

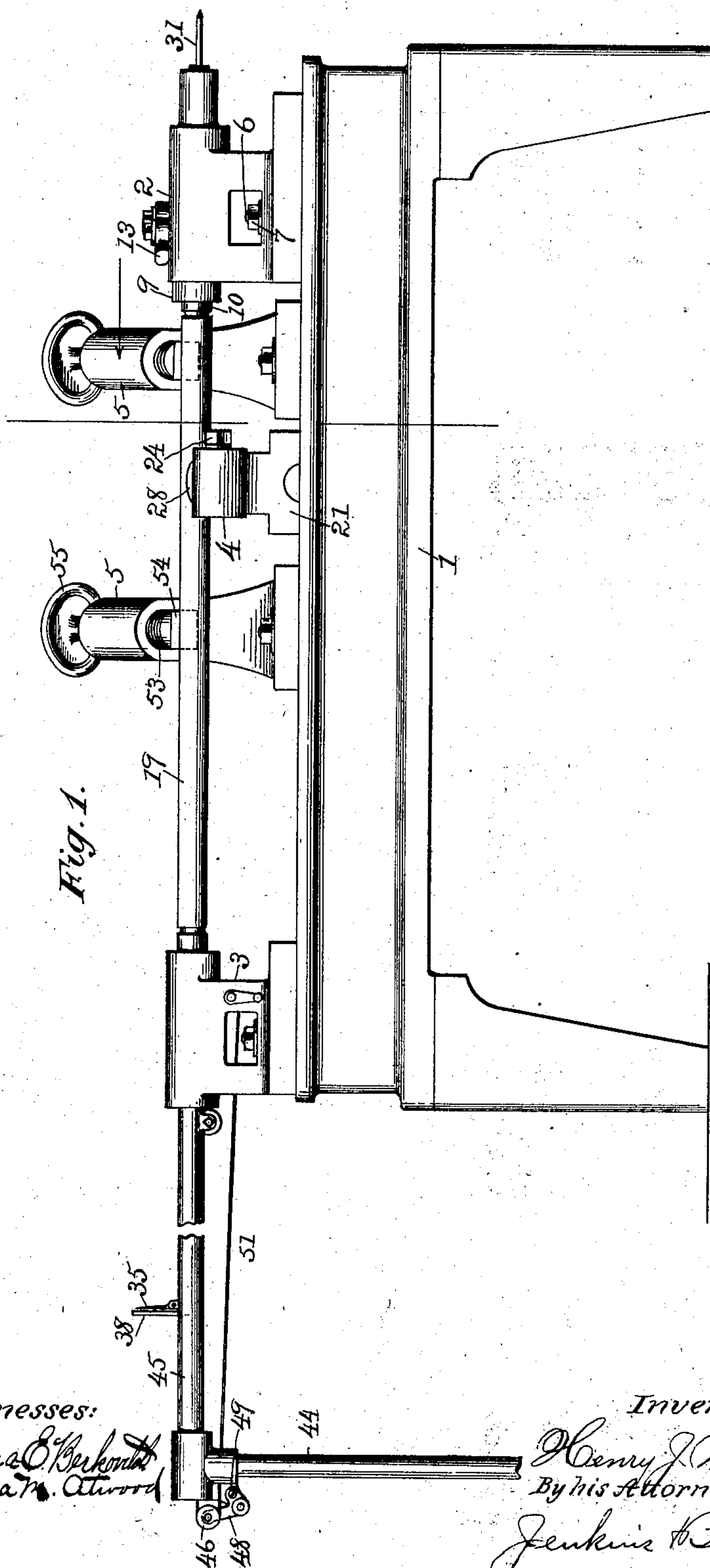
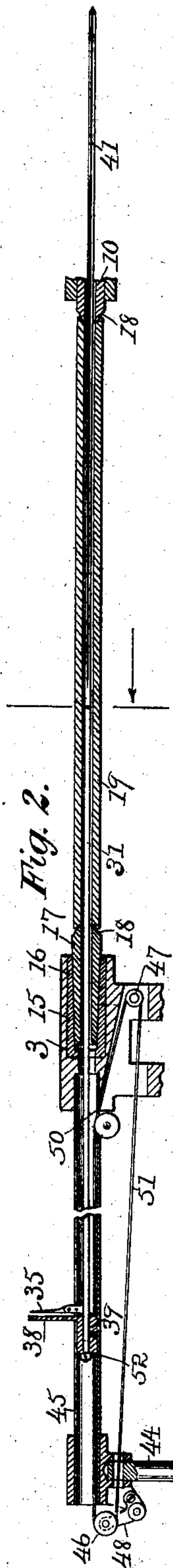
No. 791,282.

