Dec. 15, 1925. 1,565,502

F. RODLER

PENETROMETER

Filed Oct. 23, 1924 2 Sheets-Sheet 1

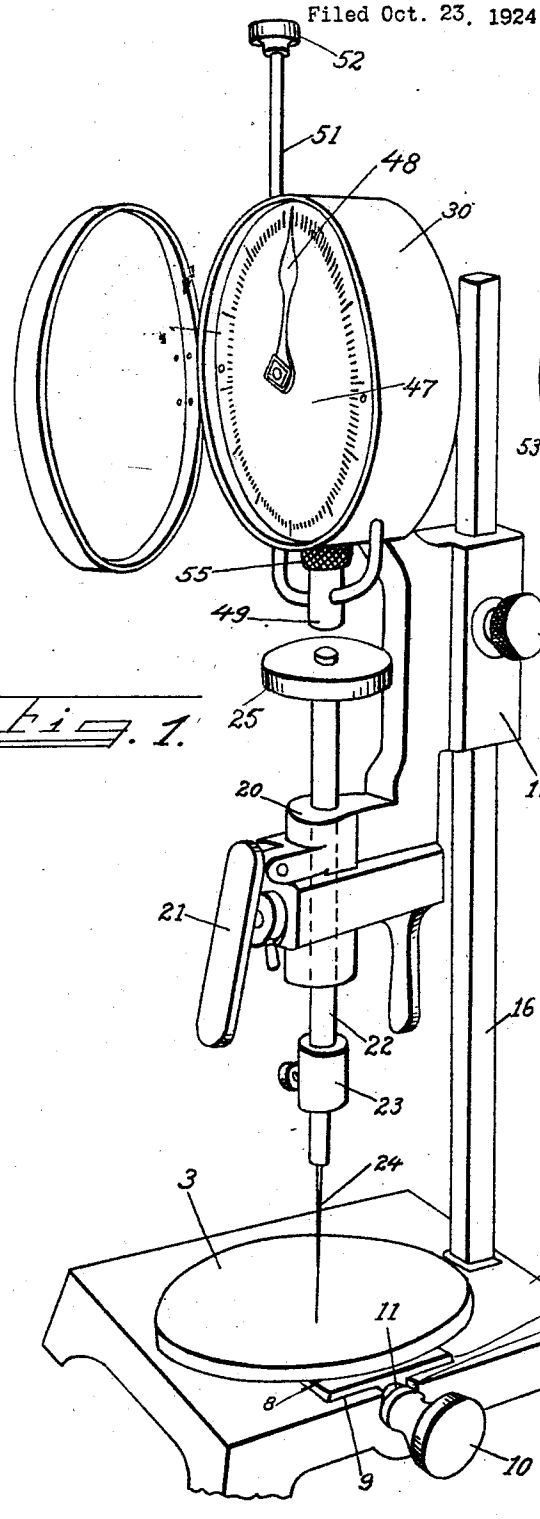



Fig. 1.

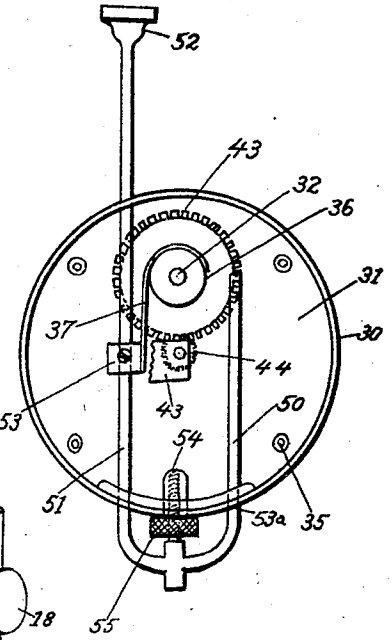



Fig 2

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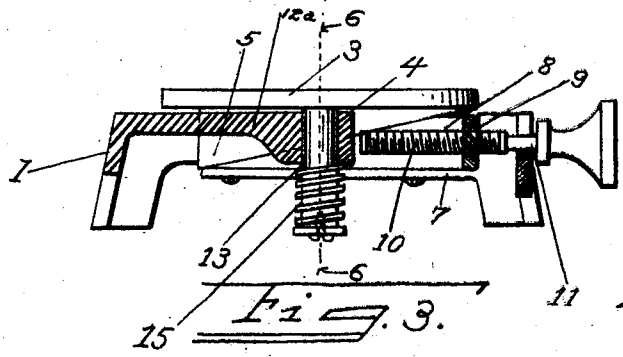



Fig. 3.

