(No Model.)

R. BEHMER.

MEASURING BAND.

No. 483,642. Patented Oct. 4, 1892.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 8.

Fig. 1.

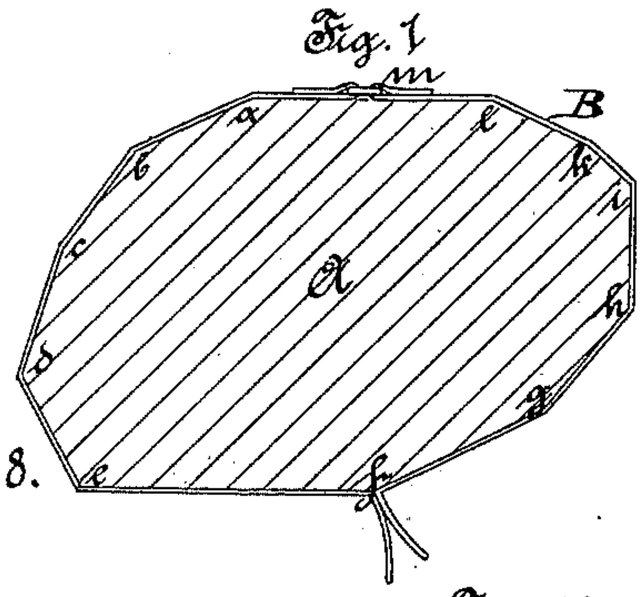


Fig. 6.

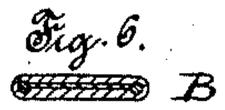


Fig. 7.

Fig. 9.

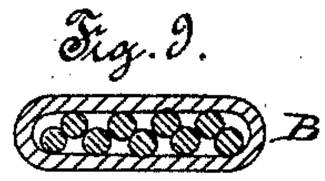


Fig. 12.

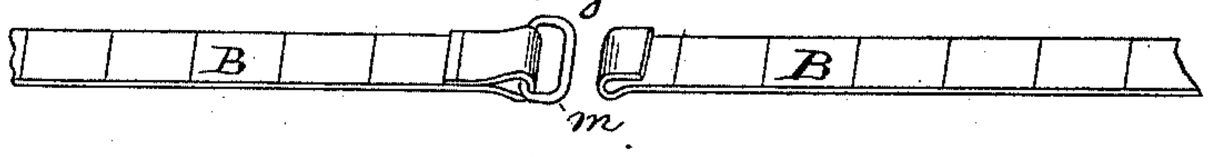


Fig. 2.

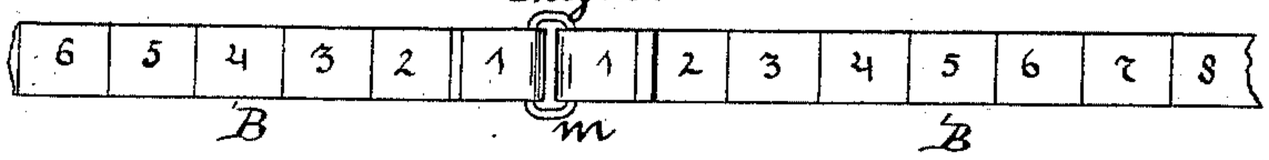


Fig. 13.

