No. 691,777. Patented Jan. 28, 1902.

W. J. KAUFFMAN.

TYPE WRITING MACHINE.

(Application filed June 15, 1899. Renewed June 24, 1901.)

(No Model.) 4 Sheets—Sheet 1.

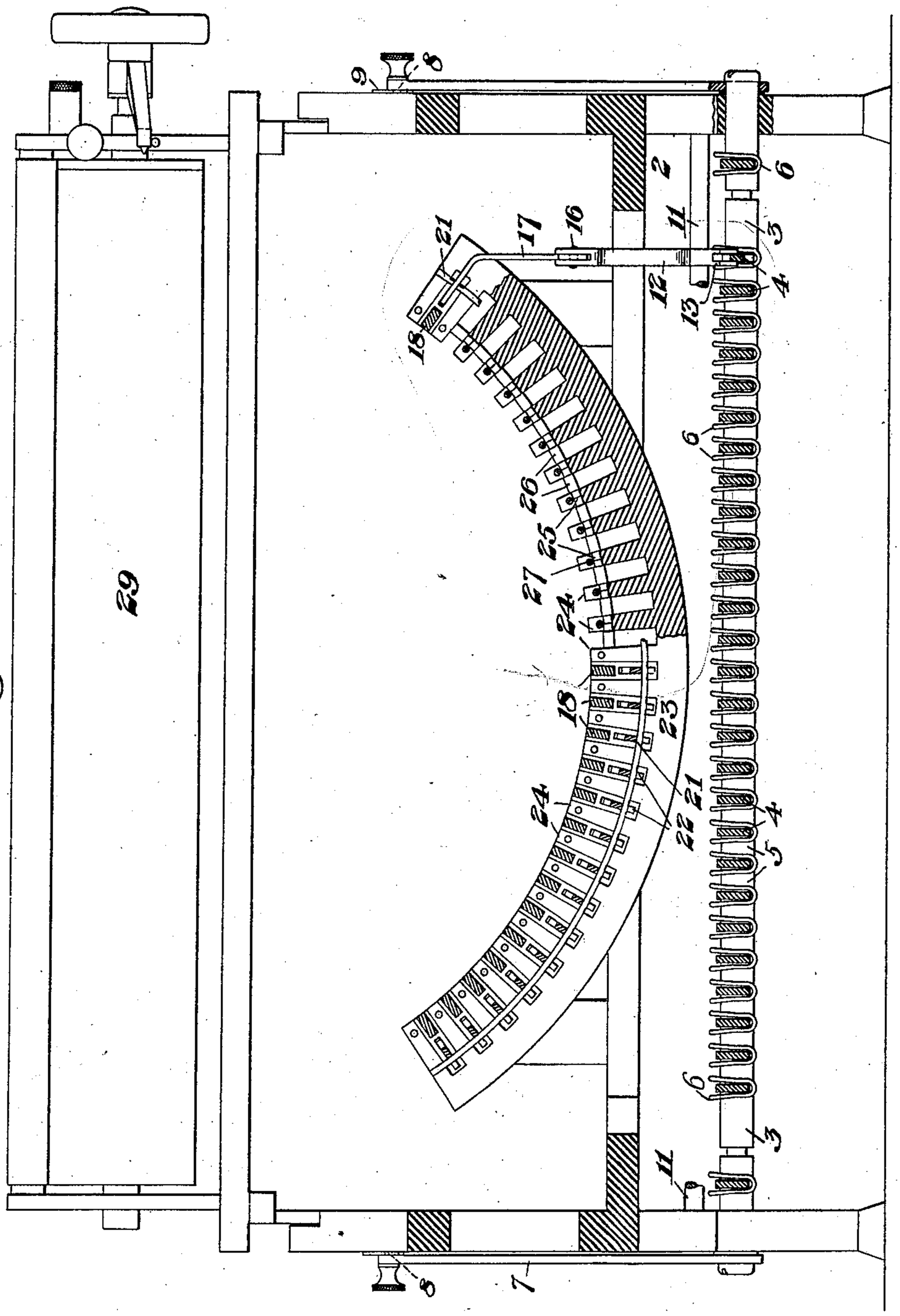

Fig. 1.

WITNESSES

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(No Model.) 4 Sheets—Sheet 2.

