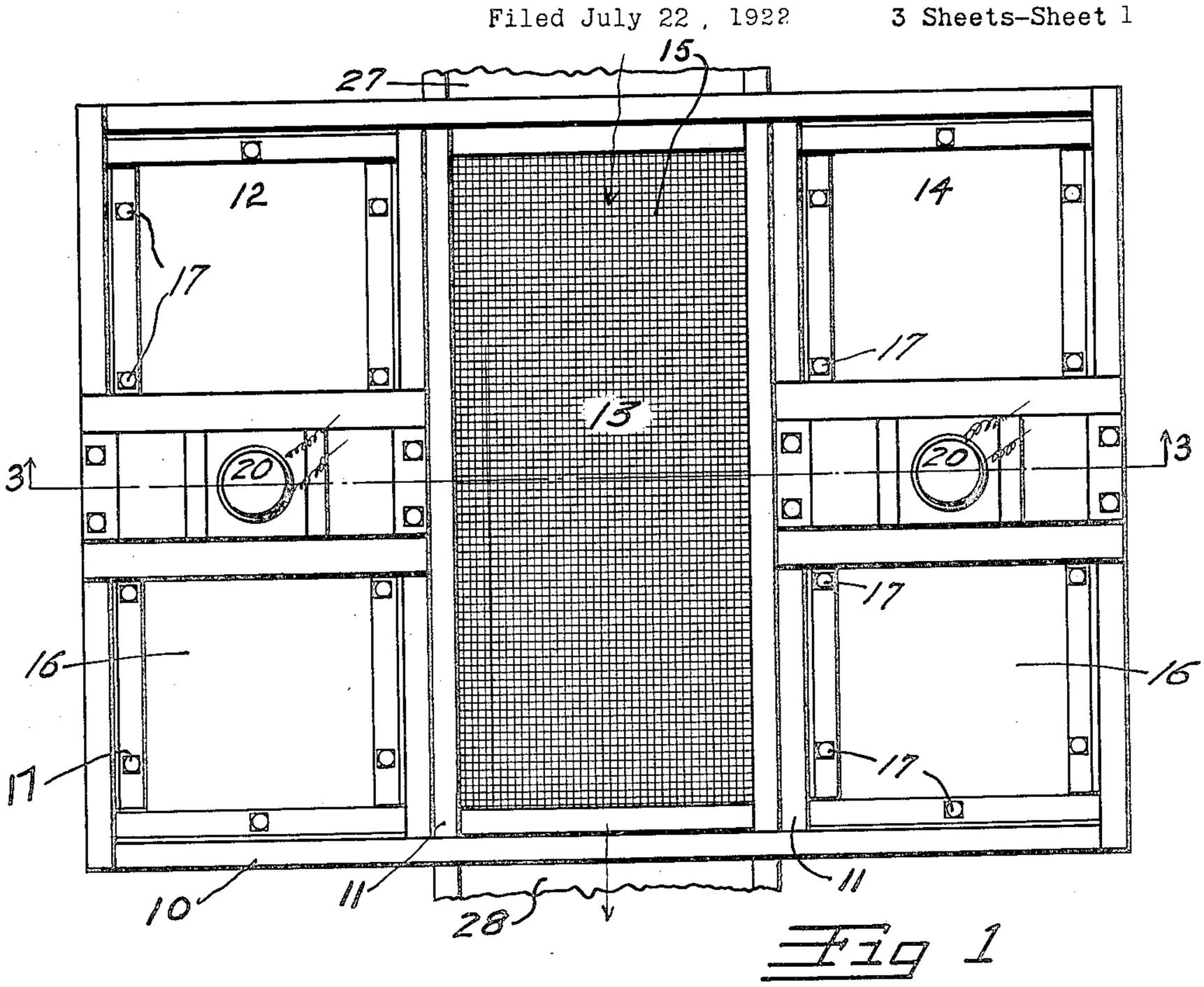

Fig 1

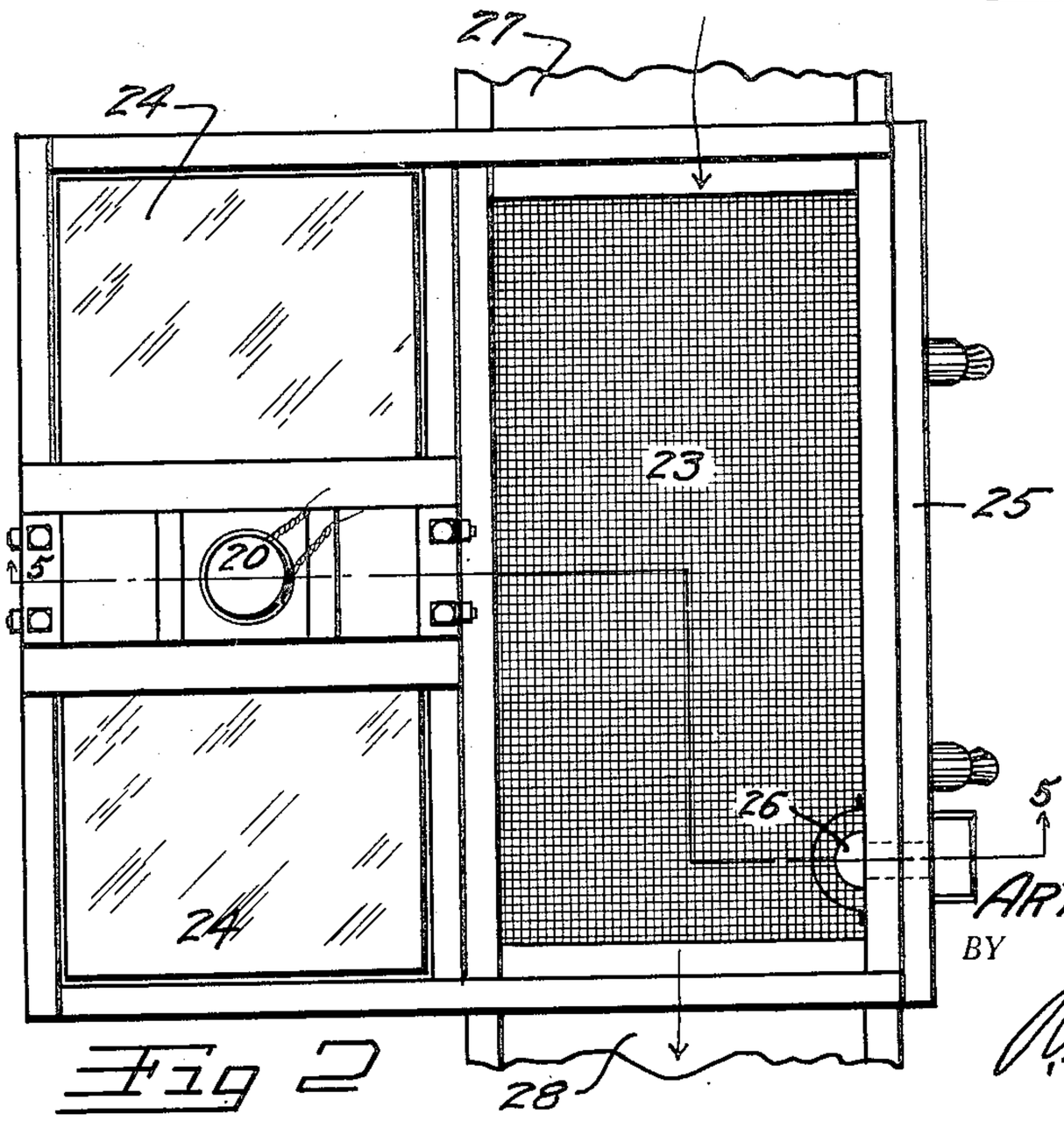

Fig 2

INVENTOR.
ARTHUR C. DAMAN
BY
R. H. Talbreath
ATTORNEY.

