

No. 733,525.

PATENTED JULY 14, 1903.

M. E. WORDEN.

WRENCH.

APPLICATION FILED JUNE 25, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

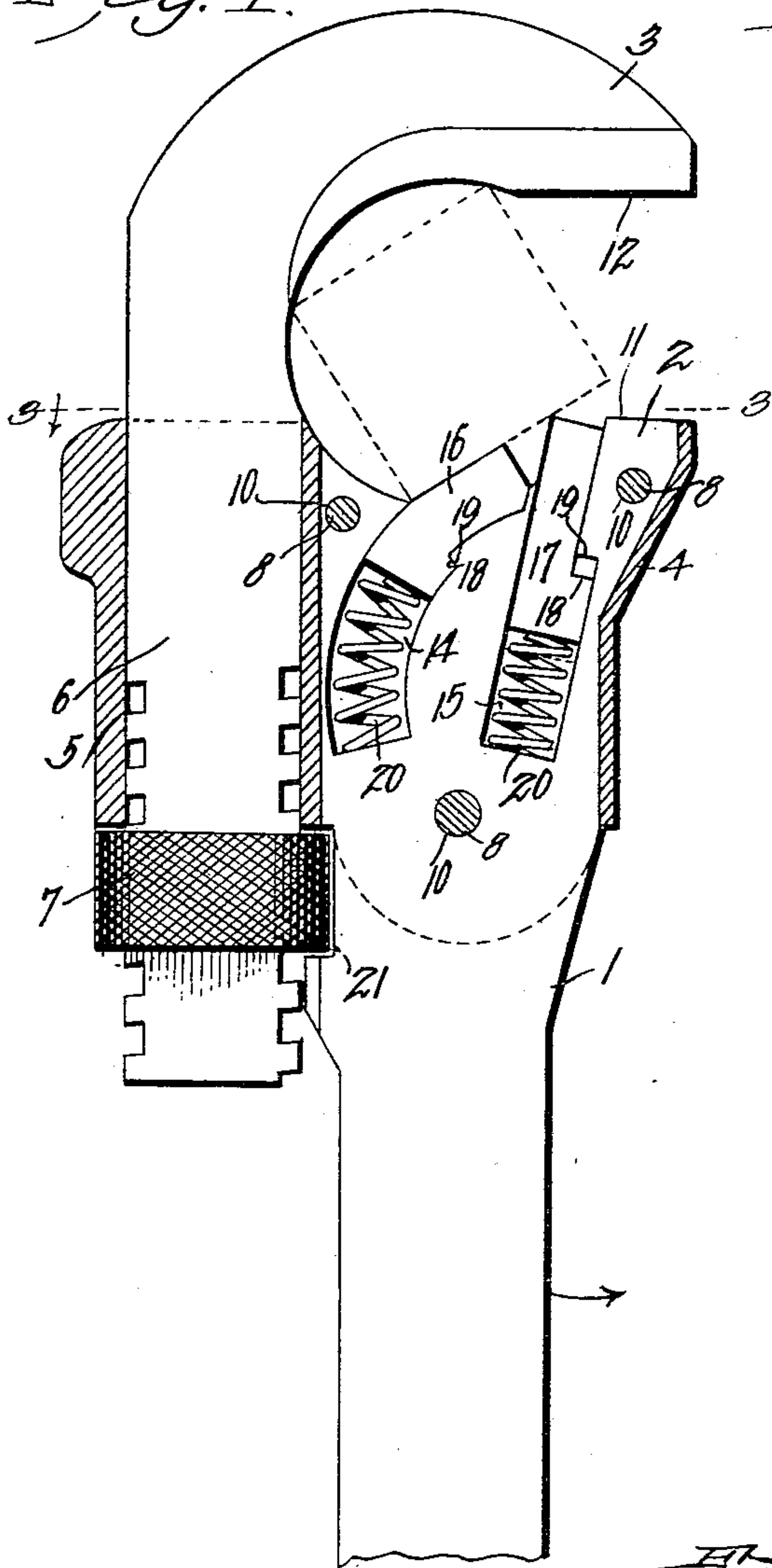


Fig. 2.