PATENTED MAY 30, 1905.

H. J. NICHOLS.
TESTING MACHINE.

APPLICATION FILED APR. 15, 1904.

2 SHEETS—SHEET 1.



Witnesses:

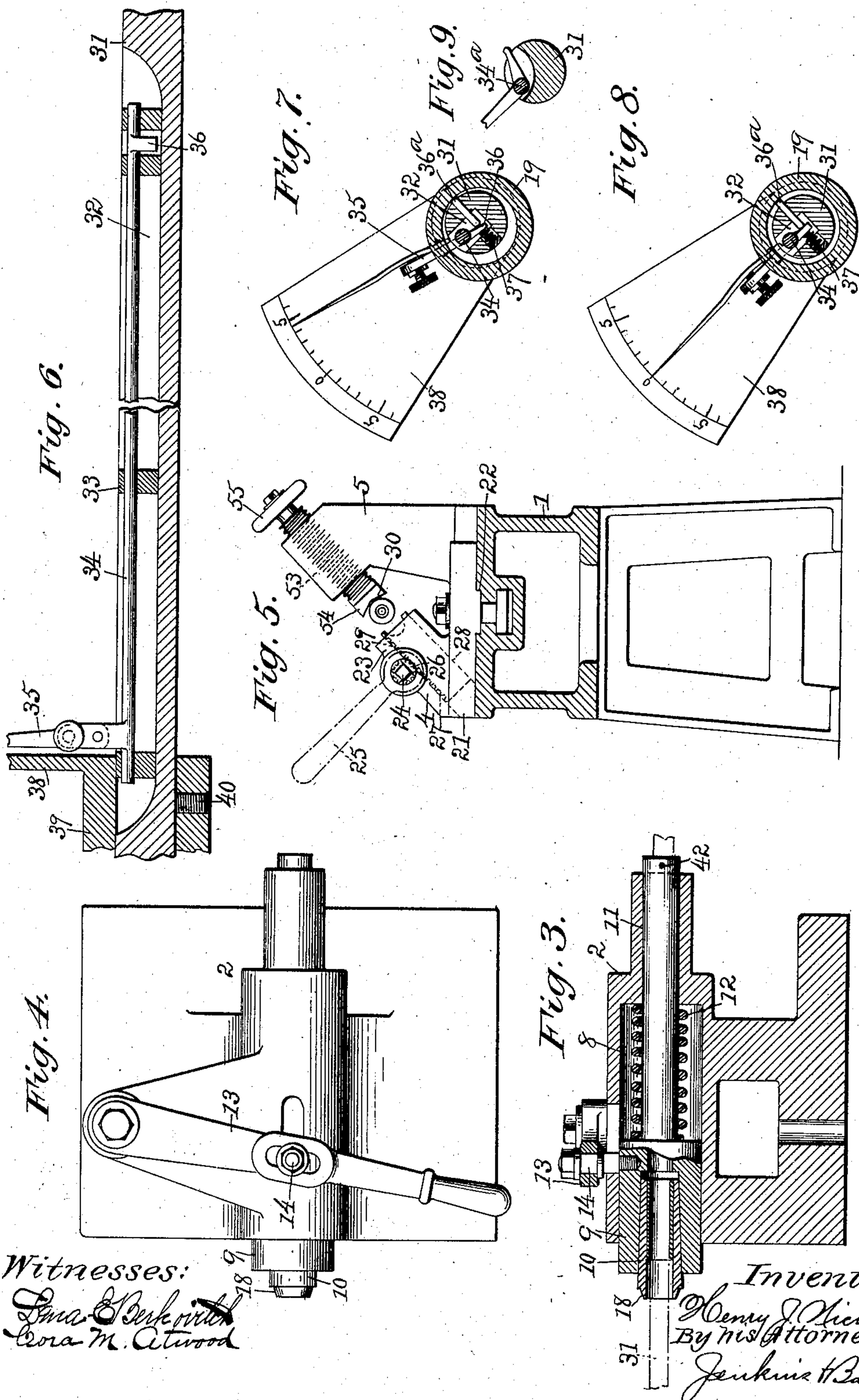
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HENRY J. NICHOLS, OF WESTFIELD, MASSACHUSETTS.

TESTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 791,282, dated May 30, 1905.

Application filed April 15, 1904. Serial No. 203,314.

To all whom it may concern:

Be it known that I, HENRY J. NICHOLS, a citizen of the United States, and a resident of Westfield, in the county of Hampden and State of Massachusetts, have invented a certain new and Improved Testing-Machine, of which the following is a specification.

My invention relates to a machine more especially adapted for testing tubes; and the object of my invention is to provide a device by means of which a tube, as a gun-barrel, may be tested for the purpose of truing up by the aid to a great extent of mechanical means; and a further object of the invention is to provide a device by means of which a tube, as a gun-barrel, may be expeditiously and accurately tested.

A form of device by the use of which the above objects may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in front elevation of a machine embodying my invention. Fig. 2 is a detail view in section through a portion of said machine and showing a gun-barrel in place. Fig. 3 is a detail view, on enlarged scale, in vertical section, through the head-stock. Fig. 4 is a top or plan view of the head-stock. Fig. 5 is a detail view, in vertical section, through the machine on the line indicated in Fig. 1. Fig. 6 is a detail view, on enlarged scale, in longitudinal section, through the indicator-support. Fig. 7 is a detail view, on enlarged scale, in cross-section, through the indicating device, showing the pointer or indicator in abnormal position. Fig. 8 is a like view showing the pointer or indicator in its normal position. Fig. 9 is a detail view in cross-section through the indicator-support and indicator, showing a modified form of the invention.

In the accompanying drawings the numeral 1 denotes the base of the machine, that may be supported in any usual and ordinary way, as upon legs, and upon this base are mounted the operative and movable parts of the device. These parts consist of a head-stock 2, a tail-stock 3, a straightener 4, and intermediate supports 5. The head-stock is mounted upon the base and is adjustable therealong, as by means of a bolt 6, extending through

the head-stock and through the base, the lower end of the bolt being suitably headed, and a nut 7 is employed for clamping the parts in place. The lower portion of the head-stock may be suitably formed to prevent lateral movement on its base or support and in any well-known manner common to devices of this class. The upper part of the head-stock has a shouldered recess 8, in which is located a center bushing 9 for a center 10. The bushing is enlarged at that end toward the center of the machine, and the opposite end extends through an opening 11 from the recess 8. A spring 12 is located in the recess 8 and rests with one end against the wall of the recess and the other end against the shoulder formed between the reduced and enlarged portions of the bushing. The center 10 is accurately fitted within the bushing 9, this center being tapered at that portion located within the bushing, as shown in Fig. 3 of the drawings.

A lever 13 is pivoted at one end to the head-stock, at the upper edge thereof, this lever projecting laterally across the head-stock and having a pin 14 projecting through a slot in the stock and engaging the bushing 9. By swinging this lever on its pivot the bushing may be forced backward against the tension of the spring 8.

In the tail-stock 3 a recess 15 is formed in which is located a center bushing 16 for the reception of a center 17. The construction of this center and bushing is much the same as that above described with relation to the center and bushing of the head-stock, except that in the present instance the bushing may be fixed within the tail-stock or movable in the same manner as in the head-stock. Each of the centers is tapered, as at 18, for the reception of a barrel 19, which is to be operated upon.

