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SAFETY DEVICE FOR FORGING MANIPULATORS.

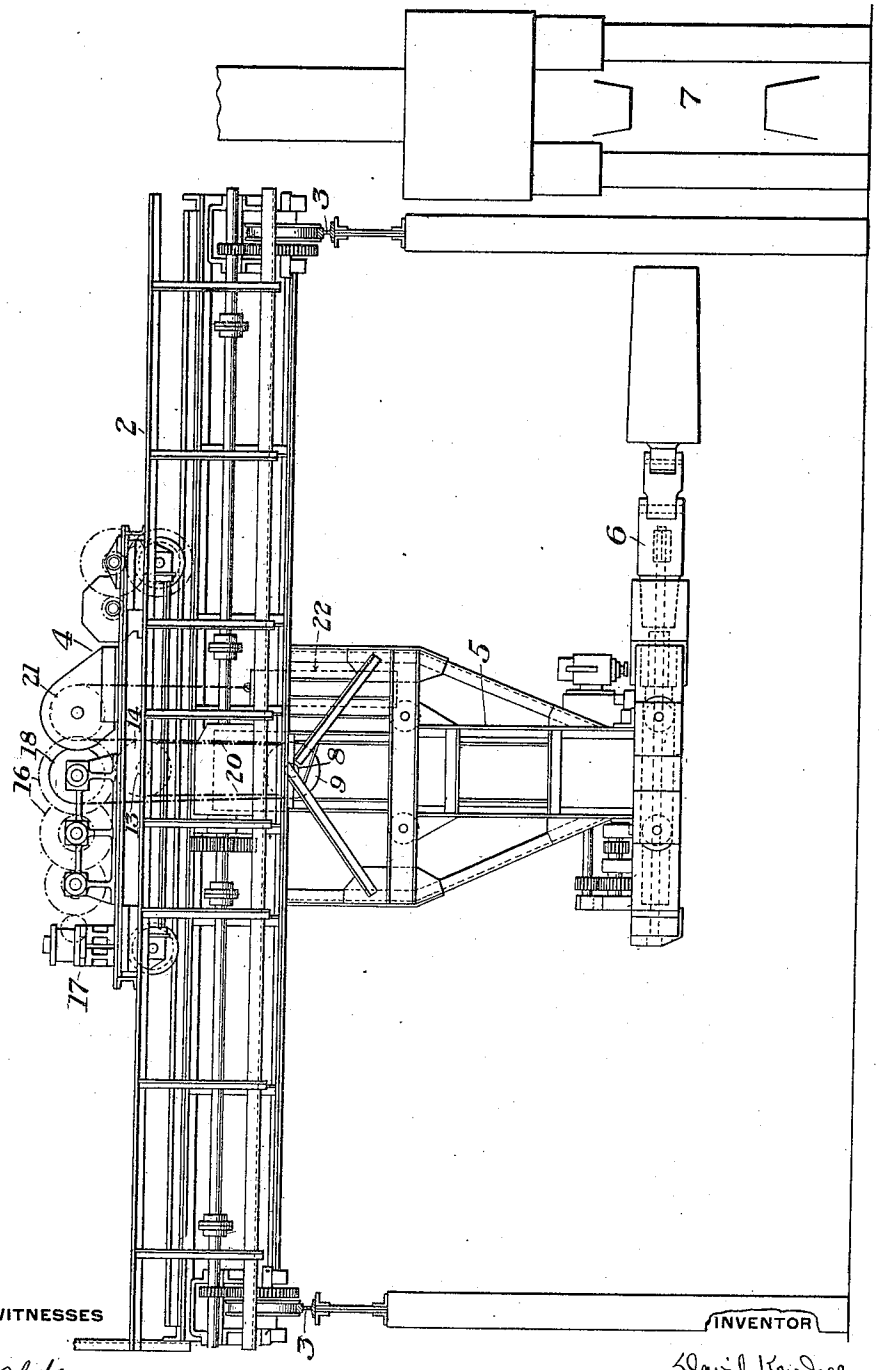
APPLICATION FILED JULY 5, 1917.

1,281,393.