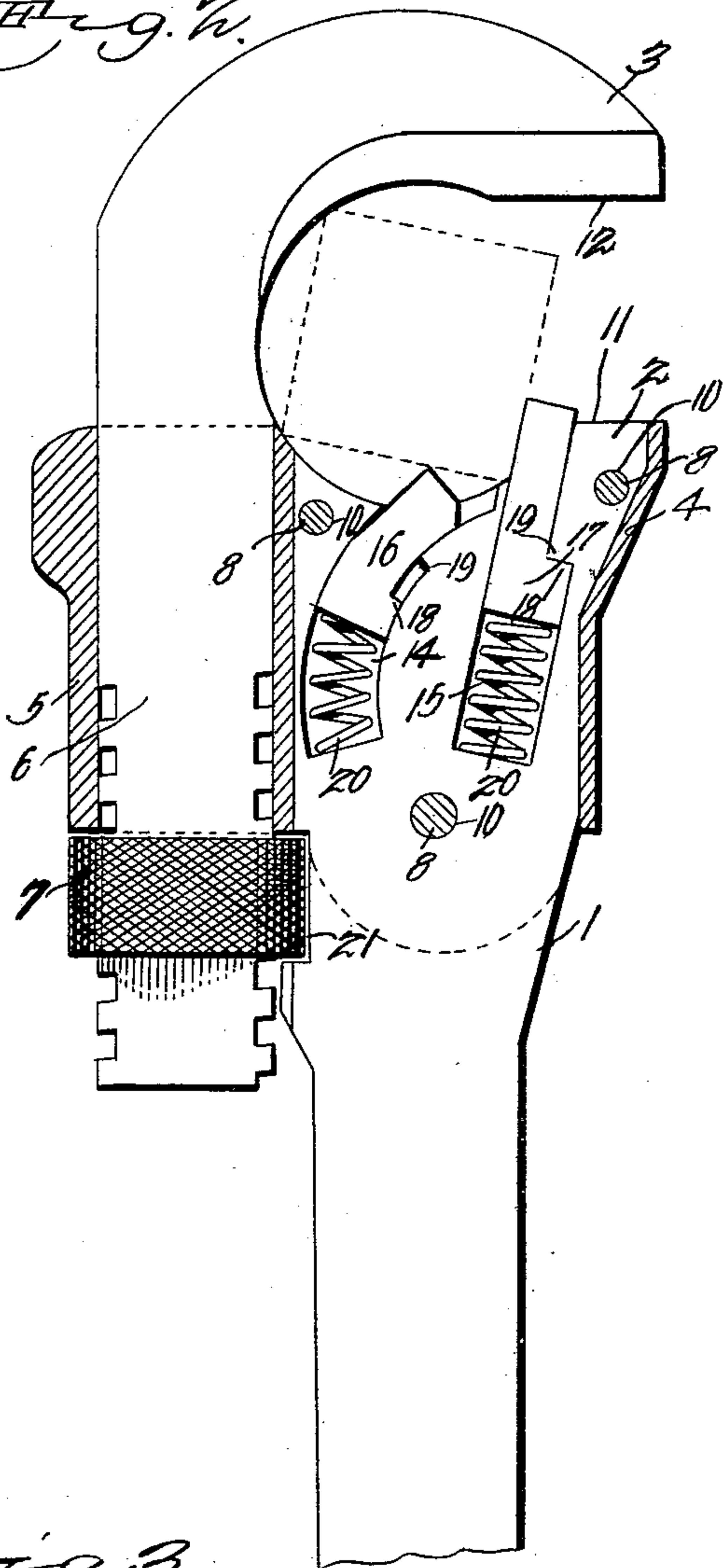
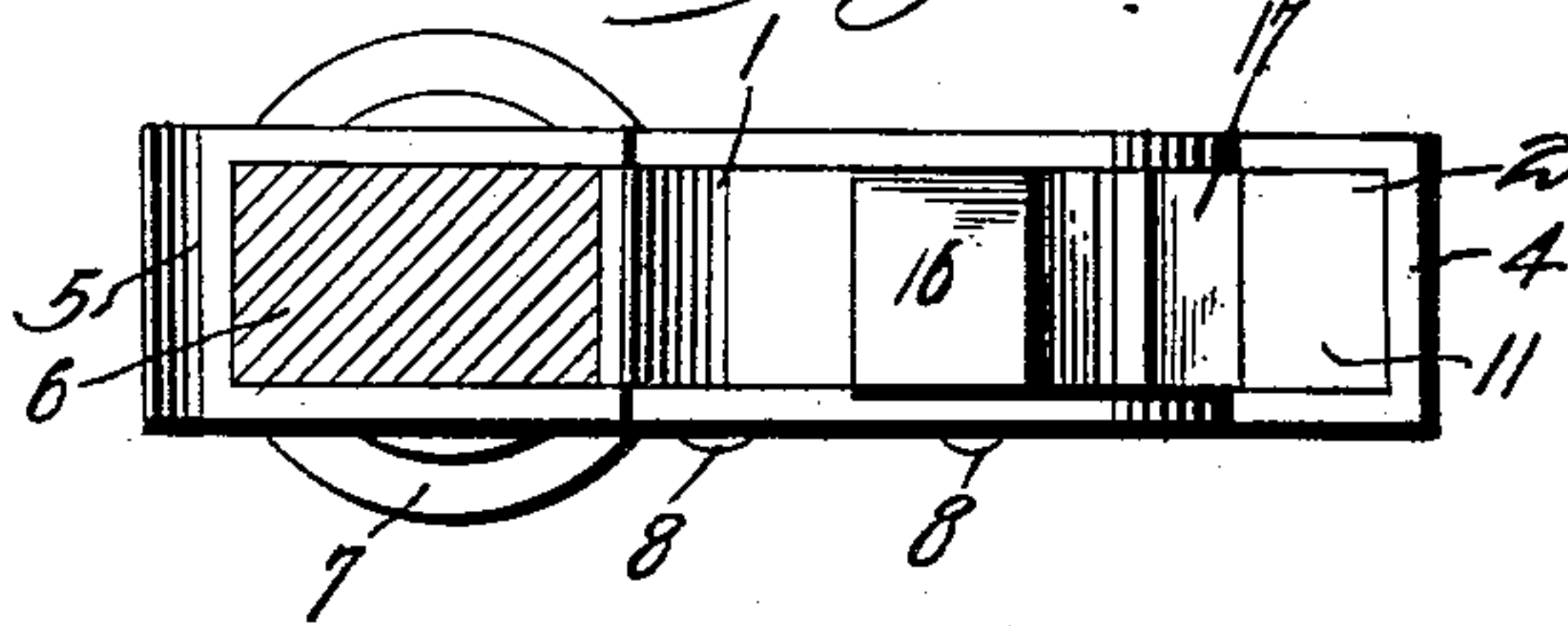


