

No. 846,463.

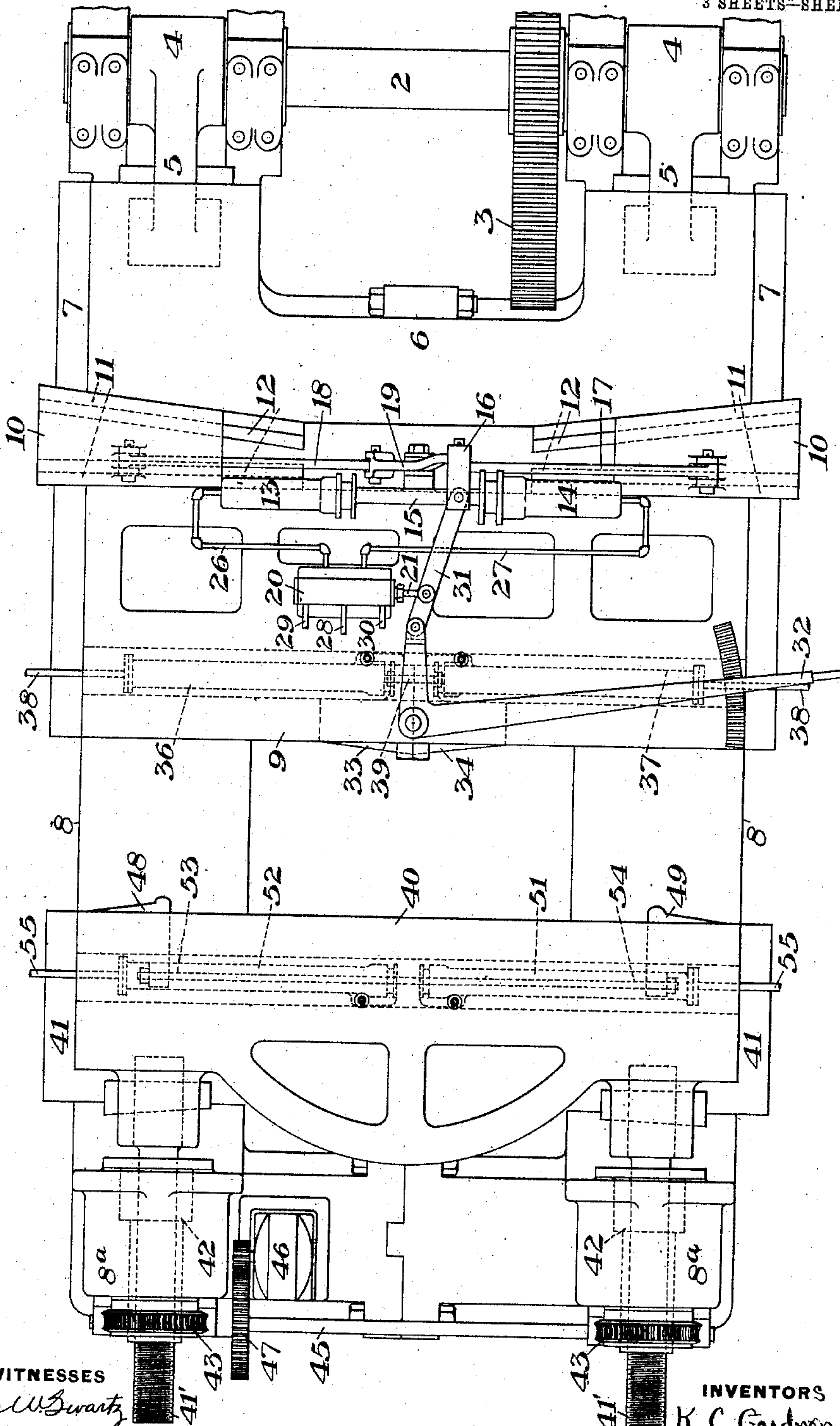
PATENTED MAR. 12, 1907.