Fig. 2.

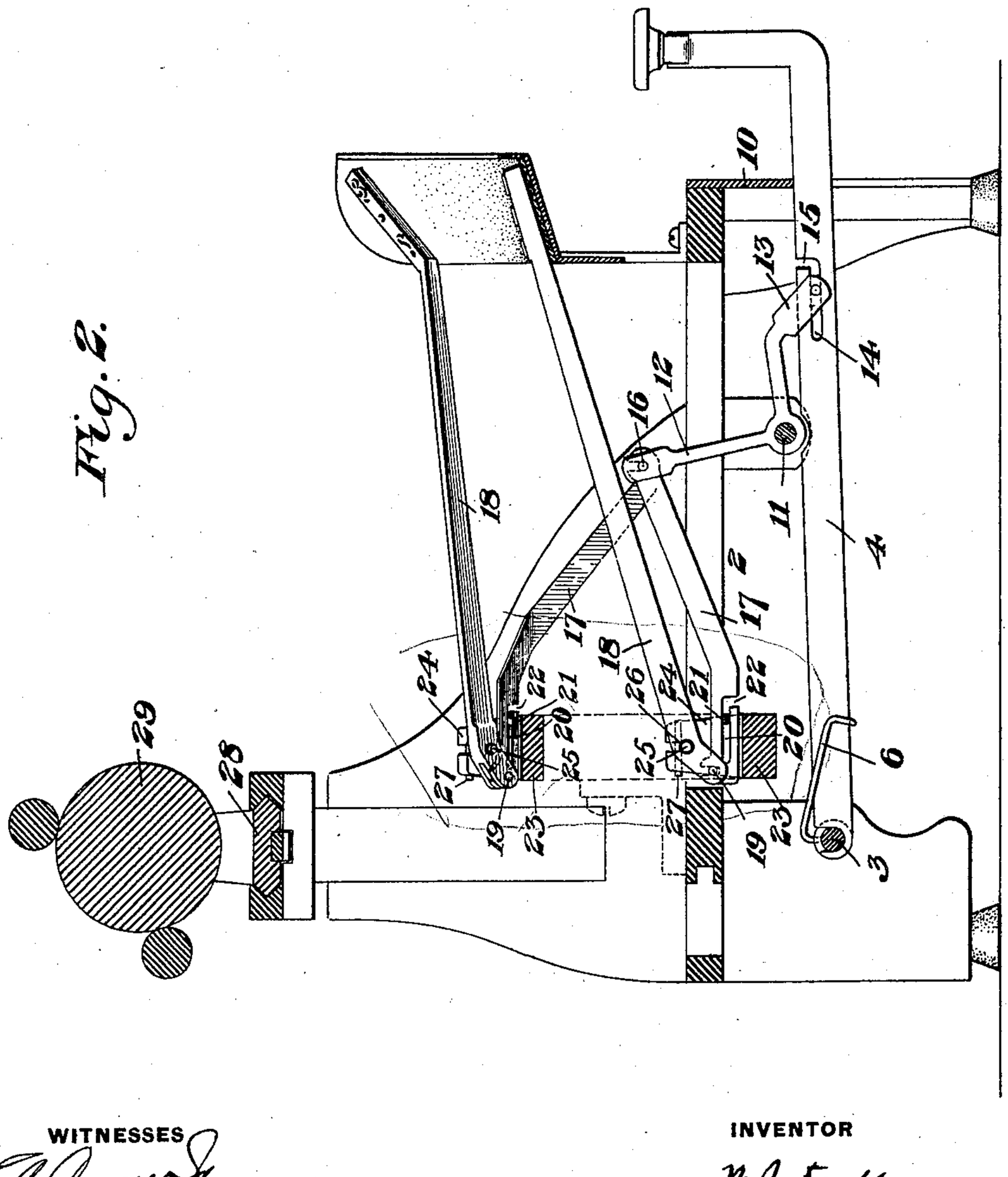

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Fig. 4.

