M. F. ROBISCHON.

MACHINE FOR UNRAVELING KNITTED GOODS AND WINDING THE YARN.

APPLICATION FILED SEPT. 15, 1919.

1,399,657.

Patented Dec. 6, 1921.

5 SHEETS—SHEET 1.

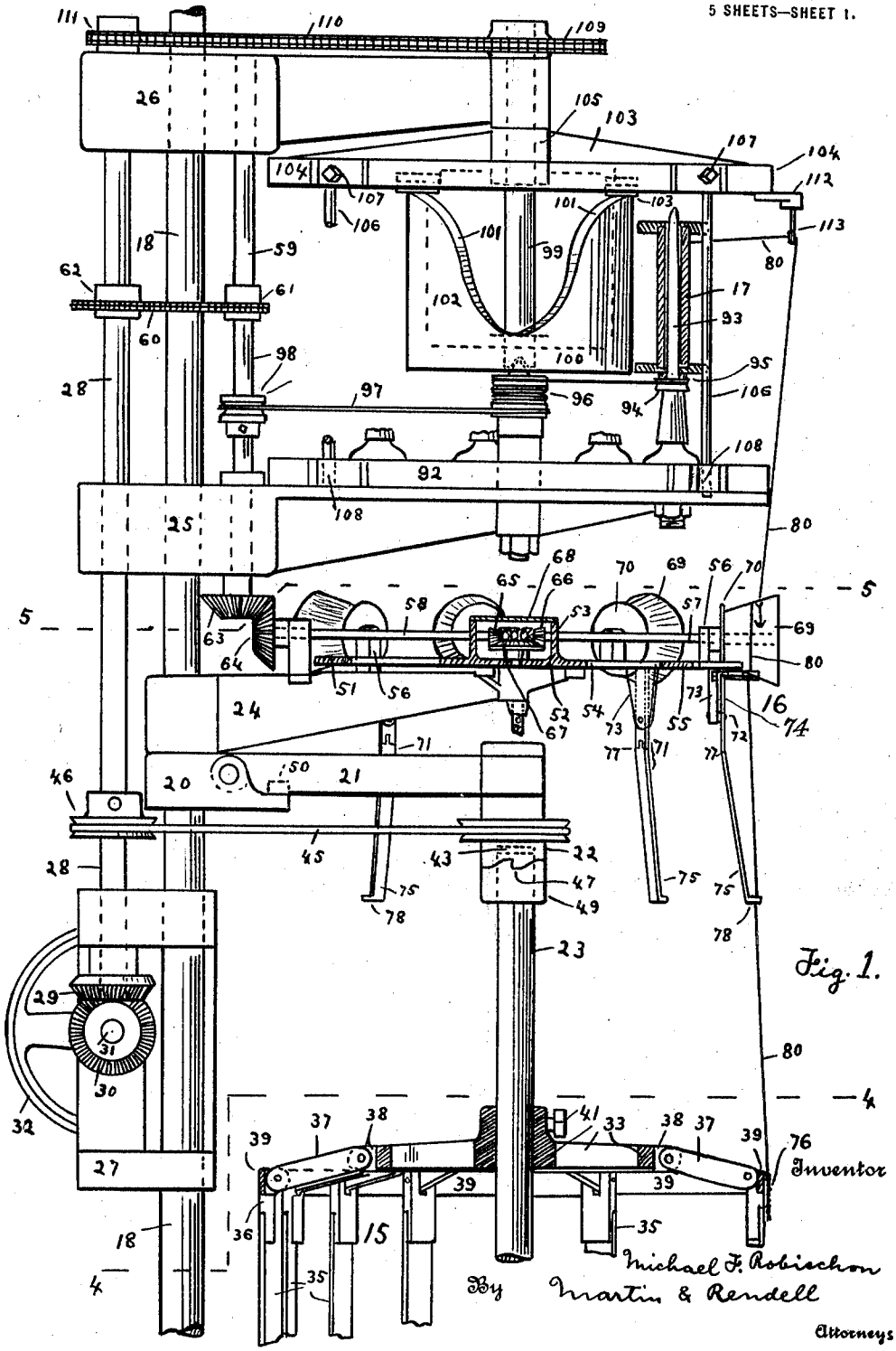

Fig. 1.