Fig. 3.



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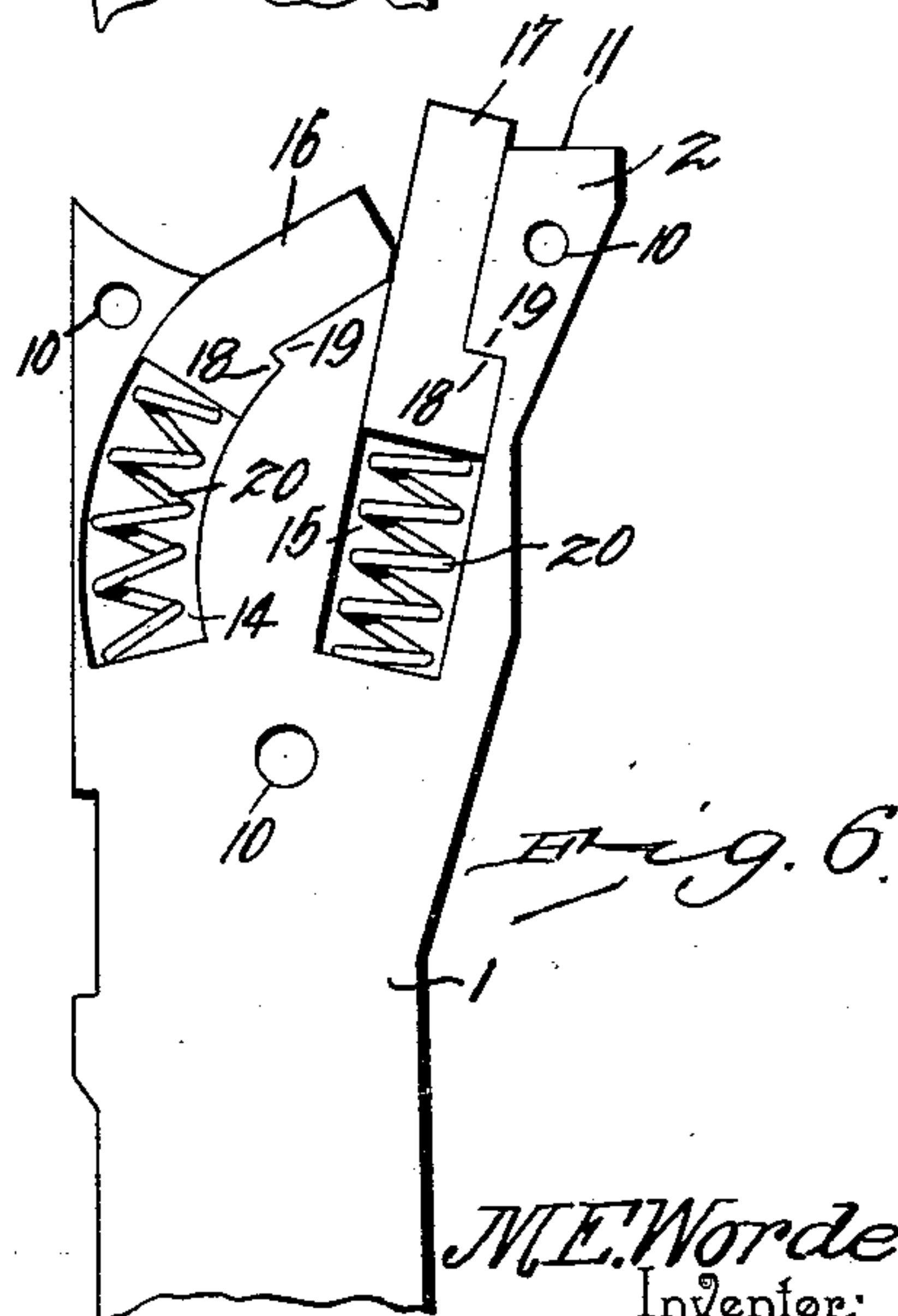