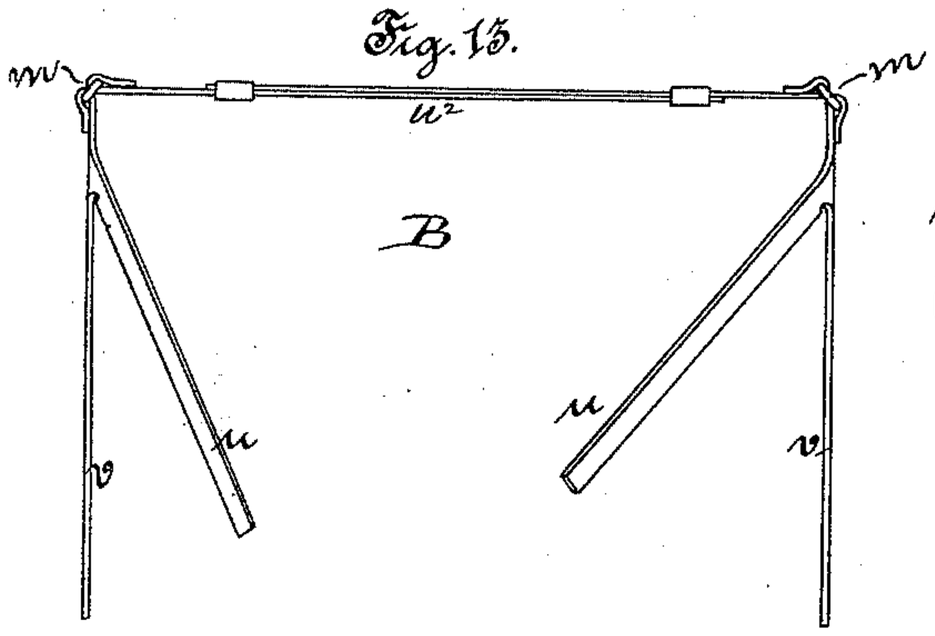


Fig. 14.

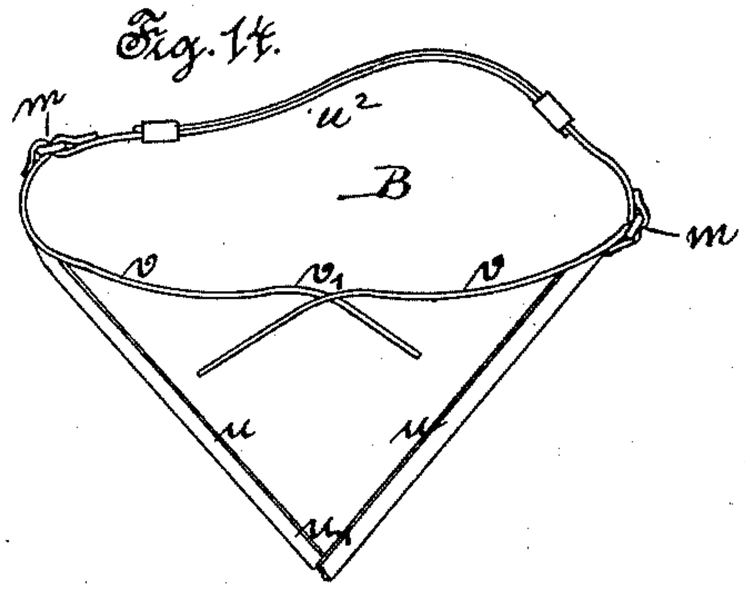


Fig. 15.

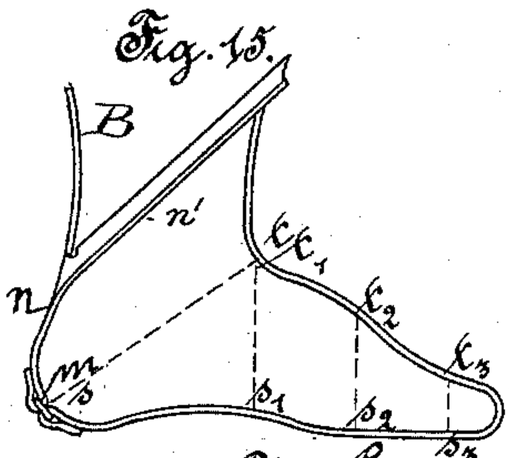


Fig. 19.

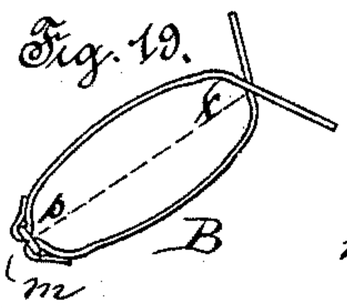


Fig. 16.

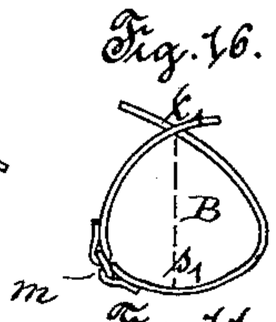


Fig. 17.

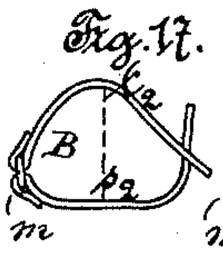


Fig. 18.

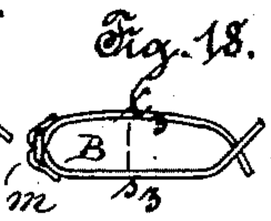


Fig. 10.