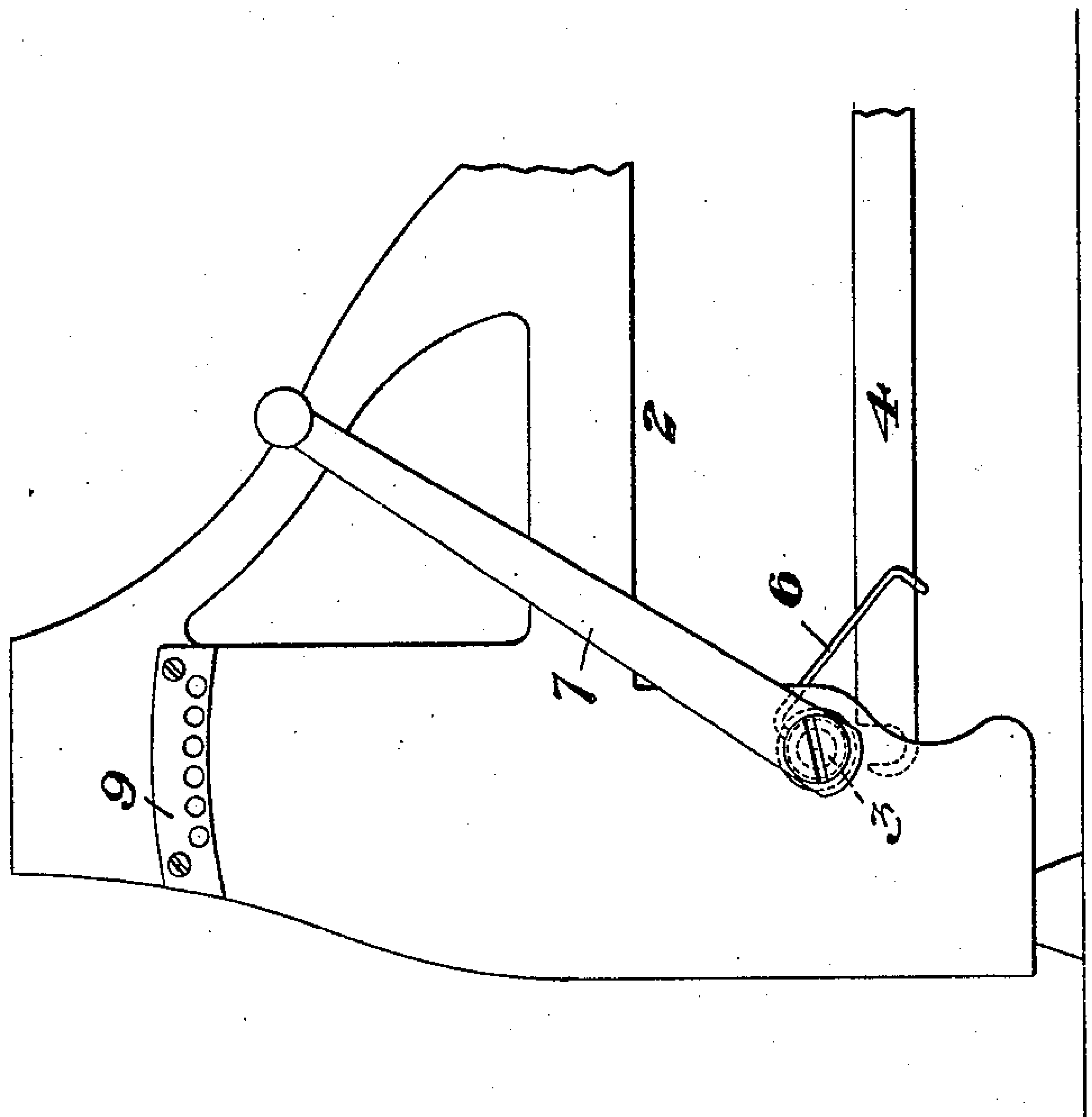

Fig. 3.