K. C. GARDNER & F. C. BIGGERT, JR.
STRAIGHTENING AND BENDING MACHINE.

APPLICATION FILED MAY 14, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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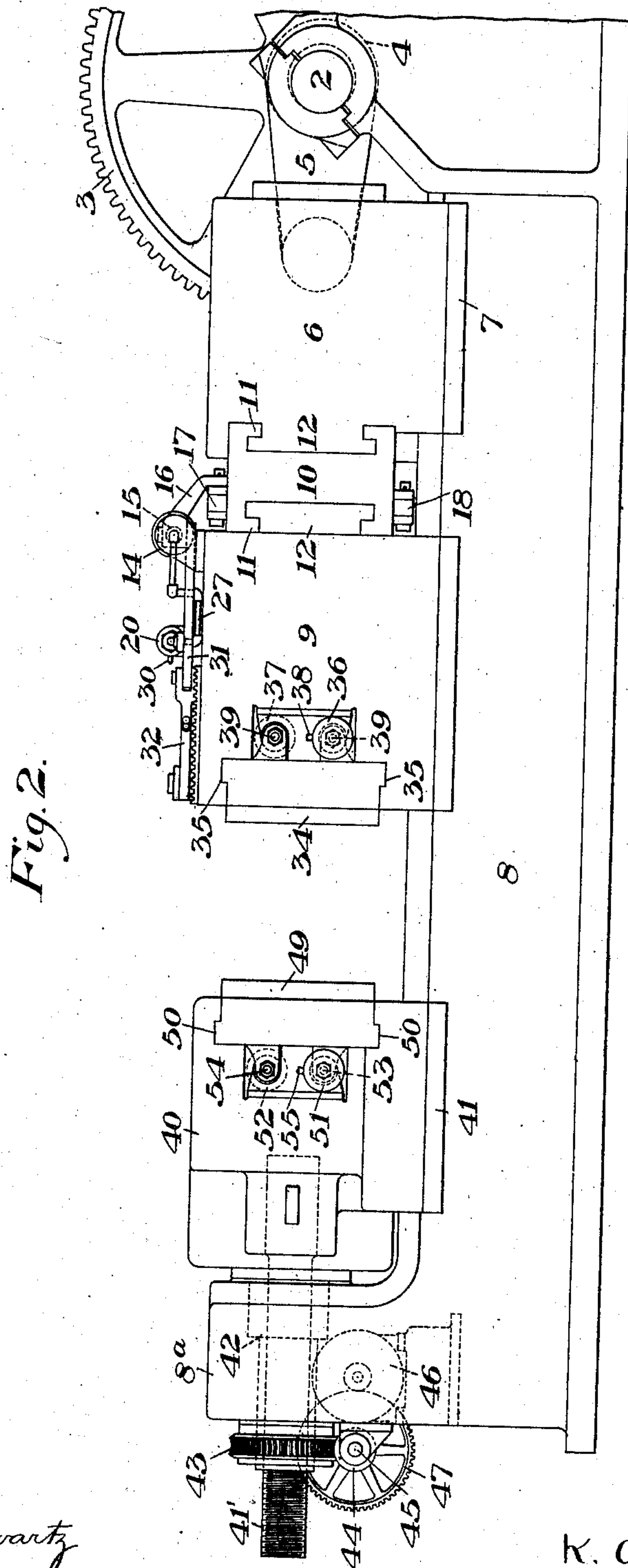
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 3.