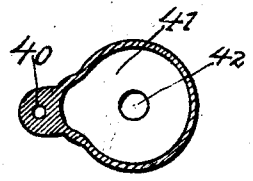



Fig 5

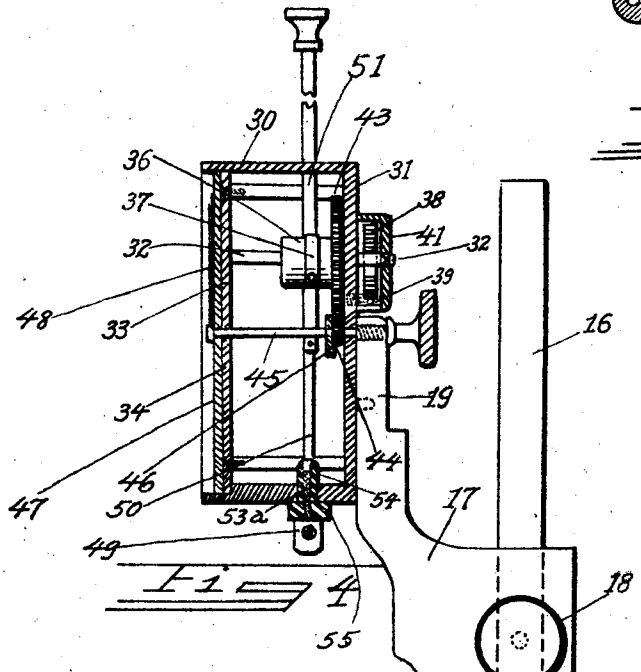



Fig 4

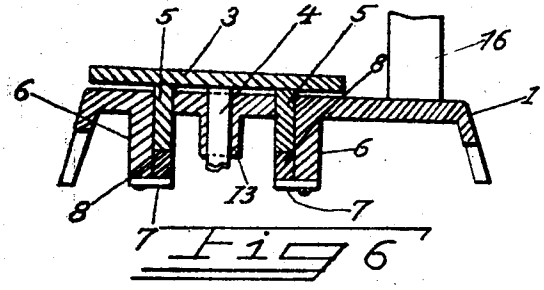



Fig 6

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# UNITED STATES PATENT OFFICE.

FRED RODLER, OF CINCINNATI, OHIO.

## PENETROMETER.

Application filed October 23, 1924. Serial No. 745,487.

*To all whom it may concern:*

Be it known that I, FRED RODLER, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Penetrometers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to penetrometers, in which the desired operation is to permit a weighted needle to rest on a piece of material for a given length of time and then by means of a gauge to read the amount of penetration of the needle.

In machines of this character the accuracy of work is determined by the nicety of the first adjustment of the needle with relation to the gauge, and the accuracy of the gauge itself.

My invention has as its object the construction inexpensively of a suitable gauge, in which the main arbor is given adequate support, thereby permitting a gear and pinion drive for the gauge needle, to be used as a perfectly reliable mode of operation. It is my object to simplify the structure of means for return spring, and means for driving the main arbor by means of a flexible strip of metal engaging over a drum, the motion of which is opposed by the said spring.

It is also my object to provide a micrometer adjustment of the needle, gauge at zero, and piece of material to be tested, to the end of starting the work at an accurate point.

I accomplish my objects by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings:

Figure 1 is a perspective view of the device.

Figure 2 is a front elevation of the gauge with the cover plates removed.

Figure 3 is a detail cross section of the micrometer table.

Figure 4 is a central vertical cross section of the gauge.

Figure 5 is a detail plan view of the spring housing.

Figure 6 is a section on line 6—6 of Figure 3.

Referring to the structure shown in the drawings which is given as a typical example of my invention, I provide a table-like base 1, having an aperture 2, for the table operating elements. The work supporting table 3 has a central post 4, and a pair of inclined depending webs 5, 5. The base has a pair of depending webs 6, 6, and a wedge is provided which is set beneath the webs 5, and rests on supporting plates 7, 7, secured on the bottom edges of the base webs 6. The wedge is formed as a fork, with the tines 8, 8, of wedge-like shape and a cross member 9, into which is threaded the adjusting screw 10. The adjusting screw has a smooth portion 11, which seats in a notch 12 in the edge of the table so that the screw cannot move endwise with relation to the table. The turning of the head of the screw will thus force the wedge tines in or out with relation to the base, and raise the table or permit it to lower.

In order to guide the table, the base is formed with a projection $12^a$ terminating in a boss 13, there being space left for the table webs 5 at both sides of the projection. The central post 4 is secured to the table and passes down through the boss. A spring 15 mounted on the end of the post bears against the boss and tends to force the table downwardly, so that it follows the adjusting wedge.

It is evident that this construction permits of fine adjustments of the table, which will give a micrometer adjustment. It is my intention that the rough adjustments for work to be done, be accomplished by moving the gauge bodily, and the fine adjustments be made by moving the table, on which the material to be tested is arranged.

The standard 16 is mounted on the base and carries a slider 17, which is held in place on the standard, adjustably, by means of a set screw 18. The slider has a mounting plate thereon, as at 19, for the gauge, and it has also secured thereto, the needle plunger journal 20. I have not shown the details of this journal, but it will be understood that following general practice, a finger piece 21, when depressed will release the plunger for movement through the journal but when released will apply a brake to the plunger so that it cannot move.

The plunger is shown at 22, and has a chuck 23 for the penetration needle 24. At the upper end the plunger is to be equipped with weights, as at 25.