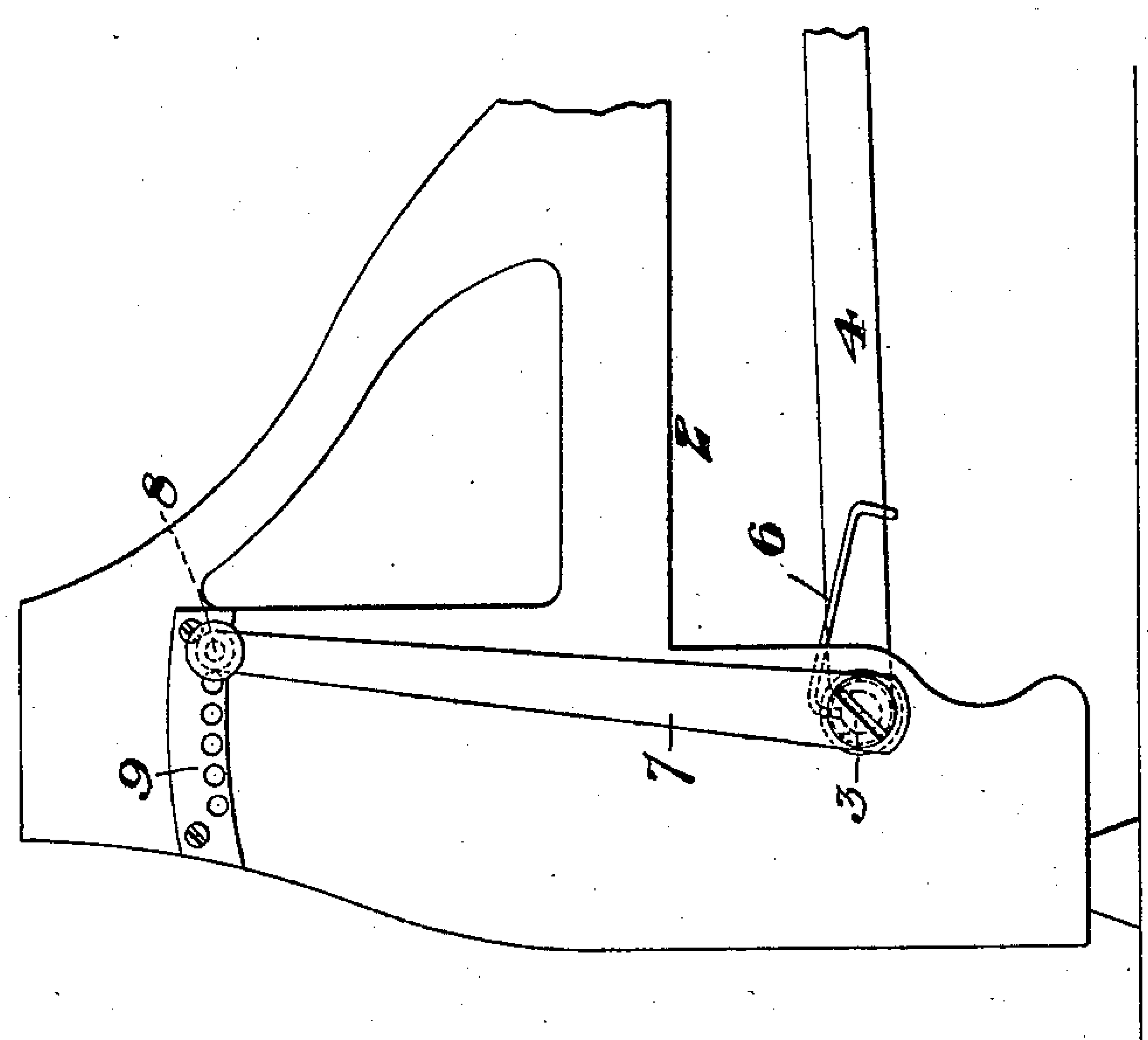

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Fig. 5.