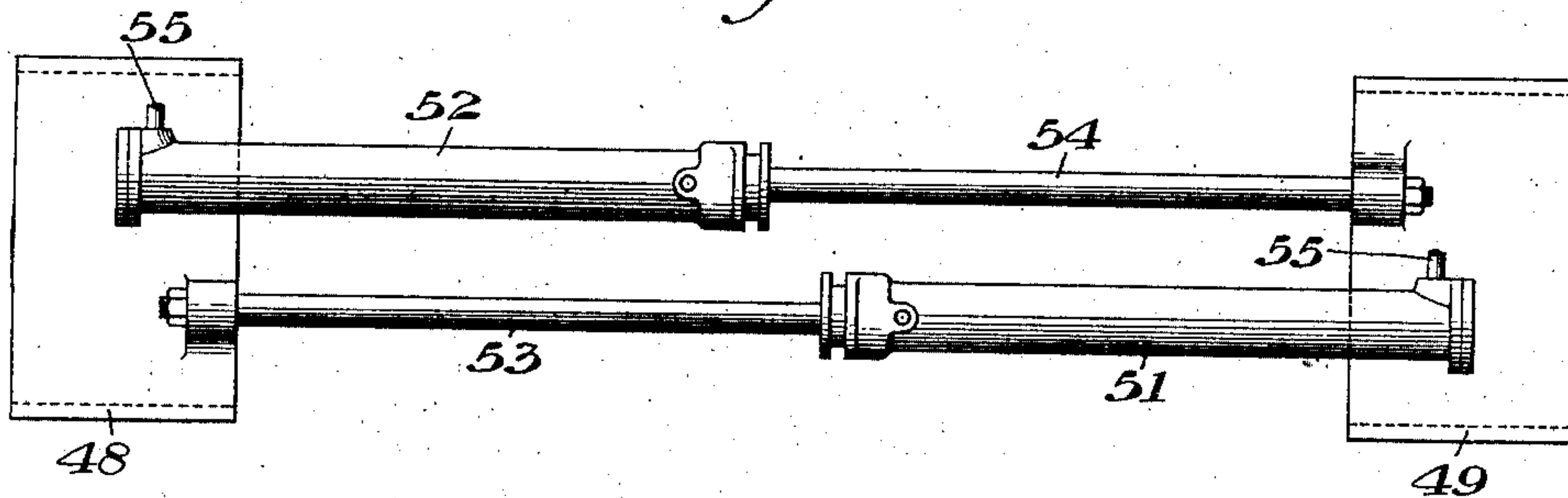


Fig. 4.