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JIG

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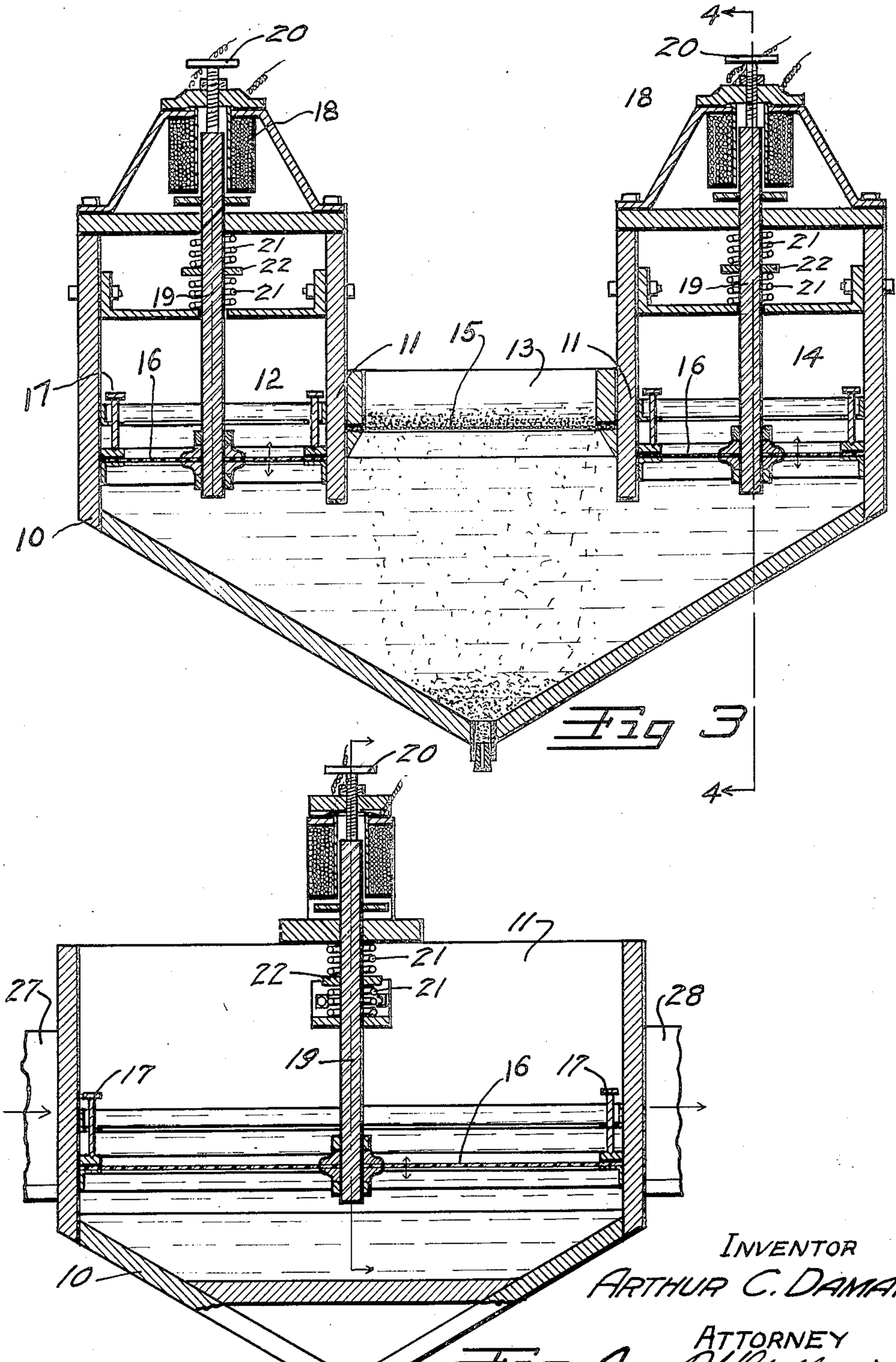