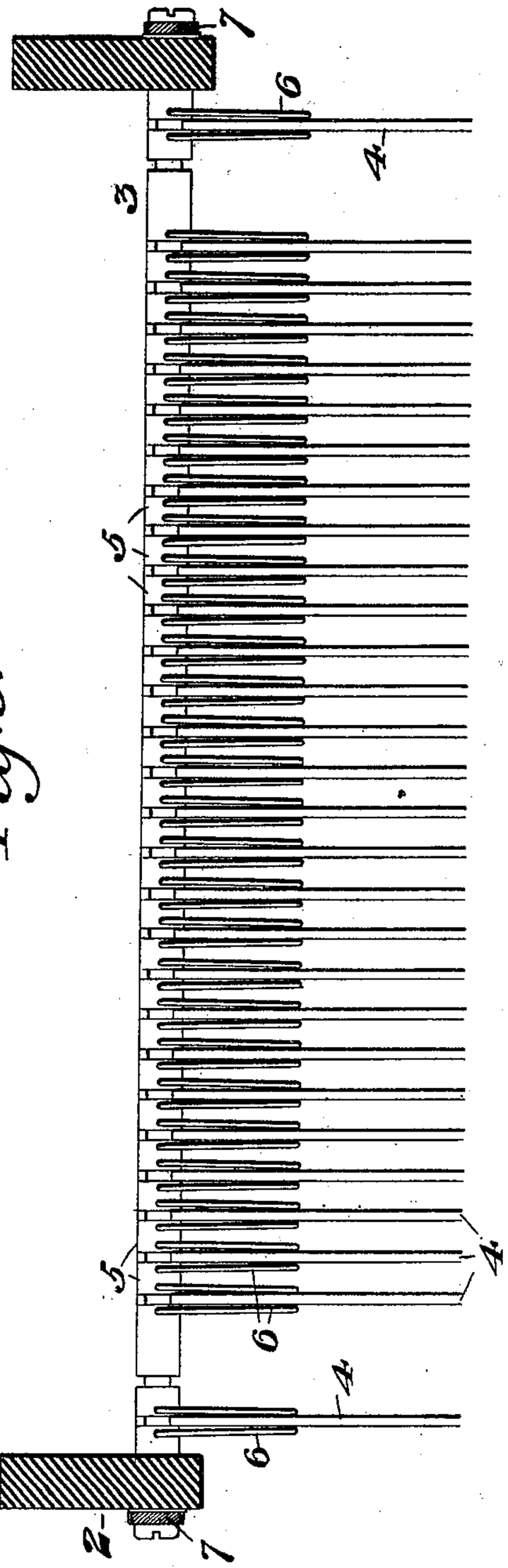
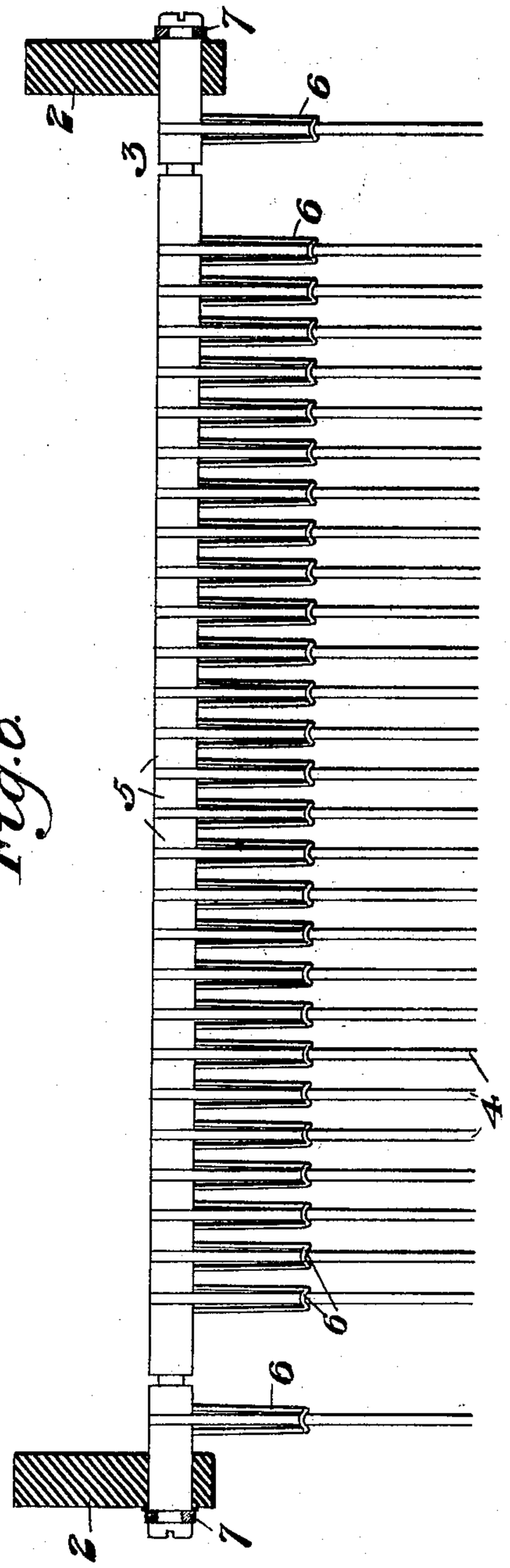


Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM J. KAUFFMAN, OF CANTON, OHIO, ASSIGNOR TO THE KAUFFMAN TYPEWRITER COMPANY, A CORPORATION OF OHIO.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 691,777, dated January 28, 1902.