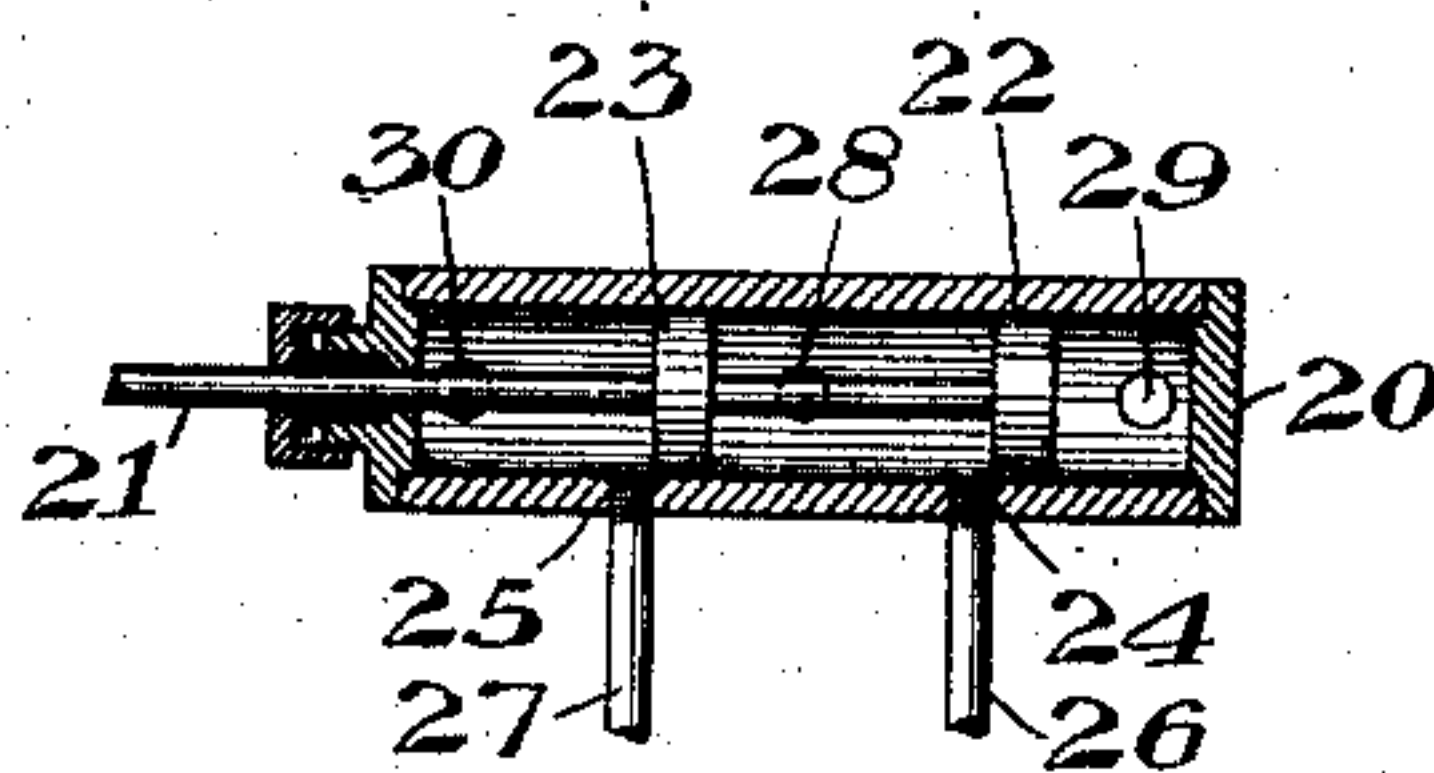
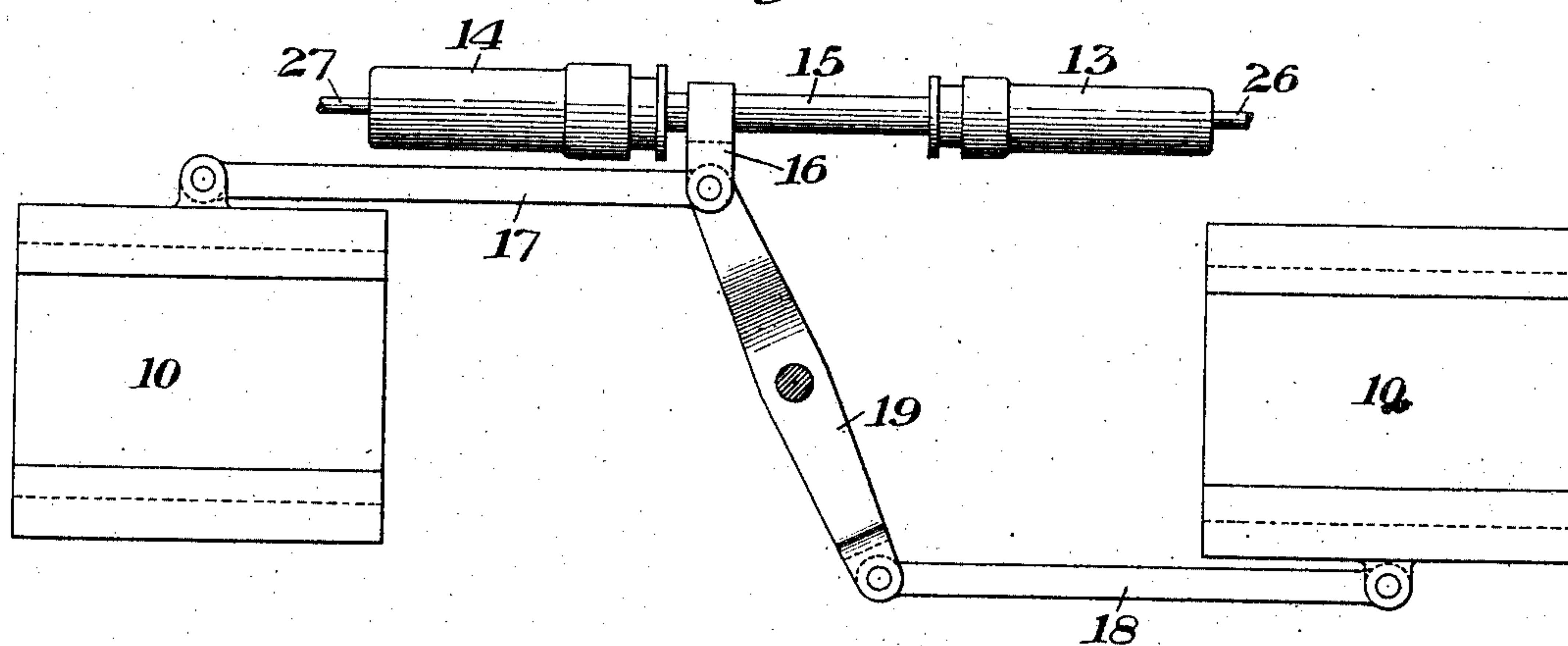