The straightener 4 includes a straightener-base 21, which is supported on the base 1 and constructed to have a movement therealong, the base being provided with any suitable means, as a boss 22, for preventing lateral movement of the base. This base is preferably freely slidable along the base of the machine and may have devices, as shown, for

clamping it in any desired position when required. A support 23 projects upward from the base, and in this support is mounted a shaft 24, to which are secured a bending-lever 5 25 and a gear 26. In an opening 27, extending through the support, is mounted a plunger 28, having a rack 29 in mesh with the gear 26. The front end of the plunger is adapted to engage a gun-barrel 19, and the 10 lever is employed to exert a pressure upon the barrel to remove any bend which may exist therein.

The intermediate supports 5 may be located between the head and tail stocks and the 15 straightener. These supports may consist of a base similarly formed as that hereinbefore described with relation to the head and tail stocks and the straightener, being provided with similar means for preventing lateral 20 movement and for clamping them in position. Each of these supports may have a recess 30, within which the gun-barrel may be located.

An indicator-bar carrier 31 is adapted to be located in the openings through the bushings 25 9 and 16 and also through the centers 10 and 17 and the gun-barrel supported thereon. This carrier is provided at one end with an indicator groove or recess 32, in which is secured indicator-bar bushings 33. An indicator-bar 34 is located within these bushings 30 and is rotatable therein. One end of the indicator-bar is bent or extended to form a pointer or indicator 35, located near the end of the indicator-tube, and the opposite end of 35 the indicator-bar is bent or extended to form a finger 36, which is adapted to rest against a feeler that is adapted to make contact with the inner surface of a gun-barrel supported in the machine. The feeler 36^a extends through 40 the wall of the carrier into the groove, its inner end lying loosely against the finger 36. A spring 37 is located within the groove in the carrier, with one end pressing against the finger 36, as shown in Figs. 7 and 8 of the 45 drawings, in a manner to hold the feeler 36^a with its outer end pressing against the inner wall of the gun-barrel 19.

A dial 38 is supported on the end of the carrier 31, the hub 39 of the dial having a set- 50 screw 40 projecting through the hub and against the carrier for the purpose of holding the dial in any position of adjustment. This dial is provided with suitable graduations, in connection with which the pointer 55 or indicator 35 is operated. In the preferred form of the invention, as shown herein, the zero-mark of the scale is located in the center of the dial, and the graduations are numbered from zero upward both to right and left of 60 the zero-mark. The opposite end of the indicator-bar carrier is provided with a guide-groove 41, in which is located a guide-pin 42, projecting through the head-stock 2 and bushing located therein, the end of the pin 65 resting in the groove and preventing rotary

movement of the carrier, but allowing free lengthwise movement thereof.

A standard 44 is located at any desired distance from the base of the machine, and an indicator-bar sleeve 45 has one end support- 70 ed in a recess in the standard and its opposite end in the tail-stock 3. The hub 39 of the dial has a sliding fit within this sleeve, which is slotted at its upper side to permit passage of the dial 38 and the pointer or indicator 35. 75 A pulley 46 is rotarily mounted on the standard 44, and a pulley 47 is also rotarily mounted on the tail-stock 3. The pulley 46 is mounted in a bracket 48, extending from the standard 44, and this bracket may be provided with 80 adjusting-screw 49, fitting the screw-threaded surface of the bracket. The indicator-bar sleeve is also provided with a slot 50, in which a belt 51 projects, this belt passing around the pulleys 46 and 47 and being secured, as 85 at 52, to the hub of the dial 38. The pulley 47 may be provided with a handle for the purpose of turning the pulley, and thus moving the indicator-bar carrier lengthwise of the machine. As shown herein, the indicator- 90 bar is located at one side of the center of the indicator-bar carrier; but while I do not intend to limit my invention to this location of the indicator-bar it will be found of especial advantage. With the indicator-bar and car- 95 rier thus relatively located the force required to rotate the indicator-bar may be utilized to the greatest advantage, this force being applied to the bar through a member located at an angle (preferably at about forty-five de- 100 grees) to a vertical and a horizontal line. The dial 38 and the pointer 35 are so arranged that with the indicator-bar and the part immediately connected therewith, to which power is applied, located in this position the pointer 105 shall register with the zero-mark on the dial. It will thus be seen that the gun-barrel and the indicator-bar carrier both being centered on the centers 10 and 17 if the gun-barrel is true at the point of contact of the feeler 36^a, the 110 feeler will touch the inner surface of the gun-barrel at such point that the pointer or indicator will register with the zero-mark on the dial. If, however, the gun-barrel shall be bent at the point of contact of the feeler with the bar- 115 rel and the bend shall be in a downward direction, the pointer will be thrown to the right from the zero-mark as one faces the dial, (see Fig. 7;) but if the barrel be bent in the opposite direction then the pointer or in- 120 dicator will be thrown in the opposite direction from the zero-mark. It may thus be ascertained at just what points along the barrel the latter is bent, and this point being determined the barrel is turned and the straight- 125 ener 4 moved to the point to be straightened, and by use of the handle 25 the plunger 28 is forced against the barrel to relieve the latter of the bend therein.

