H. W. ANTHONY & C. M. GERHARD.

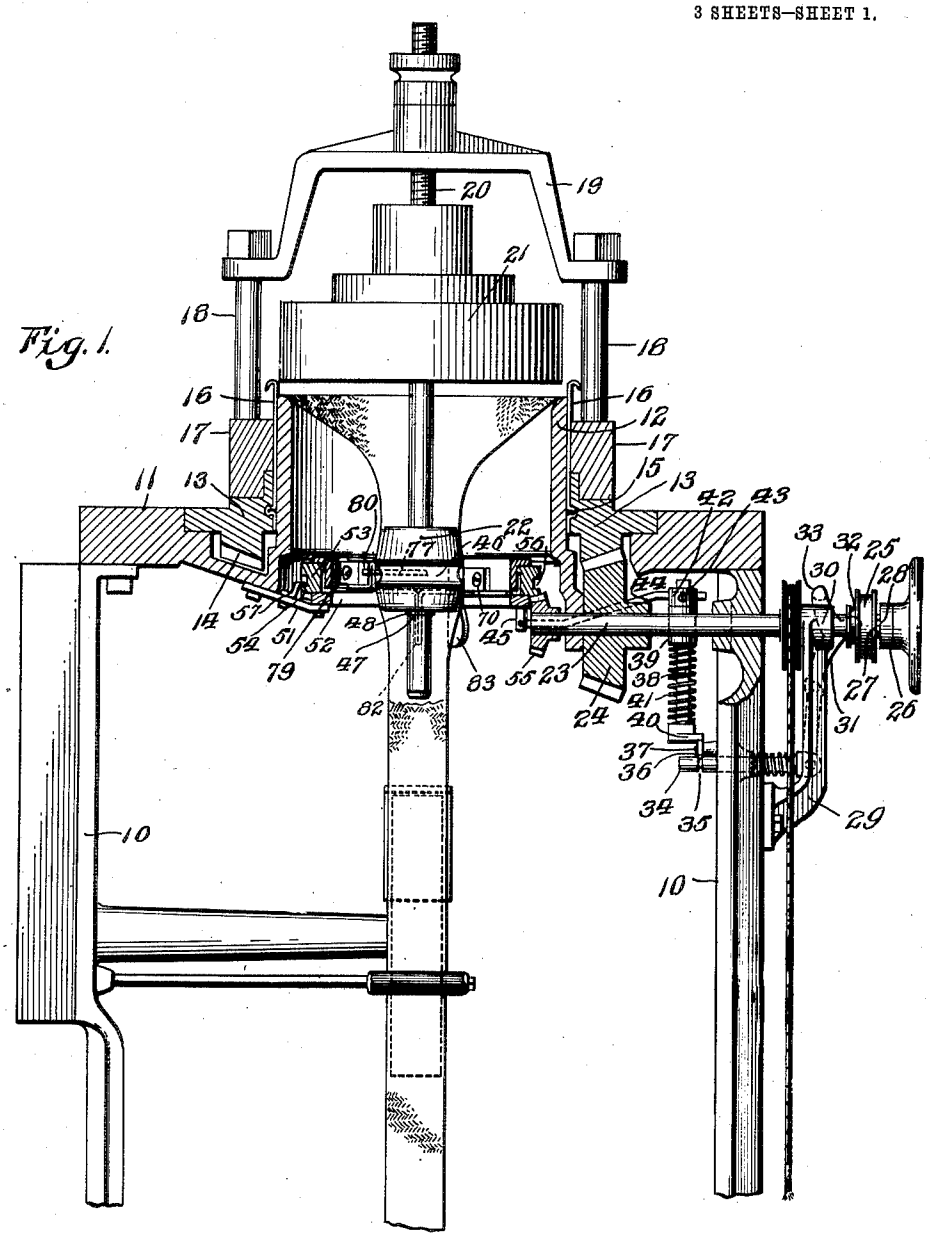
AUTOMATIC STOPPING MECHANISM FOR KNITTING MACHINES.

APPLICATION FILED NOV. 1, 1912.

1,097,503. **Patented May 19, 1914.**

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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3 SHEETS—SHEET 2.

Fig. 2.