Application filed June 15, 1899. Renewed June 24, 1901. Serial No. 65,838. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. KAUFFMAN, of Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Type-Writing Machines, 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 irregular vertical section of my improved type-writer, taken in front of the arc-shaped support for the key-levers, with this support partly broken away. Fig. 2 is a vertical cross-section of the machine with parts removed for clearness. Figs. 3 and 4 are partial end views showing the lever for adjusting the tension, and Figs. 5 and 6 are partial horizontal sections above and below the key-lever shaft.

My invention relates to type-writers, and more particularly to those of the type set forth in my pending application, Serial No. 683,174, filed June 11, 1898, wherein a series of parallel vertically-swinging key-levers are used connected with parallel vertically-swinging bell-crank levers, the bell-crank levers being connected by links to a series of type-levers mounted in a curved plane; and its object is to improve the connections between the key-levers and the type-levers, so that the key-levers will have a substantially uniform touch or require substantially the same amount of power to actuate the type-levers, and, further, to provide connections which are easily assembled or taken apart and to afford simple means for changing the tension or releasing the key-levers.

In the drawings, 2 represents the rectangular frame of the machine, having at the rear bearings in which is carried a key-lever shaft 3, to which the key-levers 4 are pivoted, spacing-collars 5 being formed between the ends of the key-levers. These ends of the levers are slotted to engage the shaft, as shown in Figs. 2, 3, and 4, and are held in engagement with the shaft by springs 6, each having one end secured in the shaft and the other bent into hook form to engage the lower edge of a key-lever. To adjust the tension of these springs, I secure to the projecting ends of the shaft 3 levers 7, each having at its upper end a pin 8, which is adapted to engage any one of the series of holes in an arc-shaped plate 9. The levers are made of spring material, so that the pins may be pulled out of one set of holes and the levers moved to rock the shaft and give the desired tension. On releasing the levers they are held in adjusted position by the pins engaging the holes.

The key-levers all extend parallel with each other and swing within vertical slots in the front plate 10 of the machine. A longitudinal shaft 11 is secured rigidly in the frame above the intermediate portions of the key-levers, and on this shaft are loosely mounted a series of swinging bell-crank levers 12. The lower end of each bell-crank lever is provided with a downwardly-extending forked end portion 13, having a cross-pin engaging a horizontal slot 14 in the key-lever, which extends through the forked portion of the arm. A short slot 15 is preferably provided in the key-lever, which leads to the slot 14 and provides for easy assembling of the parts. The upper arm of each bell-crank is also forked and provided with a pin 16, which passes through a slot in the end of a link 17, connecting the bell-crank lever to its type-lever 18. The open slot is formed at this end of the link to allow for insertion of the pin on the bell-crank, the action of the joint being a simple pivotal one. The other end of the link is provided with a similar open slot engaged by a cross-pin 19 in the inner forked end of the type-lever, this slot being necessary for the sliding and turning of the pin. The inner horizontally-extending portions of the links 17 are also provided with horizontal slots 20, through which extends a rod or wire 21 common to all and secured to the base, and short slots 22 are preferably used which lead to the slots 20 to allow the parts to be easily assembled.

The type-levers are pivoted to an arc-shaped base 23, the upper part of which is slotted to form a series of inwardly-extending radial arms 24. These arms are themselves slotted to receive the reduced end portions 25 of short shafts 26, upon which the type-levers

swing. The ends of each shaft abut against each other within the slots of the arms, as shown at the right hand of Fig. 1, and these shafts are rigidly secured in place by small wedge-pins 27, driven in through holes in the arms and each bearing upon the reduced ends of two adjacent shafts. The rear portions of the connecting-links 17 are bent so as to bring each such portion into a plane substantially parallel with the plane of movement of its type-lever, the degree of inclination depending upon the angle of the particular type-lever to which the link is connected.

