Feb. 4, 1941. A. OHRTMANN 2,230,668

STEEL TAPE MEASURE

Filed Oct. 19, 1938

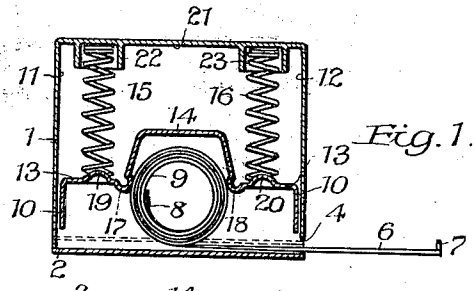

Fig. 1.

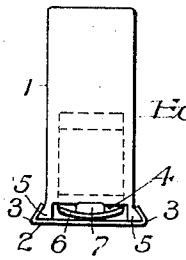

Fig. 3.

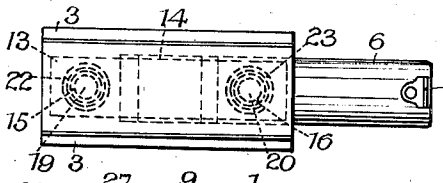

Fig. 2.

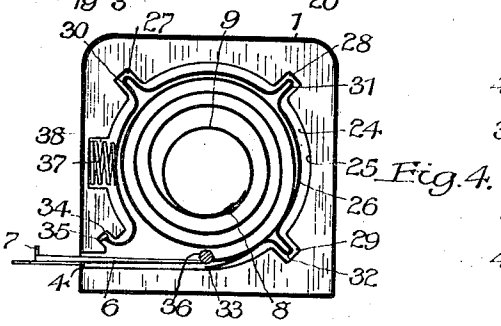

Fig. 4.

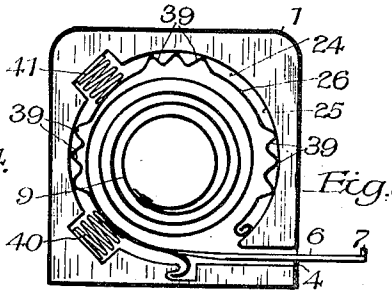

Fig. 5.

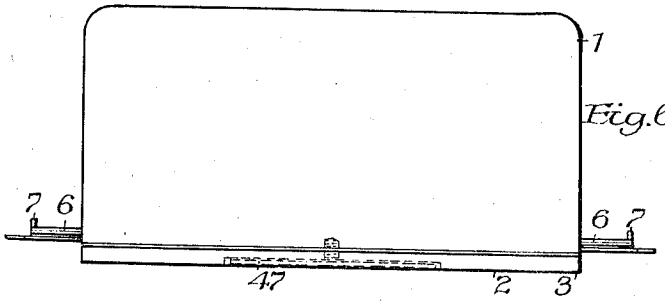

Fig. 6.

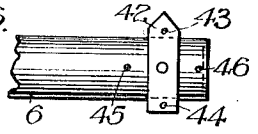

Fig. 8.

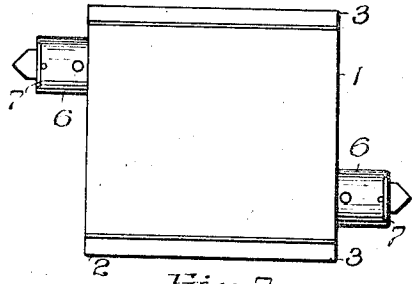

Fig. 7.

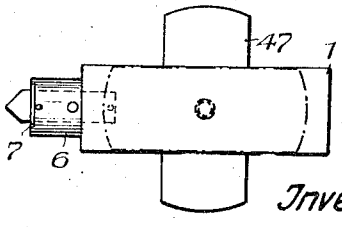

Fig. 9.

Inventor:

August Ohrtmann

Patented Feb. 4, 1941 2,230,668

UNITED STATES PATENT OFFICE

2,230,668

STEEL TAPE MEASURE

August Ohrtmann, Hamburg, Germany

Application October 19, 1938, Serial No. 235,764
In Germany December 11, 1937

4 Claims. (Cl. 33—138)

The present invention relates to steel tape measures of the kind wherein a graduated steel strip or tape is normally held spirally wound inside a casing and may when desired be pulled out to any desired extent through a slot in said casing, being then held in position for reading while after use it may be retracted into the casing and rewound spirally therein.