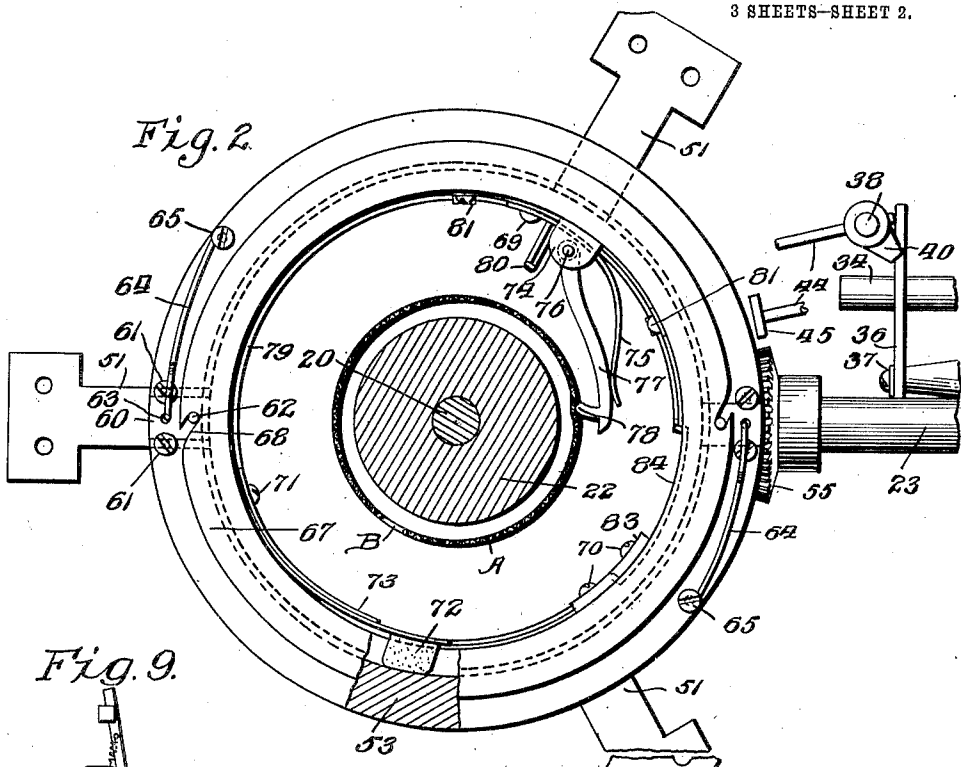
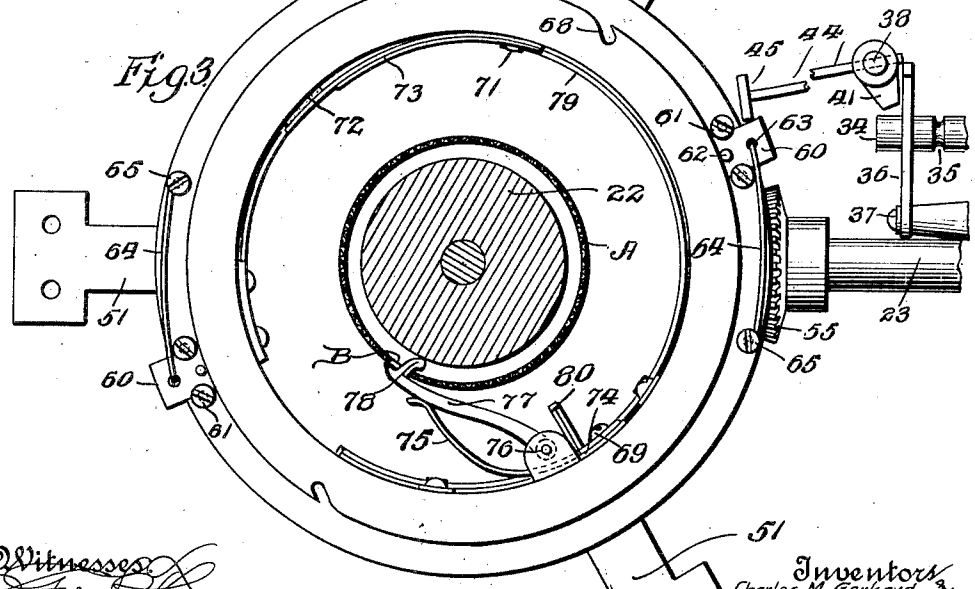


Fig. 9.