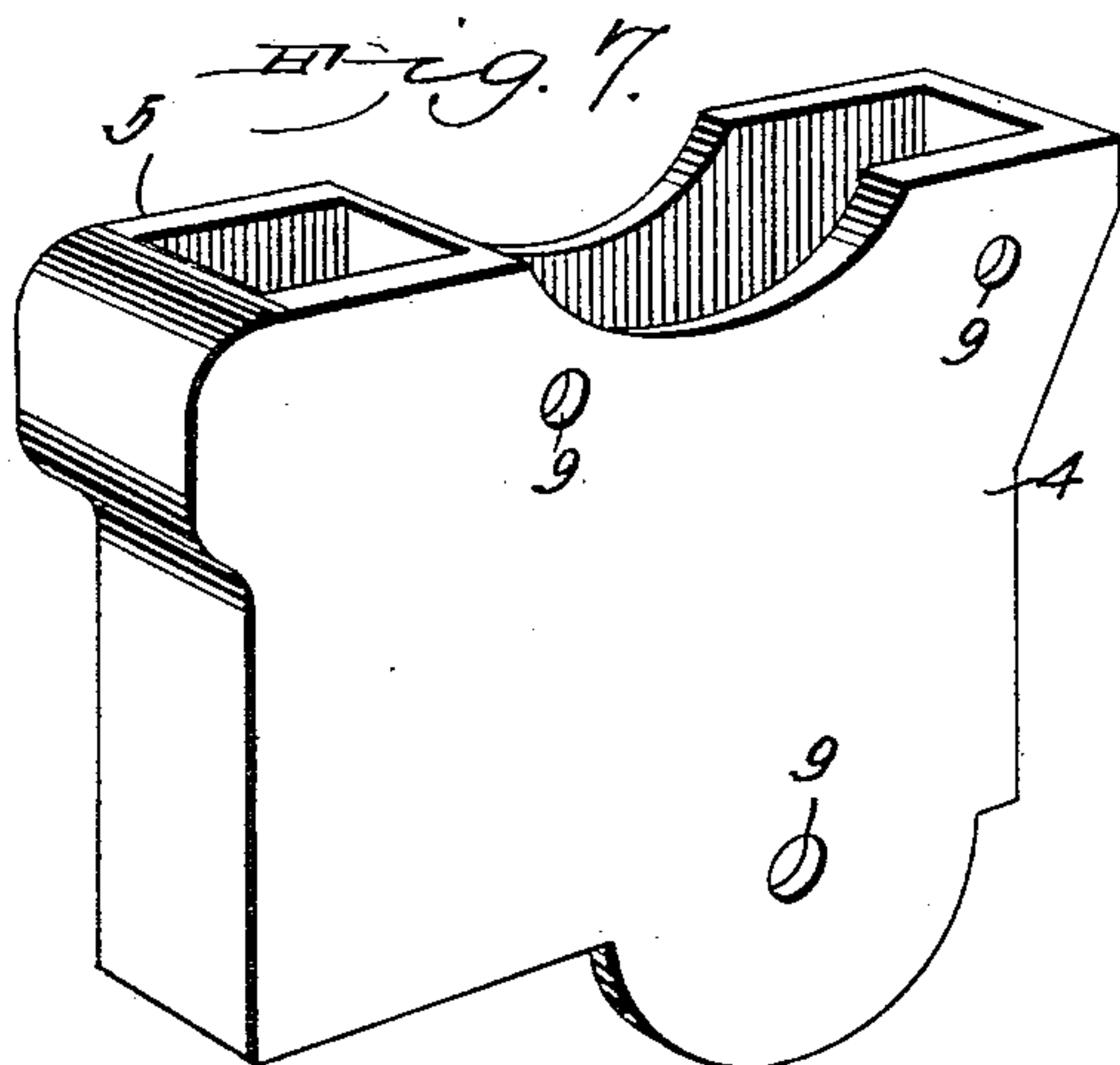
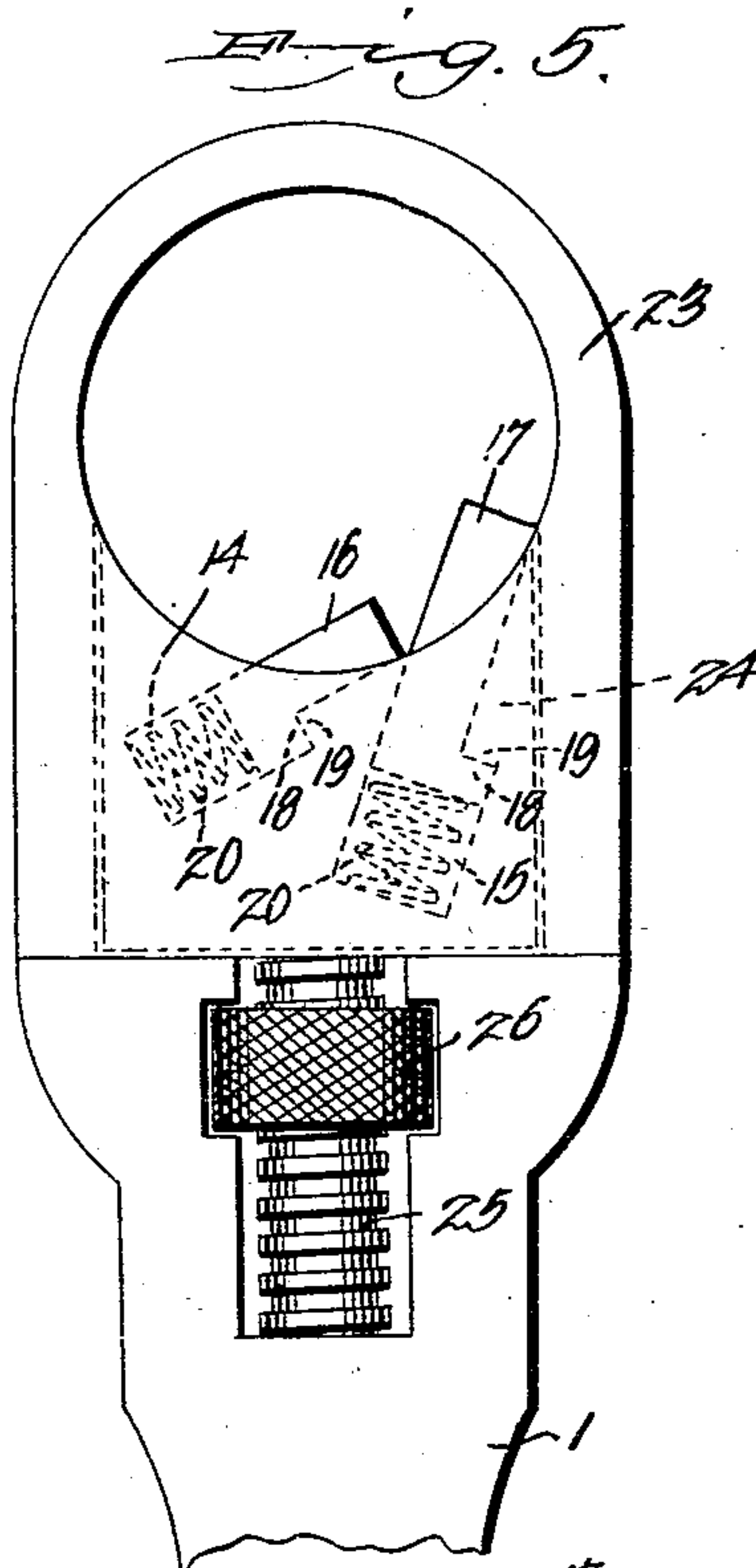