In operation the plunger is moved up

until it contacts at its upper end with the gauge contact piece. The slider is then moved along the standard, until the needle is close to the top face of a piece of material to be tested, that is resting on the table. The slider is then clamped and the table adjusted to bring the point of the needle into contact with the piece to be tested. The gauge being at zero position, the operator grasps the finger piece 21 and holds it in plunger releasing position for the required time. He then operates the gauge to give a reading of penetration of the needle.

I will now describe the preferred form of gauge. The casing of the gauge is indicated as having a cylindrical side wall 30, and a back wall 31. The main arbor 32 is jornaled in the back wall, and has a pointed forward end not shown which engages a depression for a point bearing in the cover plate 34. This plate 34 is mounted on posts 35 over the gauge mechanism in the usual manner for mechanisms of this character.

The arbor has a drum 36 on which is secured a metal ribbon 37, by means of which the arbor is operated. The arbor projects through the back wall of the casing, and beyond this wall has a coiled spring 38 thereon, which is held at its outer end by a slotted screw 39, set into the back wall.

The arbor projects beyond this spring, and a small housing is provided having an attaching lug 40 to be screwed to the back wall of the casing, and a hollow body 41 to surround the spring. In the body is a hole 42 to serve as a third journal for the main arbor.

It is thus evident that a three-point bearing is provided for the main arbor, in a very simple manner, and that abuse of the instrument cannot normally get the arbor out of line or distorted, and accordingly that the arbor will always run smoothly and accurately.

The arbor has a gear 43 thereon, which meshes with a smaller pinion 44, on the indicator arbor 45. This arbor is mounted in the back wall and passes through the cover plate, and a small bracket 46 (only indicated) will hold the pinion and hence the indicator arbor, in position of mesh with the gear 43.

The dial plate 47 is mounted over the cover plate by any desired means, and the indicator arrow 48 on the arbor 45 moves around the dial, which is calibrated to read in distances of penetration.

The contact piece 49 of the gauge is secured to a U-shaped rod, having the arms 50 and 51. The arm 51 passes up through the gauge and out at the top, and is equipped with a head 52. This arm has also the adjustable block 53 thereon, which holds the end of the metal ribbon that is not secured to the drum on the main arbor.

The rod portion 50 extends only part way into the gauge casing, and serves as a guide.

On top of the contact piece of the gauge is a screw 53[a], over which is set a screw cap 54. This cap has an enlarged knurled head 55, which abuts against the bottom of the gauge casing, and the body of the cap passes in and out of a hole in the bottom of the said casing. Thus by adjusting the cap, the uppermost position of the contact piece will be defined, and in operation this cap is adjusted to bring the indicator arrow to zero. The spring on the main arbor pulls up on the rods 50 and thus holds the cap normally in its uppermost position of abutment against the lower face of the gauge casing.

Proceeding with the operation of the device, following a setting of the needle into contact with the material to be tested, which I have already described, the operator permits the needle to penetrate the material for a given time. He then depresses the head 52 of the contact piece rod 51, which revolves the drum on the main arbor by means of the ribbon which is wound around it and secured to the rod. It also depresses the contact piece until it strikes the upper end of the plunger. The main arbor drives the indicator arrow around to give a reading of how far the contact piece was lowered, which will give a measure in fine degrees of distance which the needle penetrated during the given period of time.

Having thus described my invention by a typical example thereof, what I claim as novel therein and desire to secure by Letters Patent, is:—

1. In a penetrometer, the combination with a base and standard, of an adjustable element on the standard, said element having a gauge and needle plunger thereon, a material supporting table on the base, and means for giving micrometer adjustment in height to the table to provide fine adjustments of the position of the surface of a piece of material to be tested.

2. In a penetrometer, the combination with a base and standard, of an adjustable element on the standard, said element having a gauge and a needle plunger thereon, a material supporting table on the base, and a screw adjusted wedge for regulating the height of the table with relation to the base to provide fine adjustments of the position of the surface of a piece of material to be tested.

3. In a penetrometer, the combination with a needle plunger and gauge and a material support, of framework for supporting said plunger gauge and support, means for adjusting the position of the

gauge and plunger with relation to the framework, and means for adjusting the position of the material support with relation to the framework.

4. An adjustable material supporting table for penetrometers comprising, in combination with a base, a table having inclined depending webs thereon, vertically sliding means intermediate the table and the base, said webs passing through the base, an adjustable wedge arranged to support the table webs, and means on the base for supporting the wedge.

5. An adjustable material supporting table for penetrometers comprising, in combination with a base, a table having inclined depending webs passing through the base, webs depending in the base along which the table webs lie, a wedge having elements located in support of the inclined webs, supporting plates for the wedge elements secured to the base webs, and a screw rotatably mounted in the base, and threaded into the wedge, and means for guiding the table for vertical sliding only, with relation to the base.

6. An adjustable material supporting table for penetrometers comprising, in combination with a base, a table having inclined depending webs passing through the base, webs depending in the base along which the table webs lie, a wedge having elements located in support of the inclined webs, supporting plates for the wedge elements secured to the base webs, and a screw rotatably mounted in the base and threaded into the wedge, and means for guiding the table for vertical sliding only, with relation to the base, said means comprising a post depending from the table, a boss on the base, and a spring engaging the lower end of the post and of the boss, as and for the purpose described.

FRED RODLER.