Fig. 3.



Witnesses.

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3 SHEETS—SHEET 3.

Fig. 6.

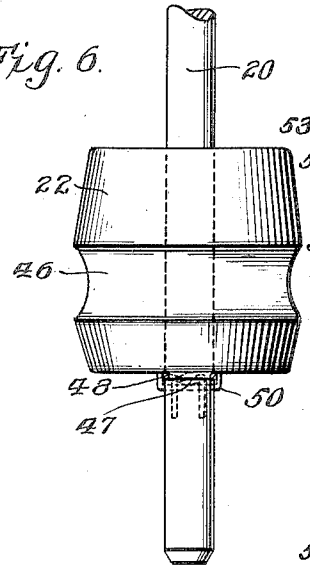


Fig. 4.

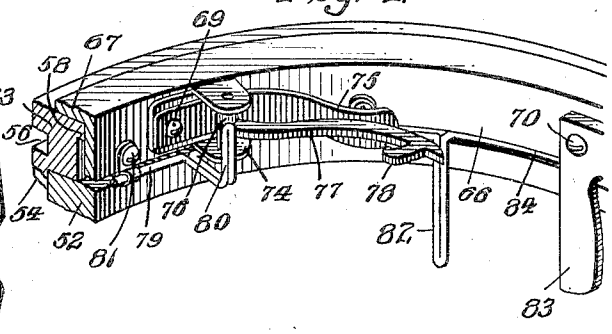


Fig. 5.

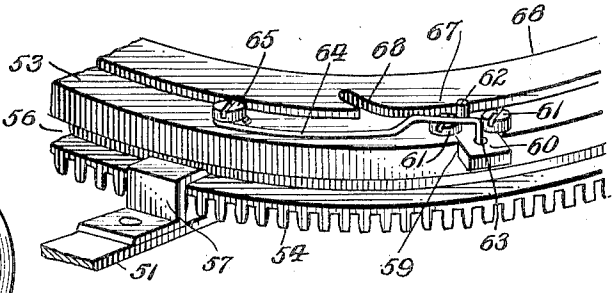


Fig. 7.

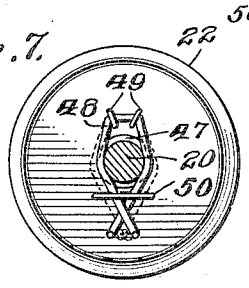
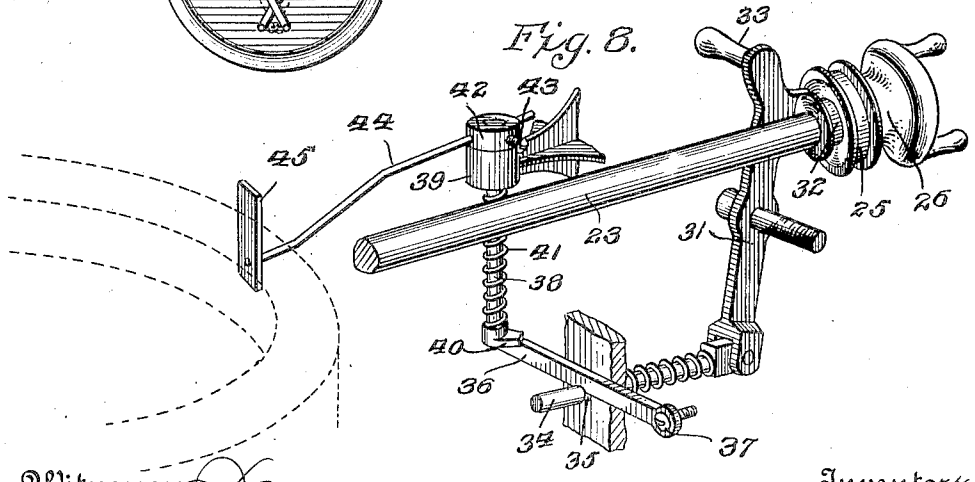


Fig. 8.



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UNITED STATES PATENT OFFICE.

HARRY W. ANTHONY AND CHARLES M. GERHARD, OF STRAUSSTOWN, PENNSYLVANIA.