Fig 3

Fig 4

INVENTOR
ARTHUR C. DAMAN

ATTORNEY
P. P. Galbreath

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A. C. DAMAN

JIG

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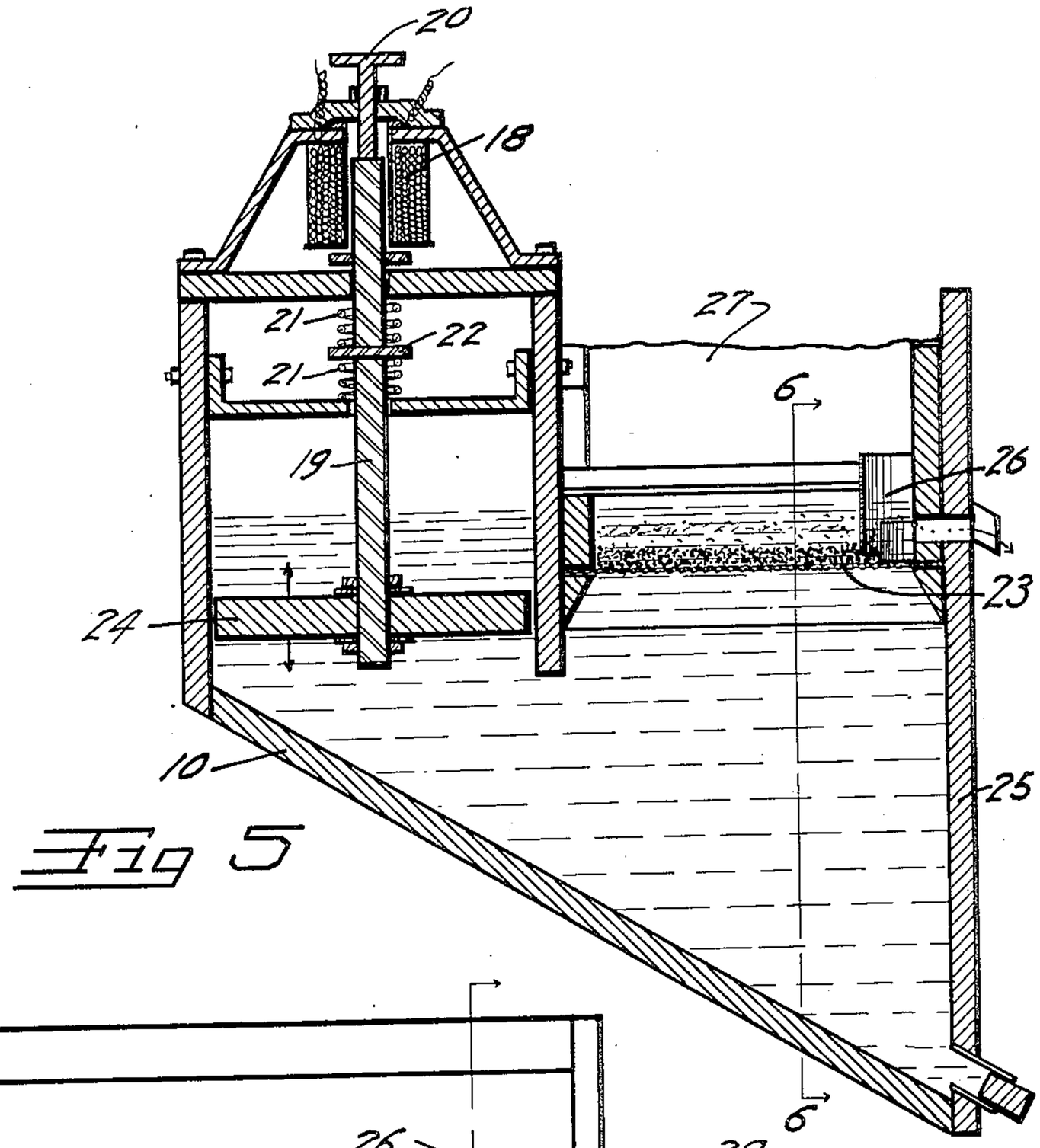