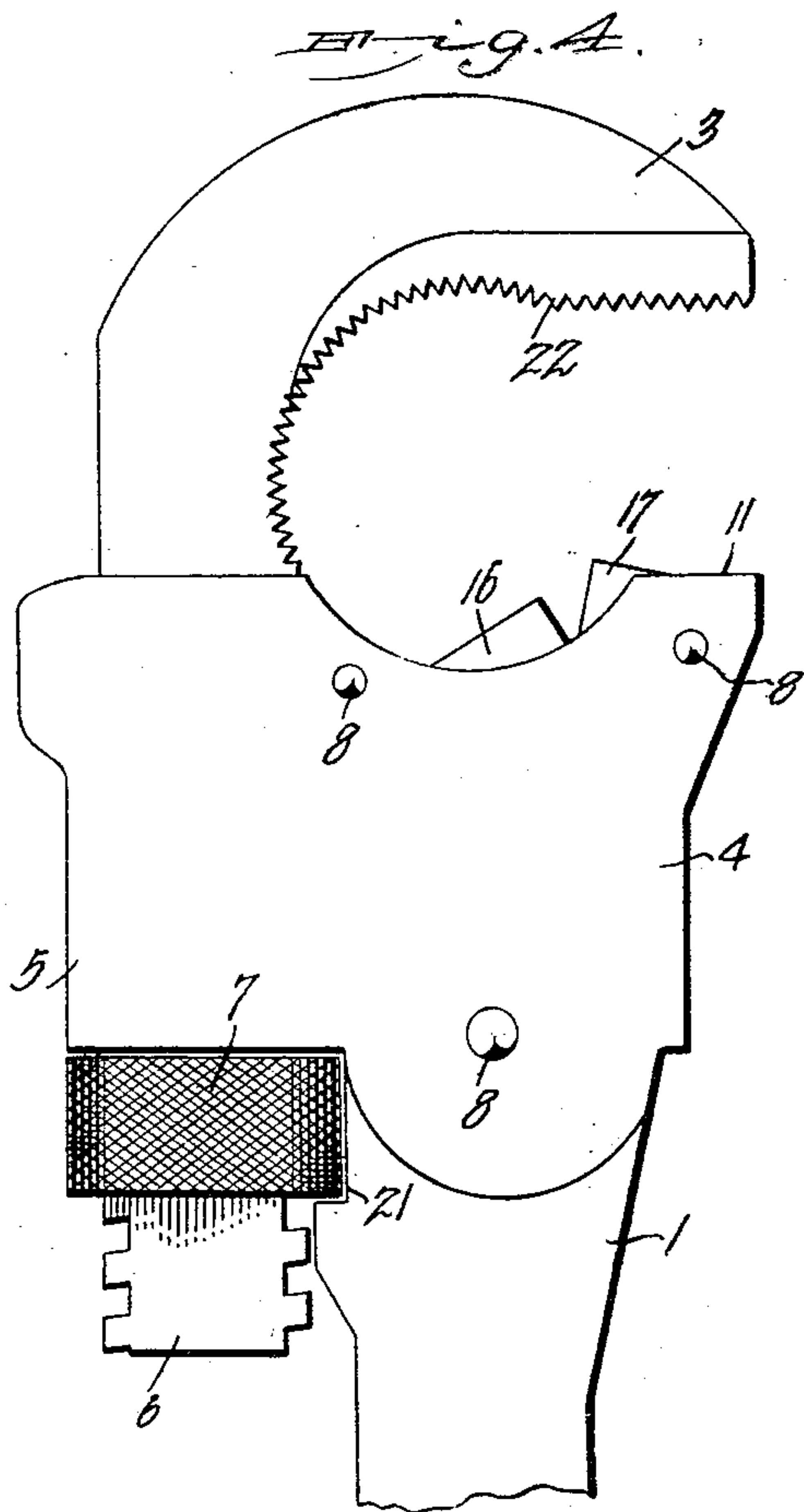
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UNITED STATES PATENT OFFICE.