AUTOMATIC STOPPING MECHANISM FOR KNITTING-MACHINES.

1,097,503. Specification of Letters Patent. Patented May 19, 1914.

Application filed November 1, 1912. Serial No. 729,097.

To all whom it may concern:

Be it known that we, HARRY W. ANTHONY and CHARLES M. GERHARD, citizens of the United States, residing at Strausstown, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Stopping Mechanism for Knitting-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to automatic stopping mechanism for knitting machines and more particularly for use in connection with machines knitting tubular fabric such as hosiery or the like and has for an object to provide means by which the movement of the machine is stopped when for any reason a series of stitches are dropped so as to form an opening or break in the knitting.

A further object of this invention is to provide a means for partly stretching the knitted tube so as to expose any openings resulting from faulty knitting.

A further object of this invention is to provide a rotating member through which the knitted tube passes which rotating member carries a finder which is intended to engage any openings in the tubular fabric and which rotating member when held against rotation by the finder extends lugs carried by a continuously rotated member while the machine is in operation which lugs engage a stopping mechanism which stopping mechanism shifts the belt in the belt driven machine or breaks the circuit in an electrically operated machine.

A further object of this invention is to provide a stopping mechanism comprising a rotatable member which is rotated in a uniform direction while the machine is in operation and a member carried thereby which is rotated therewith through frictional means until otherwise prevented at which time lugs carried by the first-mentioned rotating member project beyond the periphery thereof and engage the stopping mechanism.

A further object of this invention is to provide means for holding the finder in inoperative position when so desired.

Further objects will be apparent from the following specification, appended claims and drawings, in which,

Figure 1 is a sectional view through a tubular knitting machine showing the invention applied thereto, Fig. 2 is a plan view of the invention in a position permitting the operation of the knitting machine, Fig. 3 is a plan view of the invention showing how the same stops the operation of the knitting machine, Fig. 4 is a perspective view of a portion of the invention showing the finder, Fig. 5 is a similar view showing the lug in extended position and the means for causing it to assume that position, Fig. 6 is an elevation of the form over which the tubular fabric passes, Fig. 7 is a bottom view thereof, Fig. 8 is a fragmentary perspective view of the stopping mechanism for a belt driven machine, and, Fig. 9 is a modified form showing the stopping mechanism for an electrically driven machine.

In knitting machines for the production of tubular fabrics, it is possible through the breaking of one of the needles for the dropping of a stitch or a series of stitches which would make the finished product worthless and in order to provide a stopping mechanism in the event of an accident to the machine to cause the above result, it is necessary to have a finder which frictionally engages the fabric as it is knitted so that the finder may engage any opening in the knitted form which is sufficiently large to admit the finder. In this invention when the finder engages an opening in the tubular fabric it prevents further rotary movement of the supporting medium of said finder which in turn through the medium of pins and cam slots causes lugs to extend beyond the periphery of a rotating member which supports the ring to which the finder is secured and one of these lugs engages a trip so as to rock the shaft and release a lever which in turn releases a spring actuated shaft to which the clutch member is secured through the medium of an additional lever.

Referring to the drawings there is shown a knitting machine comprising the frame 10 and the head 11, to which the needle sup-