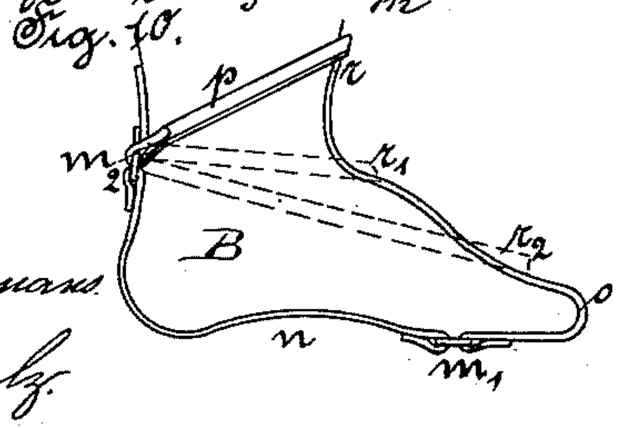
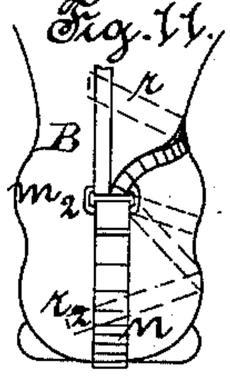


Fig. 11.



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by his attorneys
Roeder & Briesen

UNITED STATES PATENT OFFICE.

RUDOLF BEHMER, OF BERLIN, GERMANY.

MEASURING-BAND.

SPECIFICATION forming part of Letters Patent No. 483,642, dated October 4, 1892.

Application filed March 24, 1892. Serial No. 426,197. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF BEHMER, a citizen of the Kingdom of Prussia, residing at Berlin, Prussia, Germany, have invented certain new and useful Improvements in Measuring-Bands, of which the following is a specification.

My invention relates to an improved apparatus for rendering the contour or measuring the outside form of objects, especially of living bodies or parts of the same. Thus such bodies may be readily reproduced by drawing or model and their sections may be readily ascertained.

In the accompanying drawings, Figure 1 represents my improved measuring-band in use. Fig. 2 is a detail of the band provided with a scale. Figs. 3 to 9 are varieties of cross-sections of the band. Figs. 10 and 11 represent the measuring-band in side and rear view when applied for measuring a human foot. Fig. 12 shows the band with the hinge open. Figs. 13, 14, and 15 represent modifications of the band. Figs. 16 to 19 represent the band in different positions for ascertaining the outline of a foot.

My improved band is especially adapted for measuring the human body or parts of the same for scientific or military use and also for measuring or gaging articles which are destined to be applied to parts of the bodies of living beings so as to obtain an exact fit. The band also serves to determine the exact shape of any object which is to be copied from a pattern or model and may be used for household or scientific purposes generally.

The principal feature of my improved apparatus consists in so forming the same that it readily takes and retains the contour of objects around which it is placed and that it may be removed without losing such contour. To this effect the band consists of a strip of supple or flexible but non-elastic metal, preferably of aluminium or alloys thereof, and provided with one or more joints. Thus the band will readily assume the contour of encircled bodies, and by opening it on the joint it may be removed without losing the shape of its component parts. This faculty of removing the measuring-band without the necessity of bending it out of the encircled shape is of particular importance, as it enables the operator to re-establish the exact form after the apparatus has been removed. In this way the form may be transferred by drawing or model or may be fixed in other suitable manner.

The letter B represents my improved band, which is flexible, so as readily to assume the shape of bodies against which it is pressed, and is also inelastic, so as to retain such shape after removal. Thus if the band B is placed around the body A, Fig. 1, it will readily follow its sides and its angles *a*, Fig. 1, whether regular or irregular.

To permit the flexible band to be removed without losing the form assumed, it is provided with one or more joints *m*, upon which it may open.

To obtain the required rigidity of the measuring-band without losing the necessary quality of suppleness or flexibility, it is desirable to use different materials for the varying sizes of objects to be measured. For larger sizes the measuring-band will require an increased thickness and rigidity, and I prefer to form such larger sizes from tubing filled with wire.