If a barrel or tube of a size different from 13

that just above described be placed in the machine, the feeler 36^a will of course be thrown outward to a greater or less degree, and the pointer would therefore be moved to the right or left of the zero-mark. In order to cause the pointer or indicator to register with the zero-mark, the adjustment of the dial on the indicator-tube is provided. This will adapt the machine and the same indicator-bar carrier and indicator-bar for use with barrels of different sizes. The intermediate supports 5 may be provided with a screw-threaded plunger 53, on the lower end of which is loosely and rotarily located a rest 54. A hand-wheel 55 may be employed to locate the rest in any position with reference to a gun barrel or tube placed in the machine.

In Figs. 7 and 8 of the drawings the feeler, which makes contact with the inner surface of the gun-barrel, is shown as loosely connected with the indicator-bar—that is, it is in the form of a pin which rests with its inner end against the finger 36. In the modified form of the device (shown in Fig. 9 of the drawings,) this feeler is rigidly connected with the indicator-bar and consists of a projection bent at a proper angle and formed to make contact directly against the inner surface of the tube or gun-barrel, thus doing away with the loosely-connected feeler. (Shown in Fig. 7 of the drawings.) It will be noted, however, that in each instance the force applied to the indicator-bar is communicated thereto through a rigid part located, preferably, at an angle of about forty-five degrees to a vertical and a horizontal line.

While my invention has been shown and described herein with special reference to a machine for straightening gun-barrels, in connection with which it finds ready application, it will be obvious that it might be extended to varied uses, and I do not desire to limit myself to the application as herein shown and described.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a support for a tube, an indicator-bar wholly supported independently of but projecting through the bearing of and within the tube, a feeler connected with the indicator-bar within the tube, and an indicator connected with the indicator-bar outside of the tube.

2. In combination with supports for each end of a tube, an indicator-bar wholly supported independent of but projecting within the tube, a feeler connected with the indicator-bar within the tube, and an indicator located outside of the tube and connected with the indicator-bar.

3. In combination with end supports for a tube, an indicator-bar projecting through one of said supports into but supported independent of the tube, a feeler connected with the indicator-bar within the tube, and an indicator

located outside of the tube and connected with the indicator-bar.

4. In combination with a support for a tube, an indicator-bar wholly supported independent of but projecting within the tube and having a feeler operating by contact with the inner surface of the tube to turn the indicator-bar, and an indicator connected with the indicator-bar outside of the tube.

5. In combination with supports for each end of a tube, an indicator-bar independently supported to project through a support into the tube, a feeler connected with the indicator-bar to turn the latter by contact with the inner surface of the tube, and an indicator located and connected with the indicator-bar outside of the tube.

6. In a testing-machine, supports for the ends of a barrel, an indicator-bar independently supported and projecting through a support, a feeler to be located in the barrel and connected with the indicator-bar and operated by contact with the inner surface of the barrel, a pointer connected with the indicator-bar outside of the barrel, and a dial to operate in connection with the pointer.

7. In a testing-machine, a support for a gun-barrel, an indicator-bar carrier to project at each end of said barrel, means for sustaining each end of the indicator-bar carrier, an indicator-bar mounted in the carrier, a feeler operated by contact with the inner surface of the barrel and loosely connected with the indicator-bar, and an indicator located outside of the barrel and connected with the indicator-bar.