According to the invention the inner end of the tape is formed as a closed ring and inside the casing a resilient bearing for said ring is arranged in such a way that the tape is wound or unwound spirally around the ring. The closed ring thus becomes a rotatable core which requires no pivoted bearing in the casing but by means of the resilient bearing is mounted in such a manner as to render possible the spiral winding and unwinding without any special requirements or skill.

By this arrangement the casing instead of being formed of two complementary halves may be made in one piece and may be secured at the end where the slot is located to a base plate graduated along its longer edges. By means of the base plate the casing can be given high stability and strength and there is no risk of the tape becoming twisted during operation of the device.

For the formation of such casings in one piece the use of synthetic resin has been shown to be particularly advantageous since it has a good appearance and is inexpensive while at the same time having sufficient stability and strength.

The invention is illustrated by way of example in the accompanying drawing in which:

Fig. 1 is a vertical section of the device;

Fig. 2 is a plan of Fig. 1;

Fig. 3 is a side view from the right of Fig. 1;

Figs. 4 and 5 are vertical sections of modified forms of embodiment;

Fig. 6 is a front view of a double tape measure;

Fig. 7 is a plan view of a modified form of double tape measure;

Figs. 8 and 9 are detail views.

In said drawing 1 denotes the casing which is preferably of synthetic resin or similar material and is made in one piece of rectangular form open along one narrow edge and attached to a base plate 2, for example of tin or thin sheet metal graduated along its longer edges (Fig. 3), a slot 4 in the casing 1 for the passage of the tape being provided above said plate. The latter is provided with flanges 3 adapted to co-operate with edges 5 of the casing 1 and is restrained to remain fixed in position by friction or other means.

The steel tape 6 is of the usual construction having a slightly curved section so that it is rigid when withdrawn from the casing and when retracted is spirally rewound while being thereby flattened so that the turns can be close together. The outer end of the tape 6 is provided with a grip 7 to facilitate its extraction and reinsertion and to prevent the complete withdrawal of the tape by the abutment of said grip against slot 4.

According to the present invention the inner end of the tape 6 is by means of rivets 8 or other suitable means closed to form a ring 9 which serves as a winding core for the tape and is mounted without pivots in the casing 1 by means of a resilient bearing which presents minimum resistance to the rotation of the ring.

In the embodiment of Fig. 1 the said resilient bearing consists of a member 13 capable of upward or downward rectilinear movement and mounted by means of lateral cheeks 10 abutting against the inner faces 11, 12, of casing 1, the member 13 comprising a clamping member 14 for the ring 9 and subjected on both sides thereof to the action of springs 15, 16. The ring 9 and spiral tape 6 bear against rounded parts 17, 18 and sufficient space is provided for the complete winding of the steel tape until the grip 7 abuts against slot 4.

For simplicity and cheapness of construction the bearing 13 may be formed of bent strips as shown in Fig. 1, the edges 17, 18 being provided with rounded off projections which form bearings for the ring 9 so that upon movement of the tape the frictional force is exerted only at the bearing points and not across the whole section of the tape.

To fix the springs 15, 16 in position, on the bearing 13 are provided curved parts 19, 20 passing into the end turns of the springs and in the wall 21 of casing 1 are provided sockets 22, 23 into which pass the other ends of the springs.

In Figs. 4 and 5 the casing is provided with a circular recess 24 bounded by a circular wall 25 holding a resilient steel strip 26 which forms a bearing for the ring 9 and provides the necessary grip for the tape windings. Into recesses 27, 28, 29 of the circular wall 25 are forced bent parts 30, 31, 32 of the steel strip 26 (Fig. 4). One end 33 of the strip 26 bears against the wall 25 at a point adjacent slot 4, while the other hooked end 34 engages in a recess 35 located above slot 4 so that the bearing formed by strip 26 is prevented from participating in the rotation of the ring and tape windings. On the end 33 of strip 26

is fixedly arranged a pin **36** which may carry an antifriction roller and which serves for guiding the outer end of tape **6** to slot **4**.

The bearing formed by strip **26** is also subjected to the influence of a spring **37** which assists the regular winding and unwinding of tape **6**, and which is accommodated in a recess **38** (Fig. 4) in the circular wall **25** to prevent it from undergoing any displacement. Since upon insertion of the tape the pressure is not uniform around the ring, the steel band **26** instead of being in one piece is divided by the bent parts **30**, **31**, **32**, into several pieces which are protected against displacement by engagement in recesses **27**, **28**, **29**, and which form slide surfaces for the tape **6** during the winding or unwinding, the necessary resiliency being given by the provision of spring **37**.

