April 13, 1937. F. O. CARLSON 2,076,704

STEEL RULE

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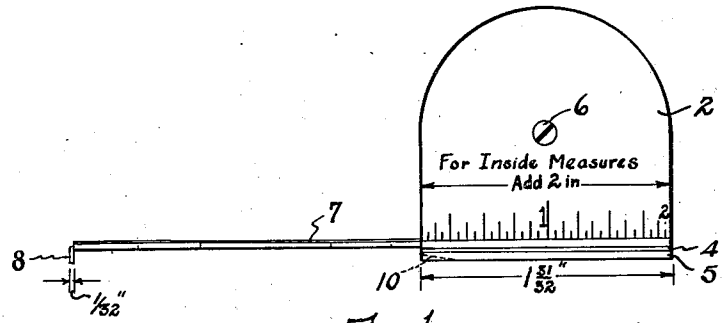


Fig. 1.

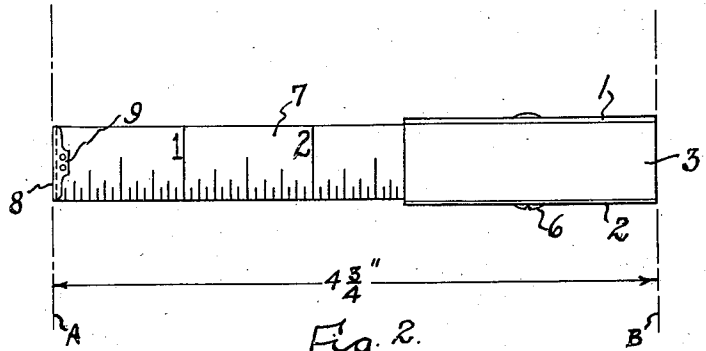


Fig. 2.

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STEEL RULE

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5 Claims. (Cl. 33—138)

This invention relates to improvements in steel rules more particularly, but not necessarily, of the type employing a ribbon of tempered steel of concave-convex cross section.

The general object of this invention is to provide a steel rule of this type so constructed as to adapt it for use as a height gauge, a depth gauge, an inside and outside measuring instrument, and for layout work, as well as for the other usual uses to which such rules are put.

A particular object of this invention is to provide a steel rule so constructed that it may be easily used for inside measurements, and may be directly read when so used.

A further object of this invention is to provide a hook at the end of the tape, of such construction as to permit of tipping of the rule when close measurements are to be made.

These and other objects, which will be particularly emphasized in connection with the following detailed description are secured by means of this invention.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be described in detail below.

In the drawing,

Fig. 1 is a side elevational view of a structure in accordance with this invention showing the steel tape extended; and

Fig. 2 is a top plan view.

The details of the invention will be described in connection with a tempered steel graduated measuring rule of the concave-convex type which is rolled up into a casing in actual form, and is withdrawn from and returned into the casing through an opening therein. Such measuring rules are well known in the art in many forms. The objects of this invention will become clearer from the following description.

As illustrated in the drawing, the instrument comprises a casing consisting of side plates 1 and 2 composed of three straight sides and one curved side, as is clear from Fig. 1. Interposed between these plates is a metal wall member 3, which is shaped to conform with the outline of the side plates, and may be secured between them in any suitable manner. As illustrated the cover member 3 does not enclose the bottom opening between the side plates. This opening is closed by means of a pair of plates 4 and 5 which are secured thereto in any suitable manner. These parts are secured together by means of a screw 6, or its equivalent. At 7 is the graduated tempered steel tape which is stored in the casing in coil form, in accordance with well known practice. The casing, including the bottom plates, may be formed of metal by casting or otherwise or may be molded from any suitable material, or otherwise constructed in accordance with well known practice in the art. The bottom cover plates may likewise be of any suitable material suitably formed and secured in place in any known manner.

The novel features of this invention consist of the end hook 8 secured to the free end of the tape at its top portion 9 by riveting or eyeleting. The hook portion 8 extends the full width of the tape and projects below the tape a distance no greater than the distance which the casing extends below the top so that when the tape is fully within the casing the hook will lie against the end of the casing without projecting either below it, or to the sides thereof.

To permit of easy initial withdrawing of the tape the bottom plate 5 is provided with a fingernail curve 10'. The hook member 8 is either transversely curved or narrowed into the tape portion sufficiently so as not to deform the tape from its natural concave-convex shape.

As will be clear from Fig. 2, the tape is graduated from its extreme free end towards the other end in accordance with the usual standard graduations to any degree of fineness. In other words, the first graduated inch on the end of the tape is a full inch. The thickness of the hook member 8 is of a known amount. In this case $\frac{1}{32}$''. The width of the casing in the direction of the length of the tape is defintely predetermined in accordance with this invention. As illustrated it is $1\frac{31}{32}$'' long. Thus, when the tape is entirely within the casing so that the hook member 8 lies against the end thereof, the overall width of the device at this point, including the casing and hook member, will be exactly 2''. The side of the casing is graduated with standard graduations as shown.

For rough inside measurements the device may be used as a plug gauge, at which time the tape will be entirely within the casing, and the exact width of the device in the region of the hook member 8 is 2''.