Inventor

Michael F. Robischon

By Martin & Rendell

Attorneys

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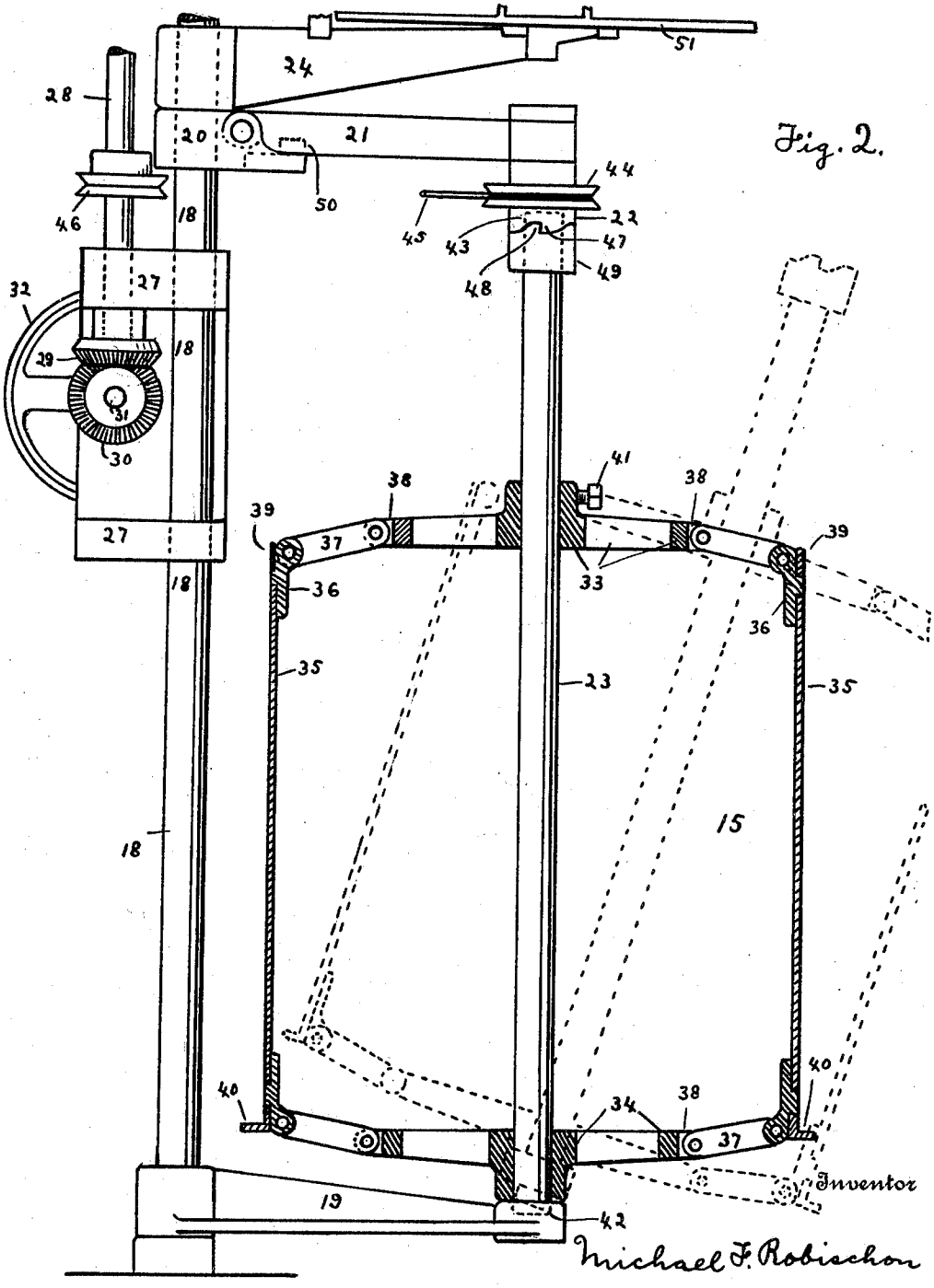
Fig. 2.