The form of embodiment shown in Fig. 5 is substantially similar to that of Fig. 4 except that the strip **26** is supported against wall **25** by corrugated portions **39** and two springs **40**, **41** are provided for acting on strip **26**. Spring **40** takes the pressure which arises on inserting the tape into the casing; spring **41** ensures that during retraction the tape is wound spirally. The corrugations **39** ensure the satisfactory operation of the winding and unwinding.

Since steel tape measures of this kind are not generally stable for lengths over 2 metres, in order to permit greater distances to be measured in a modified embodiment according to the invention two tape measures are provided which can be drawn out in opposite directions. The tapes may either be arranged in alignment (Fig. 6) or in juxtaposition (Fig. 7).

Doubling the tape presents the advantage of enabling internal measurements to be accurately made. For this purpose on the free end of each tape is provided a pointer serving as an index. Fig. 8 shows a rotatable pointer **42** which is rotated laterally and is held by two grips **43**, **44** on the long edges of the tape. After use it is rotated back to its original position and by means of the grips **43**, **44** secured against undesired rotation in recesses **45**, **46** of tape **6**.

If for example it is desired to measure the internal dimensions of a cylinder, the casing **1** is held in the hand and the tapes **6** drawn out in opposite directions to about equal lengths until the pointers **42** come into contact with the points whose separation is to be measured. In this position the tapes remain fixed so that they can be read.

With two tapes present the casing **1** must have greater stability and it is therefore provided either with a widened foot or with a rotatable or slidable plate, arranged underneath the base plate so that it projects on both sides. Fig. 6 shows a rotatable plate **47** of this kind and Fig. 9 shows how the plate **47** is arranged to ensure greater stability.

It is to be understood that the above described details of construction are given only by way of example and that modifications may be introduced therein without thereby departing beyond the scope of the invention as set forth in the appended claims.

I claim:

1. In measuring apparatus the combination of walls forming a case of parallel epipedic shape and open at one side, a base plate closing said case on the open side, the walls of said case having at least one slot adjacent to the base plate, at least one steel tape normally of curved cross-section passing through a slot, a ring for each tape whereon it is coilable inside the case, a bent strip-metal bed for each ring inside the case, helical springs inside the case acting on said strip-metal bed to locate said ring within said case adjacent the base plate of same, flange portions of said strip-metal bed bent to engage the interior of said case at two parallel surfaces thereof, there being sockets within said case to receive the abutting ends of said helical springs and there being means on the bent strip-metal bed to receive the second abutting ends of said helical springs, and a grip on the outer end of each tape preventing the passage of said outer end of the tape through its slot in the case.

2. In measuring apparatus of the kind set out in the preceding claim having a base plate closing the case, a member pivotally mounted on the outside of the base plate so as to be flush therewith and to be turned transversely to the base plate to give additional stability.

3. In measuring apparatus the combination of a case of parallel epipedic shape and open at one side, a base plate closing said case on the open side, there being two slots one in each of opposite sides of said case adjacent to the base plate, two steel tapes normally of curved cross-section and each passing through one of said slots so as to be extensible in opposite directions from said case, a ring for each tape inside said case and to which the inner end of the respective tape is secured and whereon said tape is coilable, a bed of bent strip-metal for each ring slidable within said case, helical springs urging said bed to engage and locate said ring within said case, projections on said bed for engagement with said springs, sockets within said case accommodating one end of each of said springs, rounded surfaces on said bed for contact with the exterior surface of the tape coiled on said ring, and a grip on the outer end of each tape preventing said outer end from entering the case.

4. In measuring apparatus the combination of a case of parallel epipedic shape and open at one side, a base plate closing said case on the open side, a member on the said base plate externally mounted to be placeable transversely to the base plate in order to give additional stability, indicia on an edge of said base plate, two slots one in each of opposite sides of said case adjacent to the base plate, two steel tapes normally of curved cross-section and each passing through one of said slots so as to be extensible in opposite directions from said case, a pointer rotatably mounted on the free outer end of each tape, a ring for each tape inside the case to which the inner end of said tape is secured and whereon said tape is coilable, a bed of bent strip-metal for each ring slidable within said case, helical springs urging said bed to locate said ring within said case, projections on said bed for engagement with the adjacent ends of said springs respectively, there being sockets within said case accommodating one end of each of said springs, rounded surfaces on said bed for contact with the exterior surface of the tape coiled on said ring, and a grip on the outer end of each tape preventing the outer end from entering said case.

AUGUST OHRTMANN.