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WRENCH.

SPECIFICATION forming part of Letters Patent No. 733,525, dated July 14, 1903.

Application filed June 25, 1902. Serial No. 113,161. (No model.)

To all whom it may concern:

Be it known that I, MINER E. WORDEN, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a new and useful Ratchet-Wrench, of which the following is a specification.

The invention relates generally to wrenches, and particularly to a novel form of ratchet-wrench.

The device of the present invention involves a radical departure from wrenches of this character generally in use. In the ordinary form of ratchet-wrench the dogs or pawls engage with the ratchet-teeth of a head or socket to effect its rotation, and thus the turning of a nut, and while thoroughly effective for the purpose designed the scope of its usefulness is limited, for the reason that the head or socket is adapted to fit only one size of nut.

With the device of the present invention the rotatable head or socket is dispensed with and the pawls or dogs are associated with one of the jaws in such manner as to constitute gripping or engaging devices or members capable of coaction with nuts or other objects, such as pipes, &c., of as many sizes and shapes as are the jaws of an ordinary wrench. Under the vibrations of the stock the nut-gripping devices are caused on one movement to engage with the object to effect its turning and on the opposite movement to recede or slide over its face to permit a fresh purchase for a subsequent operation; but there is always one of the devices in operative engagement with the object, so that no lost motion ensues, a decided point of advantage over the ordinary ratchet-wrench. The construction and arrangement of the parts are such that the leverage or torsional thrust resulting from the vibrations of the stock is not centered on the gripping devices, but is transmitted to the other jaw, and in operation the greater the power applied to the stock the greater will be the force of contact between the last-named jaw and the object operated upon.

It is the object, therefore, of the present invention to provide a wrench which will in a ready, thoroughly feasible, practical, and rapid manner effect seating and unseating of

nuts or coupling and uncoupling of pipes, &c., and which shall have a range of adaptability to objects of this character limited only by the capacity of the jaws to accommodate them.