Fig 5

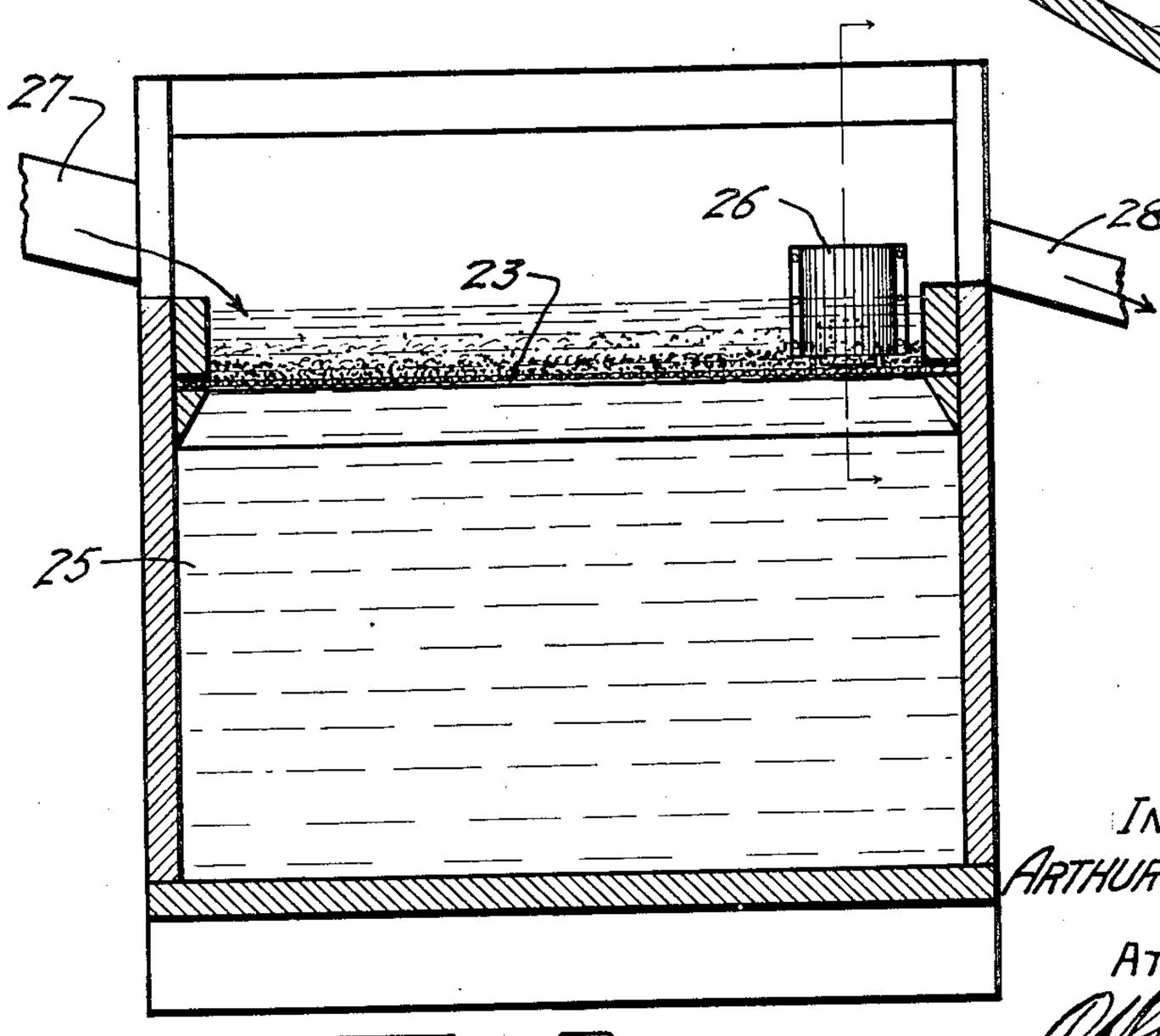

Fig 6

INVENTOR
ARTHUR C. DAMAN

ATTORNEY

Patented Nov. 18, 1924. 1,516,338

UNITED STATES PATENT OFFICE.

ARTHUR C. DAMAN, OF DENVER, COLORADO.

JIG.

Application filed July 22, 1922. Serial No. 576,808.

To all whom it may concern:

Be it known that I, ARTHUR C. DAMAN, citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Jigs, of which the following is a specification.

This invention relates to jigs adapted to the concentration of ores by a pulsating current of water and has for its principal object the provision of a device of this kind in which the pulsion and suction is accomplished in a highly efficient manner without the use of the shafting, eccentrics, connecting rods, cranks, etc., necessary in the usual devices of this character.

A further object of the invention is to provide a device of this character in which the intensity of the stroke and the relation of the pulsion stroke to the suction can be regulated without necessitating any changes in the machine structure.

Other objects and advantages reside in the detail construction of the invention, which result in simplicity, economy and efficiency, and which will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawings, which form a part hereof. Like numerals refer to like parts throughout the description and in all views of the drawings.

In the drawing:

Fig. 1 is a plan view of a form of the invention in which two pulsators are used with a single screen.

Fig. 2 is a plan view of another form of the invention in which a single pulsator and a single screen is used.

Fig. 3 is a vertical section through the form shown in Fig. 1, taken on the line 3—3, Fig. 1.

Fig. 4 is an enlarged vertical section through one of the pulsators, taken on the line 4—4, Fig. 3.

Fig. 5 is a vertical section, through the form of jig shown in Fig. 2, taken on the line 5—5, Fig. 2.