Patented Oct. 15, 1918.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

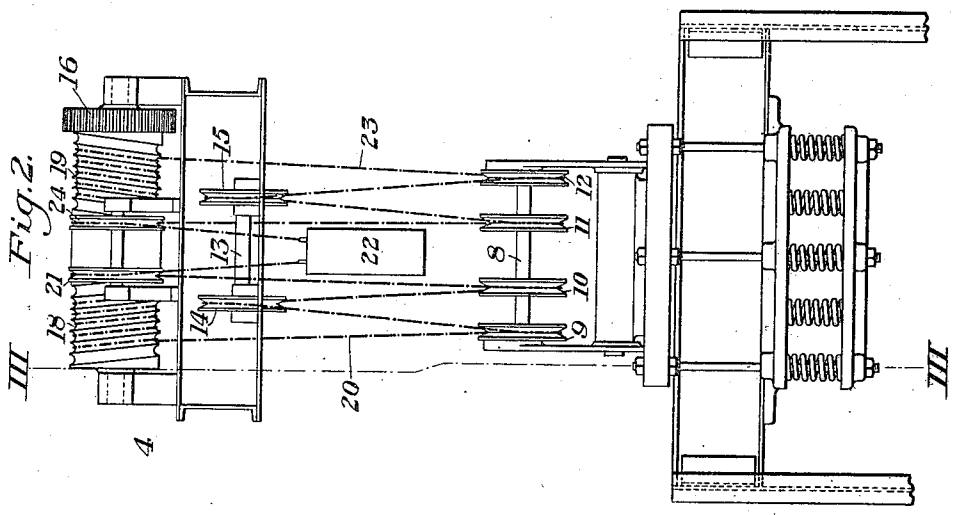
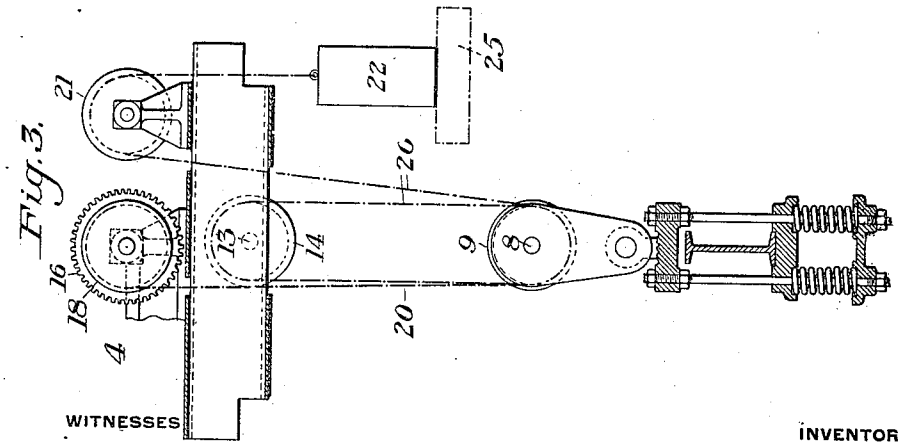


Fig. 3.



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SAFETY DEVICE FOR FORGING-MANIPULATORS.

1,281,393. Specification of Letters Patent. Patented Oct. 15, 1918.

Application filed July 5, 1917. Serial No. 178,636.

To all whom it may concern:

Be it known that I, DAVID KENDALL, a citizen of the United States, residing at Alliance, Stark county, Ohio, have invented a new and useful Safety Device for Forging-Manipulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation of mechanism embodying my invention, and

Figs. 2 and 3 are, respectively, end and front elevations, largely conventional, of a portion of the mechanism.

My invention has relation to forging manipulators; and is designed to provide a safety device for use in connection with such manipulators by means of which undue strains upon the structure are prevented when, for any reason, the forging is not level on the anvil when the press or hammer comes down. The invention is especially applicable to manipulators of the crane type, but may be applied to other types.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown the preferred embodiment thereof, and which will now be described, it being premised, however, that various changes can be made in the details of construction and operation of the several parts without departing from the spirit and scope of my invention as defined in the appended claims.