With these and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a ratchet-wrench, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate corresponding parts, there are illustrated three forms of embodiment of the invention, each capable of carrying the same into practical operation, it being understood that the elements therein exhibited may be varied or changed as to shape, proportion, and exact manner of assembly without departing from the spirit thereof, and in these drawings—

Figure 1 is a view in elevation, partly in section, of a wrench embodying the essential features of the present invention, showing one of the gripping devices in engagement with a nut and the other one idle. Fig. 2 is a view similar to Fig. 1, showing the idle gripping device of Fig. 1 in operative engagement with the nut. Fig. 3 is a view in transverse section, taken on the line 3 3, Fig. 1, and looking in the direction of the arrow thereon. Fig. 4 is a view in elevation, exhibiting the invention applied to an ordinary pipe-wrench. Fig. 5 is a similar view of another form of pipe-wrench. Fig. 6 is a view in elevation of the upper portion of the stock, the mechanisms operable in connection therewith being removed with the exception of the gripping devices and their actuating springs. Fig. 7 is a perspective detail view of a head or sleeve for inclosing the upper portion of the stock.

Referring to the drawings and to Figs. 1, 2, 3, 6, and 7 thereof, 1 designates an ordinary stock or handle having a fixed jaw 2 and a movable jaw 3. The upper portion of the stock is housed in a head or sleeve 4, the back of which is provided with a reinforced guide 5, in which fits the shank 6 of the jaw 3, the shank being provided with the usual threads to be engaged by an adjusting-nut 7.

The form of stock, head, and movable jaw herein shown is exhibitiv of one form of each that may be employed, it being understood that the invention is not to be limited to the precise arrangement shown, as these parts may be otherwise constructed and still be within the scope of the invention. The head is held associated with the stock in this instance by three pins 8, which pass through openings 9 in the head and alined openings 10 in the upper portion of the stock.

The fixed jaw 2 is provided with a flat face 11 to coact with a similar face 12 of the movable jaw, thus to present an ordinary parallel-jawed wrench, and the rear wall of the movable jaw, as also the upper portion of the head, is curved or cut away, preferably on the arc of a circle, for the reception of the faces of a nut, as clearly shown in Figs. 1 and 2, or for the reception of a pipe, rod, or the like, as shown in Figs. 4 and 5.

The head is made, by preference, in one piece and is shaped to conform snugly to the upper portion of the stock, as clearly shown in Figs. 1 and 2, the offset formed by the face 11 operating to limit inward insertion of the stock within the head.

The upper portion of the stock is provided with two chambers or slots 14 and 15, disposed at an angle to each other and adapted for the reception of dogs 16 and 17, which constitute the gripping devices, outward movement of the dogs within the chambers being limited by coaction between shoulders 18 on the latter and stops 19 on the former, as clearly shown in Fig. 6. The chamber 14 is shown as curved in Figs. 1, 2, and 6; but, if preferred, it may be made straight, as shown in Fig. 5, and these two chambers are pitched at an angle to each other, in this instance of approximately forty-five degrees, it being understood, of course, that this angle may be increased or diminished if found necessary or desirable. By this angular disposition of the gripping devices the stock may be vibrated a full quarter of a revolution before being returned to its normal position to bring the idle gripping device into engagement with the object to be turned, the two adjustments of the said devices with relation to the said object being clearly shown in Figs. 1 and 2.

In order to cause the gripping devices normally to be projected into the path of the object to be turned, coiled springs 20 are provided, which bear, respectively, against the rear walls of the chambers and the like ends of the said devices.

In assembling the stock with the head the first-named element, with the gripping devices associated therewith, is inserted through the upper end of the head, and the pins 8, which are preferably slightly tapered, are inserted in the orifices 9 and 10. The adjusting-nut 7 is then seated in a recess 21, provided in the upper rear portion of the stock for its reception, and the threaded portion of the movable jaw is then inserted through the

guide 5 and into engagement with the nut, after which the latter is turned to draw the shank downward therein, the nut being braced by the under side of the guide 5 and held from disconnection from the shank, except when desired, by the walls of the recess 21.

In the use of this wrench and when either of the gripping devices is in engagement with the nut, as indicated by dotted lines in Figs. 1 and 2, vibration of the stock in the direction of the arrow—say in the case of Fig. 1—will cause the gripping device 16 to impinge the nut and upon continued movement of the stock to turn it, and under rotation the line of force upon the said device becomes tangential to the axis of rotation of the nut, thereby forcing the latter in an angular direction rearwardly against the inner curved face of the movable jaw and rigidly clamping it there during the remainder of the stroke of the stock. When the stock is moved in the opposite direction, the gripping member 16 is disengaged from the nut and recedes into its chamber, allowing it to slide down the face of the nut, and the member 17 is now projected and engages with the nut, and so on.