porting ring 12 is secured. The head 11 is recessed and receives the needle actuating ring 13 which is provided on its under face with a gear 14 and a groove 15 in the inner face, in which grooves portions of the needles 16 bear. Above the ring 13 is another ring 17 which may be held in any desired manner and which holds the ring 13 in place. Rising from the ring 17 are the uprights 18 which in turn support the yoke 19 from which the rod 20 depends and secured to this rod 20 is an upper needle supporting member 21 and a stretching member 22 about which the knitted tube passes. The shaft 23 mounted in bearings carried by the frame carries a beveled gear 24 which meshes with the gear 14 and this shaft receives its power from the pulley 25 which is slidable on this shaft so as to engage or disengage the clutch member 26 which is fixed to the shaft. The pulley is provided with the lug 27 and the clutch member 26 with the lug 28 so that in the limit of the movement of the pulley in one direction the lugs 27 and 28 engage one another to transmit power and when in the limit of the opposite movement, the pulley 25 rotates freely on the shaft. The bracket 29 is secured to the frame 10 as shown and is provided with a bearing 30 to receive the shaft 23. Secured to this bracket is a lever 31 having one end thereof adapted to engage a groove 32 formed in the slidable pulley 25 and a handle 33 extends therefrom for manual operation of the lever. The lower end of the lever is secured to the longitudinally movable shaft 34 which is grooved as at 35 to receive the lever 36 which lever is fulcrumed as at 37 to the frame. A vertical rock shaft 38 is carried in the bearing 39 which is also carried by the frame 10 and this rock shaft has a lug 40 formed on the lower end thereof which lug in one position engages the upper edge of the lever 36 and holds the same in engaged position. A spring 41 is coiled by the shaft 38 in compression between the bearing 39 and the enlarged lower end thereof which spring is sufficiently strong to normally hold the lever 36 in engagement with the groove 35 and to frictionally hold the shaft 38 in fixed position. A collar 42 is secured to the upper end of the shaft 38 as by a set screw 43 and this collar carries a tripping arm 44 which terminates at its free end in the vertical member 45 which member is struck by lugs to be hereinafter described.

As the tube is knitted it passes down through the ring 12 and contracts as shown in the drawing. In its downward movement it passes about the stretching member 22 which may be made of any desired shape as to meet the demands and in this case it is shown as barrel shaped, having a large central portion with tapering ends. About the enlarged portion is formed a groove 46 which permits the finder, to be hereinafter mentioned, to pass through the fabric when holes appear over this grooved portion. In order to provide for the removal of the stretching member 22, the depending shaft 20 is grooved as at 47 and the stretching member 22 carries the clutch member 48 on the lower face thereof which clutch member is formed of a continuous piece of resilient metal secured at the bight 49 so as to allow the free ends to engage or to disengage from the groove 47 as desired. The guard 50 holds the free ends in fixed relation with respect to the bottom of the stretching member. After the tube leaves the stretching member 22 it contracts as shown in Fig. 1 of the drawing and is fed downwardly by the usual apparatus forming part of the knitting machine.

Supported by brackets 51 from the head 11 is a supporting ring or bearing ring 52 upon which rotates the gear ring 53 having the gear 54 formed in the lower face thereof and which gear meshes with the beveled gear 55 which is secured to and is driven by the shaft 23. The ring 53 is grooved as at 56 to receive the retaining members 57 carried by the brackets 51. The ring 53 is undercut in the inner face to provide a shoulder 58 to be hereinafter described and the upper edge of the ring 53 is recessed as at 59 to receive the radially slidable lugs 60 which lugs when in extended position are intended to engage and move the vertical member 45 carried by the rock shaft 38. The lug 60 may be secured by any desired means but we have shown screws 61 tapped into the upper face of the ring 53 to allow the heads thereof to overlap the lug 60. This lug is provided with a pin 62 and a recess 63, the recess receiving the free end of a spring 64 secured to the ring 53 by the screw 65 and the pin 62 through the action of the spring 64 engages the edge of a ring 66.

The ring 66 has a flange 67 which bears on the upper face of the ring 53 and this flange is provided with the cam slots 68 as shown which slots are intended to receive the pin 62 while the machine is in operation. The ring 66 is held to the ring 53 by the ends of the screws 69, 70 and 71 which screws in addition to serving the purpose of securing parts of the apparatus to the interior of the ring 66 pass through the ring and under the flange 58. Under normal conditions the ring 66 rotates with the ring 53 and this is accomplished by the friction block 72 carried on the free end of a spring 73 which spring is secured by the screw 71 in the ring 66. This friction block bears against the inside of the ring 53 through an opening in the ring 66 and through the agency of the spring 73 motion is transmitted from the ring 53 to the ring 66.

The screw 69 holds a bracket member 74 and a spring 75 in the ring 66 which bracket member supports the arbor 76 to which the finder 77 is secured and through the action of the spring 75 the rounded end 78 of the finder 77 frictionally engages the knitted tube "A" so that as long as the knitted tube "A" is uniform the end 78 engages the outside thereof but when the opening "B" occurs in the knitted tube the end 78 passes through the opening as shown in Fig. 3 of the drawing and prevents further rotation of the ring 66. As the ring 53 is driven forward the pins 62 rotate out of the cam slots 68 and cause the lugs 60 to extend beyond the periphery of the ring 53 so that one of them will engage the member 45.