In Figs. 3 to 9 I have represented cross-sections of different kinds of measuring-bands. In Fig. 3 it is composed of a straight flexible inelastic metal strip, preferably of aluminium or aluminium alloy; in Fig. 4, of a similar strip with reinforced edges; in Fig. 5, of a flattened tube inclosing two wires, one at each edge; in Fig. 6, of a flattened tube, which is grooved along its inner edges for the reception of the wires; in Fig. 7, of a flattened tube with a set of inclosed wires; in Fig. 8, of a circular tube with a circular core, and in Fig. 9 of a flattened tube with two sets of inclosed wires.

The legs or parts of the measuring-band are preferably provided with a suitable scale, Fig. 2, printed upon or cut into the surface. This scale is more particularly intended to determine with exactness the point at which the measuring-band crosses itself. If the scale would be omitted, this point would have to be marked, and such marks would damage the band in the course of time.

In many cases it will be desirable to provide two or more joints in the flexible measuring-band, particularly in cases where the

band is provided with two or more legs or with split legs.

If the form of a human foot is to be measured, the apparatus may best be constructed and arranged as shown in Figs. 10 and 11. Here the two legs *n* and *o* of the flexible measuring-band, connected by a joint *m'*, serve to determine the outline of the longitudinal vertical section of the foot. To a second joint m^2 there is connected a second band or strip *p*, which may be laid around the upper part of the foot.

In performing the measuring operation it will be convenient to apply the band *p* first to the line m^2 *r*, taking a note of the point where the band *p* meets with the band-leg *n o*. Then the band *p* is released and the leg *n*, between the joints *m' m²*, is removed from the foot by opening joint *m'*, after which the leg *o* of the apparatus is drawn from the foot, similar to a stocking. The legs *o n* and branch *p* are then brought into the same position they had assumed on the foot, and a copy is taken of that position. The apparatus is then once more applied to the foot and the branch band *p* is brought into the position m^2 *r'*, after which the whole system is again removed, as described, for taking a copy of the determined position of band *p*. In the same manner the third position m^2 r^2 of band *p* and any further one, if desired, may be readily determined and copied.

To render unnecessary the removal of the whole apparatus after each application of the branch band *p*, it will be more convenient and serve to accelerate the whole operation if more than one band or branch *p* is connected to the joint m^2, each of said branches *p* serving to determine the outline of one part of the foot to be measured.

Fig. 15 shows an apparatus in which the leg *n* of the band is split to form a branch leg *n'*. Figs. 16, 17, 18, and 19 illustrate how, by means of separate jointed flexible bands, the several outlines *s' t' s² t² s³ t³ s t* of the foot (indicated by dotted lines in Fig. 15) may be determined and copied.

Figs. 13 and 14 show the apparatus as consisting of two separate two-legged bands *u v*, connected by a slide u^2, so as to be adjustable in length. The branch legs *u*, parting from the main legs *v* without a connecting-joint, serve to exactly determine the positions of the two main legs, even in cases where the said main legs are applied in line, as shown in Fig. 14, without forming an angle or crossing each other. In such cases the point *v'*, where the two main legs meet, will be liable to shift; but if the two branched legs *u u* are so set as to meet and cross each other at a sharp angle away from the body or form to be measured, they determine by their point of meeting *u'* the exact position of the two main legs *v v*.

Fig. 12 shows the hinge *m* so made as to be readily disconnected. One end of the band is bent to form a hook that engages a link held by the other bent end of the band. This construction greatly facilitates the removal of the apparatus if applied to forms or bodies of a large size. The several sections of the measuring-band may in this way be singly lifted off the form and afterward reconnected without danger of losing their form.

The size, shape, and material of the apparatus and its several parts and the particular construction of the joints or links may vary, according to the particular requirements of use.

What I claim is—

1. An improved rule for measuring and determining the shape of objects, consisting of a band or strip of flexible but non-elastic metal that will retain the contour into which it is bent and that is provided with one or several joints, substantially as specified.

2. An improved rule for measuring and determining the shape of objects, consisting of a tubular flexible but non-elastic metal band that will retain the contour in which it is bent and is provided with inclosed wires and with joints, substantially as specified.

3. An improved rule for measuring and determining the shape of objects, consisting of a flexible but non-elastic metal band that will retain the contour into which it is bent and is provided with joints and auxiliary end bands, substantially as specified.

Signed at Berlin, Kingdom of Prussia, in the German Empire, this 19th day of February, 1892.

RUDOLF BEHMER.

Witnesses:
OSCAR RINAPEL,
STANKOW.