As shown in Fig. 4, the movable jaw may be provided with a serrated face 22 when the device is to be used as a pipe-wrench, and this jaw may be furnished with the wrench, thus to present a combination-tool.

As shown in Fig. 5, which exhibits another form of pipe-wrench, the stock may be provided with a yoke 23, between the members of which is arranged a movable jaw 24, carrying the gripping devices, the said jaw being provided with a threaded shank 25, to be engaged by an adjusting-nut 26. As the operation of this latter form of wrench will be obvious, detailed description is deemed unnecessary.

The provision of the head or sleeve 4 is of importance, for the reason that while it serves positively to hold the gripping devices in operative position it may readily be detached from the stock should the said devices become damaged and it be desired to repair them.

From the foregoing description it will be seen that although the wrench of this invention is exceedingly simple of construction it will be thoroughly efficient in use for the purpose designed and may be readily manufactured without the employment of special machinery for the purpose.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wrench, the combination with one of its jaws, of a gripping member, and means whereby under the vibrations of the stock the member is caused alternately and automatically to project toward and recede from the other jaw in the direction of the length of the stock.

2. In a wrench, the combination with one of

its jaws, of an angularly-disposed gripping member, and means to cause the said member alternately and automatically to project toward and recede from the other jaw under the vibrations of the stock and in the direction of the length thereof.

3. In a wrench, the combination with one of its jaws, of a spring-pressed gripping member, and means to cause it to have automatic reciprocatory movement with relation to the other jaw under vibration of the stock and in the direction of the length thereof.

4. In a wrench, the combination with one of its jaws, of a spring-pressed gripping member disposed at an angle to and adapted for automatic reciprocation with relation to the other jaw and in the direction of the length of the stock.

5. In a wrench, the combination with one of its jaws, of a gripping member adapted for reciprocation in the direction of the length of the stock and having its operative face disposed at an angle to the operative face of the other jaw.

6. In a wrench, the combination with one of its jaws, of reciprocating gripping members disposed at an angle to each other, one of said members being movable in a curved path.

7. A wrench having one of its jaws provided with reciprocatory gripping members disposed at an angle to each other.

8. A wrench having a fixed jaw and reciprocatory gripping members carried thereby and disposed at an angle to each other.

9. A wrench having a fixed jaw and spring-pressed reciprocatory gripping members carried thereby and disposed at an angle to each other.

10. In a wrench, the combination with one of the jaws, of a pair of automatically-setting gripping-dogs disposed at opposing angles with relation to each other.

11. In a wrench, the combination with one of the jaws of a pair of automatically-setting gripping-dogs disposed at an angle to the operative face of the jaw.

12. In a wrench, the combination with one of the jaws of a pair of automatically-setting gripping-dogs disposed at an angle to the operative face of the jaw, and at opposing angles with relation to each other.

13. In a wrench, a jaw provided with chambers, in combination with gripping members arranged therein, and projecting beyond the operative face of the jaw.

14. A wrench having one of its jaws provided with gripping devices, the operative

faces of which are disposed toward the rear of the jaw.

15. A wrench having one of its jaws provided with a pair of automatically-setting gripping devices, the operative faces of which are disposed toward the rear of the jaw.

16. A wrench having one of its terminal portions provided with gripping members, a head detachably associated with the said terminal and housing the members, and a movable jaw associated with the head.

17. In a wrench, a stock provided at one terminal with gripping members disposed at an angle to each other, a head detachably associated with the terminal, and an adjustable jaw carried by the head and coacting with the said members.

18. In a wrench, a stock provided at one terminal with gripping members and with a lateral extension constituting a jaw, a head inclosing the terminal and having an offset to coact with the extension to limit insertion of the stock therein, and a movable jaw associated with the head.

19. In a wrench, a stock having one end provided with chambers disposed at an angle to each other, gripping members mounted in the chambers, and a sleeve secured to the stock and housing the said members.

20. In a wrench, a stock having one end provided with chambers disposed at an angle to each other, spring-pressed gripping members mounted in the chambers, and a sleeve secured to the stock and housing the said members.

21. In a wrench, a stock having one end provided with chambers disposed at an angle to each other, one wall of each chamber being provided with a stop, spring-pressed gripping members mounted in the chambers and having shoulders to engage the stops, and a sleeve secured to the stock and housing the said members.

22. In a wrench, a stock having one end provided with two chambers one of which is straight and the other curved, spring-pressed gripping members mounted in the chambers, and a sleeve secured to the stock and housing the members.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

MINER E. WORDEN.

Witnesses:

E. E. DOYLE,

FRANK S. APPLEMAN.