When it is desired to retain the finder in inoperative position the ring 79 may be moved with respect to the ring 66 so as to cause the extension 80 to engage the finder and to hold the same back against the action of the spring 75. The ring 79 is supported at intervals by bracket members 81 and this ring is further provided with a manipulating member 82 which extends below the ring 52. A handle 83 is secured in the ring 66 by the screws 70 and by gripping both the handles 82 and 83 and moving the handle 82 toward the handle 83 the stem 80 swings the finder 77 into inoperative position. The ring 79 is continuous and is provided with an offset 84 where it passes outside of the handle 83. In the form shown in Fig. 9, the shaft 34 with its groove 35 may be the same but the longitudinal movement of the shaft 34 operates the electrical switch instead of sliding the belt pulley.

It is understood that where this device is applied to knitting machines in which the needle cylinders and knitted form rotate, the bearing ring carried by the needle cylinder may rotate but the corresponding part of the gear ring and finder are held temporarily fixed so that as an opening occurs in the knitted fabric, the finder engages the same and is rotated with the work so as to extend the lugs carried by the gear ring and to trip the necessary trip lever to stop the mechanism.

Various modifications may be made within the scope of this invention and therefore this invention is not limited to the exact form shown as it is for illustrative purposes only and

Having thus described the invention, we claim:

1. An automatic stopping mechanism comprising in combination with the circular knitting machine, a bearing ring, a gear ring secured thereto, a frictionally driven ring carried by said gear ring, said frictionally driven ring having cam slots formed therein, radially slidable lugs carried by said gear ring, said lugs having pins formed thereon for engagement in said cam slots, a friction block carried by said frictionally driven ring which friction block engages said gear ring, and a finder hingedly secured to said frictionally driven ring, which finder is spring pressed toward the axis of said driving ring.

2. An automatic stopping mechanism comprising in combination with a circular knitting machine, a stopping mechanism comprising a bearing ring, a gear ring mounted thereon and a frictionally driven ring carried by said gear ring said frictionally driven ring having cam slots formed therein, lugs carried by said gear ring having pins for engagement in said cam slots, frictional driving means carried by said frictionally driven ring for engagement with said gear ring, a finder hingedly secured to said frictionally driven ring and being spring pressed toward the center thereof, and a circumferentially slidable locking member carried by said frictionally driven ring to retain said finder in inoperative position.

3. An automatic stopping mechanism comprising in combination with a circular knitting machine, a bearing ring carried thereby, a gear ring rotatable on said bearing ring, a frictionally driven ring carried and driven by said gear ring, cam slots formed in said frictionally driven ring radially slidable lugs carried by said gear ring having engagement with said cam slots, a finder hingedly secured to said frictionally driven ring, a circumferentially movable ring carried by said frictionally driven ring, and a locking member to retain said finder in an inoperative position carried by said circumferentially movable ring.

4. An automatic stopping mechanism for circular knitting machines comprising in combination with a bearing ring, a gear ring rotatably mounted thereon, a frictionally driven ring supported by and driven by said gear ring, cam slots therein, radially slidable lugs carried by said gear ring and having engagement with said cam slots, a finder hingedly secured to said frictionally driven ring, said finder being spring pressed toward the center of said frictionally driven ring, a stretching member to receive the tubular fabric from said knitting machine, said stretching member having a grooved central portion thereof and a circumferentially movable locking member carried by said frictionally driven ring to retain said finder in inoperative position.

5. In an automatic stopping mechanism for circular knitting machines a hole detector comprising a stretching member disposed centrally of a knitted tube, a grooved central portion, and a spring pressed finder rotatable about the knitted tube over the grooved portion of the stretcher.

6. In an automatic mechanism for circular knitting machines, a stretching member sup-

ported by said knitting machine to receive tubular fabric from said knitting machine, a spring pressed hingedly mounted finder rotatable about said stretching member, means carried by said stretching member to permit its easy removal and the substitution of a different sized stretching member therefor.

In testimony whereof we affix our signatures in presence of two witnesses.

HARRY W. ANTHONY.
CHARLES M. GERHARD.

Witnesses:
ADAM BATTEIGER,
C. M. SEIFFERT.