Fig. 6 is a longitudinal vertical section through the form shown in Fig. 2, taken on the line 6—6, Fig. 2.

In Figs. 2, 5 and 6 an alternate form of pulsator, from that illustrated in Figs. 1, 3 and 4, is shown.

That form of the invention shown in Fig. 1, will be first described. Let the numeral 10 designate a jigging tank having two longitudinal partitions 11, extending throughout its length, dividing it into three compartments 12, 13 and 14. The central compartment, 13, is provided with the usual fixed screen 15, upon which the ore rests; in the side compartments, 12 and 14, means are arranged for creating the pulsating currents for the separation of the ores.

In each of the compartments, 12 and 14, is secured a diaphragm 16, composed of any suitable flexible material such as laminated rubber and fabric, by means of clamp screws 17, or in any suitable manner.

Supported on extensions of the jigging tank 10 and partitions 11, over each of the diaphragms 16 are hollow core electro-magnets 18; the armatures 19 of which are secured to the mid-point of each of the diaphragms 16.

Partitions 11 do not extend to the bottom of the jigging tank 10 thereby allowing free communication between the various compartments. The bottom of the jigging tank 10 is constructed with the usual hopper shape for the collection of the "hutch" or fine concentrates.

The operation is as follows: Electro-magnets 18 are supplied with an alternating current of electricity, which causes them to alternately attract and repel their armatures 19. This motion is communicated to the diaphragms 16 causing them to act as diaphragm pumps to alternately force the water through the screen 15 and suck it back into the jigging tank 10, thereby performing the usual functions of a fixed screen jig. The two electro-magnets 18, being fed from the same electric source, will cause the two diaphragms to pulsate simultaneously and with equal intensity.

The intensity of the pulsation in the jig can be varied, to suit different classes of ores, by varying the voltage, of the current supplied, through suitable rheostats. The frequency of the pulsation can also be varied by varying the frequency of the alternating current. This can be readily accomplished by using a small motor generator set to supply A. C. power to the jigs and varying the speed of the motor therein.

With the use of this invention a much higher pulsation frequency can be obtained than on mechanical driven jigs, which makes the use of this jig very desirable when

treating fine material. For the coarse material the strokes of the diaphragms can be slowed to any desired speed.

It has been found that in jigging closely sized products the speed of separation is increased when the pulsion stroke greatly exceeds in intensity the suction stroke; such cases as this can be handled with this improved jig, without any change in the jig mechanism itself, by simply furnishing an alternating current to the electro-magnets in which the negative alternation exceeds in intensity the positive alternation, or vice versa.

The alternating current could be supplied to the electro-magnet if desired by means of a motor driven pole changing switch from a direct current source or in any desired manner.

The length of the stroke of the armature 18 can be regulated by means of screws 20 which act as a stop to limit the movement of the armature.

Compression springs 21, may, if desired, be placed around the armatures 19, coacting with a collar 22 secured to said armatures, in order to hold the armatures 19 in the proper balanced position.

The form of jig shown in Figs. 2, 5, and 6 has only a single screen 23 and a single pulsator. The pulsator in this form is the same as that previously described except, that in place of the diaphragm 16 a loose fitting plunger 24 is used. Plunger 24 is rigidly secured to the armature 19. The movement of armature 19 will cause the plunger 24 to act as a plunger pump in causing the alternating currents through the screen 23. This form has the usual jigging box 25 provided with the usual hopper bottom for the collection of the "hutch." Jigging box 25 is provided with a middlings outlet and gangue trap 26.

Ore is supplied to both types of jigs by means of a launder 27 and the tailing carried off by trough 28.

While I have described and illustrated herein a specific form of my improvement I wish it understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:—

1. In a jig the combination of, a hydraulic pulsator; a solenoid mounted above said pulsator; a magnetic core arranged to reciprocate within said solenoid; coacting springs holding said core in elastic suspension within said solenoid and means for conveying the movements of said core to said pulsator.

2. The combination in a jig of a hydraulic pulsator; a solenoid mounted above said pulsator; a magnetic core arranged to reciprocate vertically within said solenoid as the direction of current flow in the solenoid alternates; an adjustable mechanical stop arranged to abruptly stop the movement of said core and means for conveying the movements of said core to said pulsator.

In testimony whereof I affix my signature.

ARTHUR C. DAMAN.