This arrangement is particularly adapted for inside measurements as illustrated in Fig. 2. The distance between the lines A and B which may represent the inner face of the walls of a box, for example, may be easily measured by positioning the device into the container so that the outer face of the hook member 8 contacts the wall A, and the right hand side of the casing contacts the wall B. The distance is then de-

termined to be the sum of the distance as indicated on the tape 7, plus 2" as indicated by the symbol on the side of the casing in Fig. 1. In other words, any inside measurement is obtained simply by noting the amount of the tape exposed and adding 2" to it. As illustrated in Fig. 2, the amount of the tape exposed is 2¾". To this is added 2", giving the distance between the walls A and B as 4¾".

An additional advantage of this construction is that the graduated tape is exposed for correct and accurate readings for inside measurements since the user looks directly down upon the tape, and may accurately read it along the side of the casing through which the tape issues.

Those skilled in the art will readily appreciate the difficulty of teaching the general public the use of any form of measuring device requiring special construction and instruction in its use. With applicant's arrangement the instructions for inside measurements, resulting from the construction employed, consist in the simple statement to add 2" to the reading on the tape.

Some forms of measuring devices of this general type when adapted for inside measurements employ a graduated tape which does not have correct or standard graduations thereon. For example, some measuring devices of this type employ tapes in which the first inch is not a full inch. It will be seen that with applicant's device the graduations on the tape are full, complete and standard. The hook member is of a predetermined known thickness in the direction of the length of the tape, and the casing is made of a width to absorb this additional length imparted to the tape by the presence of the hook member.

It will of course be apparent to those skilled in the art that the lengths are assumed only by way of illustration. The instructions on the casing can, for example, require the addition of 3", the hook can be ¼" thick, and the casing be actually 2¾" long in the direction of the length of the tape. In this case the inside measurements would be taken as before, and 3" would be added to the reading on the tape.

The practical value of the invention is in the simplicity of the instructions necessary to teach its use and the tape does not require special or involved graduations likely to confuse the user when the tape is employed for the usual and ordinary measurements in layout work, for example.

It is also here noted that the graduations on the casing may be made in such a way as to absorb the thickness of the hook, or the casing may be accurately graduated as has been illustrated in Fig. 1. In this case the casing is $1\frac{11}{32}$" long in the direction of the tape, and is so graduated. This is the preferred form so that the scale on the casing may be used for other purposes such as setting dividers, calipers, and the like.

The provision of the hook member extending all the way across the tape is of advantage in permitting tipping of the tape in taking measurements so as to bring the graduations close to the surface being measured to insure accurate measurements. The simple outline of the casing further aids in the ease with which the device may be used for example as a depth gauge, a heighth gauge, and in fact for all its uses.

From the above description it will be apparent that this invention resides in certain principles of construction which may be embodied in other physical forms without departure from the scope thereof. I do not, therefore, desire to be strictly limited to the disclosure as given for purposes of illustration, but rather to the scope of the appended claims.

What I seek to secure by United States Letters Patent is:

1. A measuring instrument adapted for inside measurements comprising a casing having a tempered steel tape coiled therein and withdrawable through an opening in the casing, said tape having standard and full graduations thereon starting from zero at one end and extending towards the other, and a hook member secured to the end of the tape and projecting therebelow and beyond the end of the tape a distance equal to the thickness of the material thereof, said casing having a portion extending at right angles to the line of the tape when extended and also having indicia thereon indicating the factor to be added to the tape reading for an inside measurement, the length of the casing in the direction of the length of the tape being less than said factor by an amount equal to the thickness of the hook member.

2. A measuring tape as described comprising a casing having a tempered steel graduated tape coiled therein and withdrawable from the casing through an opening therein, said tape being transversely curved when extended and a hook member rigidly secured to the free end of the tape, said hook member comprising a portion overlapping the end of the tape and a central depending portion of full tape width projecting from the convex side of the tape.

3. A measuring device as described comprising a casing having a tempered steel graduated tape coiled therein and withdrawable from the casing through an opening therein, said tape taking a concavo-convex form when extended, and a hook member secured to the free end of the tape and projecting from the convex side of the tape, said hook member overlapping the end of the tape and the projecting portion extending the full width of the tape.

4. In a measuring device of the type described, the combination comprising a casing having a straight bottom face, and an opening therein adjacent said face, a tape coiled in said casing and projectable therefrom through said opening, said tape when extended from the casing lying parallel to, and spaced closely above said bottom face, and a hook member secured to the end of the tape and extending downwardly therefrom substantially to but not below the bottom face of the casing when the tape is coiled within the casing.

5. In a measuring device of the type described, the combination comprising a casing having a straight bottom face, and an opening therein adjacent said device, a tape coiled in said casing and projectable therefrom through said opening, said tape when extended from the casing lying parallel to, and spaced closely above said bottom face, a hook member secured to the end of the tape and extending downwardly therefrom substantially to but not below the bottom face of the casing when the tape is coiled within the casing, said bottom face being notched at the end nearest the hook to provide a finger opening at the rear of the hook for grasping the same to pull the tape from the casing.

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