Fig. 5.



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UNITED STATES PATENT OFFICE.

KIRTLAND C. GARDNER AND FLORENCE C. BIGGERT, JR., OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO UNITED ENGINEERING & FOUNDRY COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

STRAIGHTENING AND BENDING MACHINE.

No. 846,463.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed May 14, 1906. Serial No. 316,607.

To all whom it may concern:

Be it known that we, KIRTLAND C. GARDNER and FLORENCE C. BIGGERT, Jr., of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Straightening and Bending Machine, 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 a plan view of a machine embodying our invention. Fig. 2 is a side view of the same. Fig. 3 is a detail view of the cylinder mechanism for operating the bending anvils or dies. Fig. 4 is a detail view of the reversible hydraulic valve, and Fig. 5 is a detail view showing the mechanism for actuating the adjusting-wedges.

Our invention has relation to machines for bending and straightening metal and to that type of such machines which employ a relatively stationary head and movable head reciprocable toward and away from the stationary head, said heads having adjustable bending dies or anvils.

The object of our invention is to provide means of novel, efficient, and simple character for securing the proper adjustments of the bending dies or anvils; also, to provide improved means for adjusting, the relatively fixed and movable heads.

With these objects in view our invention consists in the novel construction, arrangement, and combination of parts, all substantially as hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings, 2 designates the main operating-shaft, which is driven by any suitable means through the gear-wheel 3 and which has the cranks or eccentrics 4, actuating the connecting-rods 5, which are connected to the slide-block 6. This block 6 is arranged to move horizontally in suitable guides 7 on the bed 8 of the machine and is connected to the reciprocable bending-head 9 through the medium of the adjustable wedges 10. These wedges are formed with the dovetailed guideways 11, which embrace guides 12, formed, respectively, on the slide-box 6 and the head 9. These wedges provide means for securing a limited and exact adjustment of the head 9. For the purpose of actuating the wedges I pro-

vide the two cylinders 13 and 14, having their pistons connected by rod 15. The rod 15 has a laterally and downwardly projecting lug 16, which is connected by a link 17 with one of the wedges 10. The other wedge 10 is connected by link 18 and reversing-lever 19 with the said lug 16. These cylinders are preferably operated by hydraulic power controlled by the valve 20. This valve may be of any well-known or suitable character, such as that shown in Fig. 4, in which it consists of a piston-rod 21, having thereon the two heads 22 and 23, arranged to control, respectively, the ports 24 and 25, which are connected by pipes 26 and 27 with the outer ends of the respective cylinders 13 and 14. 28 designates the inlet of the valve, and 29 and 30 the two exhaust-openings. The piston-rod 21 is extended through the head of the valve-casing and is connected to a link 31, which is in turn connected to one arm of a controlling-lever 32, the movement of which serves to reverse the valve to open the supply to one of the cylinders and allow the other cylinder to exhaust, the cylinders being single-acting and exhausting through their supply-pipes into the valve-casing and thence through the exhaust-openings 29 and 30, respectively.