8. In a testing-machine, a head and tail stock to support each end of a barrel, an indicator-bar carrier mounted in the head and tail stock, an indicator-bar mounted in the indicator-bar carrier, a feeler mounted in the indicator-bar carrier to operate in connection with the inner surface of a barrel and loosely connected with the indicator-bar, an index-pointer connected with the indicator-bar outside of the barrel, and a dial mounted on the indicator-bar carrier adjacent to said pointer.

9. In a testing-machine, a head and a tail stock, centers for a gun-barrel supported on said stocks, an indicator-bar carrier mounted at each end in a stock, and projecting through said centers, an indicator-bar mounted within the indicator-bar carrier, a feeler to be located within the barrel and connected with the indicator-bar, and indicating devices located outside of the barrel and appurtenant to one of said stocks.

10. In a testing-machine, a base, head and tail stocks mounted on the base, a center mounted in one of said stocks, a center mounted in and movable longitudinally in the other stock, an indicator-bar carrier having each end extending through one of said stocks, an indicator-bar mounted in the indicator-bar carrier and projecting through one of said cen-

ters, a feeler connected with the inner end of the indicator-bar, a dial located on the indicator-bar carrier, and an indicator-pointer connected with the indicator-bar adjacent to said dial.

11. In a testing-machine, supports for the ends of a tube, an indicator-bar projecting through a support, a feeler to be located in the tube to operate by contact with the inner surface of the tube and connected with the indicator-bar, a sleeve having a bearing for the indicator-bar and with one end attached to the support, a pointer connected with the indicator-bar outside of the barrel, and a dial to operate in connection with the pointer.

12. In a testing-machine, supports for the ends of a tube, an indicator-bar projecting through a support, a feeler to be located in the tube to operate by contact with the inner surface thereof and connected with the indicator-bar, a sleeve having a bearing for the indicator-bar and with one end attached to the support, and an indicator located outside the tube and connected with the indicator-bar.

13. In a testing-machine, supports for the ends of a tube, a sleeve having one end attached to a support, an indicator-bar mounted in the sleeve and projecting through the support, a feeler to be located in the tube and connected with the indicator-bar, and an indicator connected with the indicator-bar and located outside of the tube.

14. In a testing-machine, supports for the ends of a tube, a sleeve having one end attached to a support, an indicator-bar carrier projecting through the supports and mounted in the sleeve, an indicator-bar mounted in the indicator-bar carrier, a feeler connected with the indicator-bar to be located within the tube, and an indicator located outside of the tube and connected with the indicator-bar.

15. In a testing-machine, supports for the ends of a tube, a sleeve having one end attached to a support, an indicator-bar carrier located concentrically with and supported in the end supports and with one end resting in said sleeve concentric therewith, an indicator-bar eccentrically mounted in the indicator-bar carrier, a feeler connected with the indicator-

bar to be located within the tube, and an indicator connected with the indicator-bar to be located outside of the tube.

16. In combination with a support, an indicator-bar mounted to rotate in the support, a projection from one end of the indicator-bar located radially thereof to transmit power thereto, an index-hand connected with and located radially of the opposite end of the indicator-bar, and a dial appurtenant to the index-hand.

17. In combination with a support, an indicator-bar carrier mounted on the support, an indicator-bar rotatably mounted in the indicator-bar carrier, a projection extending radially from one end of the indicator-bar, an index-finger connected with and projecting radially from the opposite end of the indicator-bar, and a dial located appurtenant to the index-finger.

18. In combination with a support, a rotatable indicator-bar, a projection extending radially from one end of the indicator-bar to transmit power thereto, an index-hand projecting radially from the opposite end of the indicator-bar, and a dial located appurtenant to the indicator-bar.

19. In combination with a support, an indicator-bar carrier mounted on the support and having a lengthwise groove, blocks located within the groove, an indicator-bar mounted in said blocks, a projection extending radially from one end of the indicator-bar, an index-hand projecting radially from the opposite end of the indicator-bar, and a dial located appurtenant to the index-hand.

20. In combination with a support, an indicator-bar carrier mounted on the support, an indicator-bar eccentrically mounted to rotate in said carrier, an indicator-feeler connected with one end of the indicator-bar, an index-hand connected with the opposite end of the indicator-bar, and a dial located appurtenant to the index-hand.

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