The carriage 28, having a platen 29, may be of any usual form and does not form a part of my invention.

In operating the machines when a key is depressed the bell-crank lever having the loose connection therewith swings forwardly, the pin moving along the slot in the key-lever, and draws forward the link 17 with a sliding movement, thus swinging the type-lever so that the type strikes the ribbon at the proper point.

The advantages of the invention result in part from the peculiar connection between the links and the type-levers. I have found that where these connections were ordinary pivotal joints the touch of the keys at the end of the bank or set differed slightly from those at the center by reason of the variance in the effective lever-arm. I have overcome this difficulty by the new form of connection shown. By using the guide-rod to compel a forward and backward sliding movement of the link and a loose sliding and swinging connection between the link and type-lever the effective lever-arm is made substantially the same for each key-lever. The slotting of the joint connections provides for easy assembling and disconnecting, a simple and efficient tension device is provided by which the tension of the keys is simultaneously adjusted, and the mode of carrying the type-levers provides for easy removal and adjustment.

Many changes may be made in the form and arrangement of the parts by the skilled mechanic without departure from my invention, since

What I claim is—

1. In a type-writer, a series of parallel vertically-swinging key-levers, a series of parallel vertically-swinging bell-crank levers connected therewith, swinging type-levers, and links connecting the bell-cranks and the type-levers, said links having sliding guide connections independent of the type-lever connections; substantially as described.

2. In a type-writer, a key-lever, a bell-crank lever connected to and actuated by said key-lever, a swinging type-lever having a link connecting it to the bell-crank, the link having a vertical open-topped slot receiving a cross-pin on the type-lever, and guide connections for the link; substantially as described.

3. In a type-writer, a swinging type-lever having a pivotal connection with a link, a guide engaging the link, and arranged to prevent its swinging while actuating the type-lever, and a key-lever connected to the link; substantially as described.

4. In a type-writer, a bell-crank lever connected to and actuated by a key-lever, and a type-lever having a link connection with the bell-crank, the link having a stationary guide engaging it, and arranged to prevent its swinging while actuating the type-lever; substantially as described.

5. In a type-writer, a swinging type-lever having a loose pin-and-slot connection with a link, means for actuating the link, and a stationary pin engaging a slot in the link and guiding its movement; substantially as described.

6. In a type-writer, a series of key-levers, a shaft having springs engaging the key-levers, and mechanism for rocking the shaft into different adjusted positions; substantially as described.

7. In a type-writer, a series of key-levers pivoted to a common shaft, springs secured to the shaft and engaging the levers, and mechanism for rocking the shaft and holding it in adjusted position; substantially as described.

8. In a type-writer, a series of key-levers having at their ends open slots inclosing a common shaft upon which they swing, and holders secured to the shaft and holding the key-levers in place; substantially as described.

9. In a type-writer, a swinging key-lever having an open-ended slot therein, a bell-crank lever pivoted at its elbow above the key-lever, and having a downwardly-bent arm with a projecting pin engaging a slot in the key-lever, and a type-lever having a pivotal link pivotally connected with the other upwardly-projecting arm of the bell-crank; substantially as described.

10. In a type-writer, a key-lever, a bell-crank having a sliding pin-and-slot connection therewith, a type-lever, and a link connecting the key-lever and type-lever, and having at each end a slot with an open top engaging a pin in the bell-crank and also in the key-lever; substantially as described.

11. In a type-writer, a support having projecting lugs between which the type-levers swing, each lever being carried on a short shaft having reduced end portions projecting into the two adjacent lugs, and a pin driven in endwise within each lug arranged to secure the ends of two shafts therein; substantially as described.

12. In a type-writer, a support having projecting lugs between which the type-levers swing, short shafts having reduced ends lying in slots in the lugs and carrying the levers, and wedge-pins arranged to be driven through

the lugs and secure the ends of two adjacent shafts therein; substantially as described.

13. A type-writer having a longitudinal shaft at its rear, provided with peripheral grooves and a series of key-levers having slotted ends engaging the grooved portions of said shaft; substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM J. KAUFFMAN.

Witnesses:
C. W. STROHN,
CHAS. A. REX.