The head 9 is provided with the two laterally-movable bending dies or anvils 33 and 34, which are arranged to slide toward and away from each other in guides 35 in the said head. For the purpose of moving these dies or anvils we provide the two double-acting cylinders, either steam or hydraulic, 36 and 37. 38 designates the supply-pipes for these cylinders, which are provided with suitable controlling-valves of the usual character. (Not shown.) The piston-rods 39 of these two cylinders are connected directly to the movable dies or anvils for the purpose of actuating the same. The two cylinders are seated in a chamber of the head 9, as shown in Fig. 2.

40 designates the relatively fixed head, which is mounted in guides 41 of the bed 8, to be adjusted toward and away from the head 9. This adjustment is preferably effected by means of the two screws 41', provided with bearings in the upwardly-extended portion 8^a of the bed-frame and which

engage nuts 42 in the said frame portion. The screws 41' are provided with worm-gears 43, which are engaged by worms 44 on the transverse shaft 45, driven by a motor 46 through the medium of the gears 47, the motor 46 being mounted on the frame portion 8^a.

The head 40 has the two movable dies or anvils 48 and 49, which are mounted to move toward and away from each other in the guides 50, which are actuated by means of the two double-acting cylinders 51 and 52, whose plungers are connected by the rods 53 and 54 with the heads 48 and 49, respectively. (See Fig. 4.) The cylinders 51 and 52 are provided with supply-pipes 55, controlled by any suitable valve mechanism (not shown) located within convenient reach of the operator, said pipes, as well as the pipes 38, having the necessary flexible connections to adapt themselves to the movements of the heads.

It will be readily seen that by means of the cylinder arrangement described the bending dies or anvils can be quickly adjusted to the desired relative positions, all that is necessary being the manipulation of the proper valves controlling the supply to and exhaust from the respective actuating-cylinders. A further advantage of the above-described means for operating the adjusting-wedges consists in the fact that all that the operator has to do is to move the lever 32 to open the controlling-valve. It will be readily seen from the drawings that when the cylinders are operated by the opening of the valve the movement of the pistons will, through the link 31, automatically return the valve to its former position. This relieves the operator from the necessity for manually closing the valve. The screw adjustment for the head 40 is used where a wider adjustment of the machine is required, the wedge adjustment of the head 9 being used to obtain closer and more accurate adjustments.

Various changes may be made in the details of the construction and arrangement of parts without departing from the spirit and scope of our invention as set forth in the claims.

What we claim is—

1. In a bending or straightening machine, a bending-head, a bending die or anvil laterally movable in said head, and a power-cylinder for actuating the die or anvil and having its piston connected thereto; substantially as described.

2. A bending or straightening machine

having its bending-heads provided with laterally-movable dies or anvils, and power-cylinders mounted in the said heads and having their pistons directly connected to the dies or anvils to actuate the same; substantially as described.

3. In a bending or straightening machine, a bending-head having guideways therein, a bending die or anvil mounted in said guideways for lateral movement, and a power-cylinder seated in the said head and having its piston directly connected to the die or anvil to actuate the same; substantially as described.

4. In a bending or straightening machine, a power-shaft, a slide-block connected thereto, a bending-head, and wedge members connecting the said head and block adjustably for the purpose of adjusting the said head, power means for actuating the wedge members, and controlling means whereby said members are simultaneously actuated; substantially as described.

5. In a bending or straightening machine, a power-shaft, a slide-block connected thereto, a bending-head, movable wedge members forming an adjustable connection between the slide block and head, and power-cylinders for actuating the wedge members; substantially as described.

6. In a bending or straightening machine, a reciprocating head, means for actuating the same, adjustable wedge members forming a part of the connection between the head and the actuating means, power-cylinders having their pistons connected to the wedge members, a reversing-valve for controlling the cylinders, and connected to the pistons thereof to be automatically closed by the movement of the pistons, and means for opening the valve; substantially as described.

7. In a bending or straightening machine, a power-shaft, a slide-block actuated thereby, a reciprocating head, adjustable wedge members forming a connection between the slide-block and head, power-cylinders having their pistons connected to the wedge members, a reversing-valve for controlling the cylinders, and a lever for controlling the valve; substantially as described.

In testimony whereof we have hereunto set our hands.

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Witnesses:

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H. M. CORWIN.