In these drawings the numeral 2 designates a crane bridge which is mounted for travel on the elevated track rails 3 in the usual manner. 4 is a trolley which is mounted for transverse travel on the bride 2, 5 is the post or column of a manipulator, and 6 the manipulating arm. As thus generally described, the mechanism is old and well known in the art, the manipulator arm 6 being arranged in a well known manner to grip and rotate an ingot, and carry it to a press or hammer 7.

In accordance with my invention the frame or column 5 is suspended from the crane trolley in the following manner: It is provided with a shaft 8 on which are mounted the four wheels or pulleys 9, 10, 11 and 12. On the frame of the trolley is mounted a shaft 13 carrying the two grooved wheels 14 and 15. On the trolley is also a drum, connected by gears 16 with a motor 17. This drum has the winding portions 18 and 19 which are preferably helically grooved, the grooves of the two portions being of opposite hand. A rope 20 is made fast at one end to the portion 18 of the drum, extends thence downwardly and underneath the wheel 9; thence upwardly and over the wheel 14, thence downwardly and under the wheel 10, thence upwardly and over a wheel 21 mounted on the trolley, its dead end being connected to a counterweight 22. A second rope 23 is connected at one end to the portion 19 of the winding drum, extending downwardly therefrom and under the wheel 12, thence upwardly and over the wheel 15, thence downwardly and under the wheel 11, thence upwardly and over a grooved wheel 24 on the trolley, its end also being connected to the counterweight 22.

The counterweight 22 normally rests on a suitably fixed support or shelf 25 carried by the trolley, and is inactive in the ordinary operation of raising and lowering the manipulator by the operation of the winding drum, its mass being properly proportioned with respect to the weight of the manipulator and of the ingot or workpiece carried thereby. For instance, if the total weight of the manipulator and its load suspended from the trolley is fourteen tons, the counterweight will weigh approximately four tons. Thus, with the two ropes 20 and 23, each having four turns, it will require approximately an action of sixteen tons before the counterweight will lift. If, through any fault of the operator in not having the forging level on the anvil block of the hammer or press when the hammer or press comes down, instead of this throwing a very great strain upon the crane, the counterweight automatically comes into action and lifts. This allows the bottom mechanism with its forging to go down as far as the stroke of either the press or the stroke of the counterweight.

The advantages of my invention will be apparent, since it provides a safety device which will automatically come into operation to prevent injury to the crane under

conditions which would otherwise throw severe and oftentimes destructive strains on the crane.

I claim:

1. The combination with a forging manipulator, of a safety device therefor comprising a winding drum, a flexible suspension member connected to the drum and to the frame of the manipulator, and a normally inactive counterweight to which the dead end of the said member is connected, substantially as described.

3. In forging manipulator of the crane type, the combination of a crane trolley having a winding drum thereon, flexible suspension members connected to said drum to wind thereon, a manipulator frame or column having sheaves or pulleys engaged by said suspension members, and a counterweight to which the ends of said members are connected, substantially as described.

3. In a forging manipulator of the crane type, the combination of a crane trolley having a winding drum thereon, flexible suspension members connected to said drum to wind thereon, a manipulator frame or column having sheaves or pulleys engaged by said suspension members, and a counterweight to which the ends of said members are connected, together with means for normally supporting said counterweight, substantially as described.

4. In a forging manipulator of the crane type, the combination of a crane trolley having a winding drum thereon, flexible suspension members connected to said drum to wind thereon, a manipulator frame or column having sheaves or pulleys engaged by said suspension members, and a counterweight to which the ends of said members are connected, said counterweight being of definite mass with respect to the weight of the manipulator and its workpiece so as to overbalance the manipulator under normal conditions, substantially as described.

5. A forging manipulator in combination with means for raising and lowering the manipulator, and a normally inactive safety supporting device for the manipulator which is only affected by the downward movement of the manipulator under abnormal forging conditions and is not affected by the upward movement of the manipulator, substantially as described.

6. The combination with a forging manipulator, of a safety device connected thereto and comprising a counterbalance which overbalances the weight of the manipulator under normal forging conditions, but permits it to automatically move downwardly under abnormal forging conditions together with means for preventing movement of the counterbalance when the manipulator is moved upwardly; substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID KENDALL.