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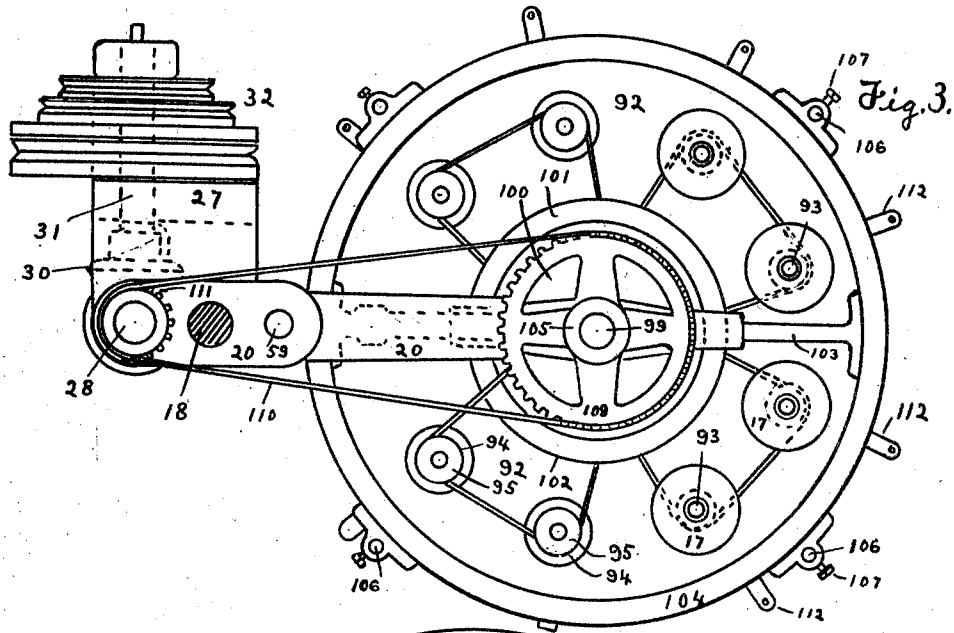

Fig. 3.

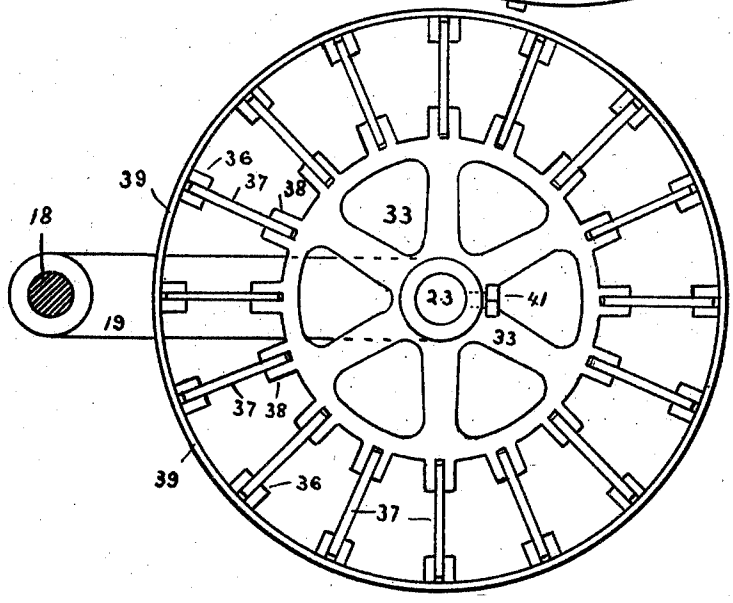

Fig. 4.

Inventor

Michael F. Robischon

By Martin & Rendell

Attorneys

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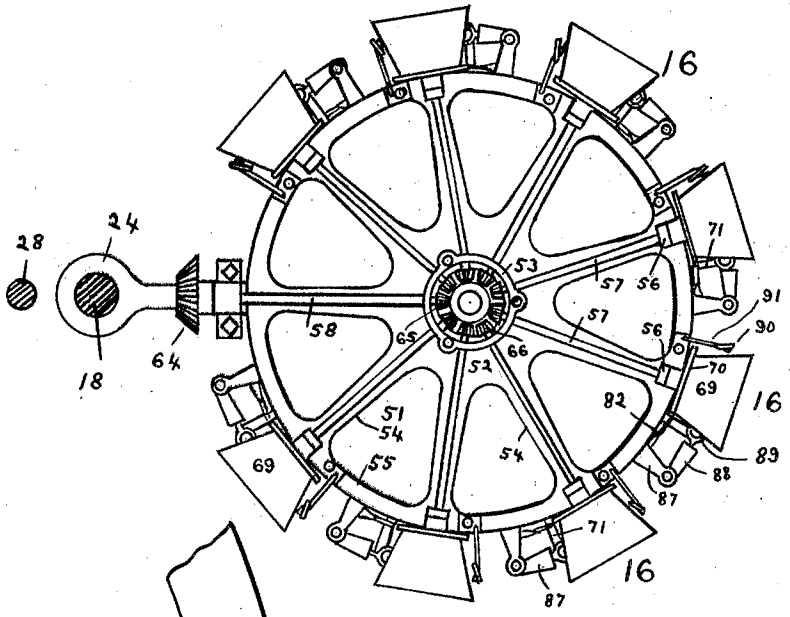

Fig. 5.

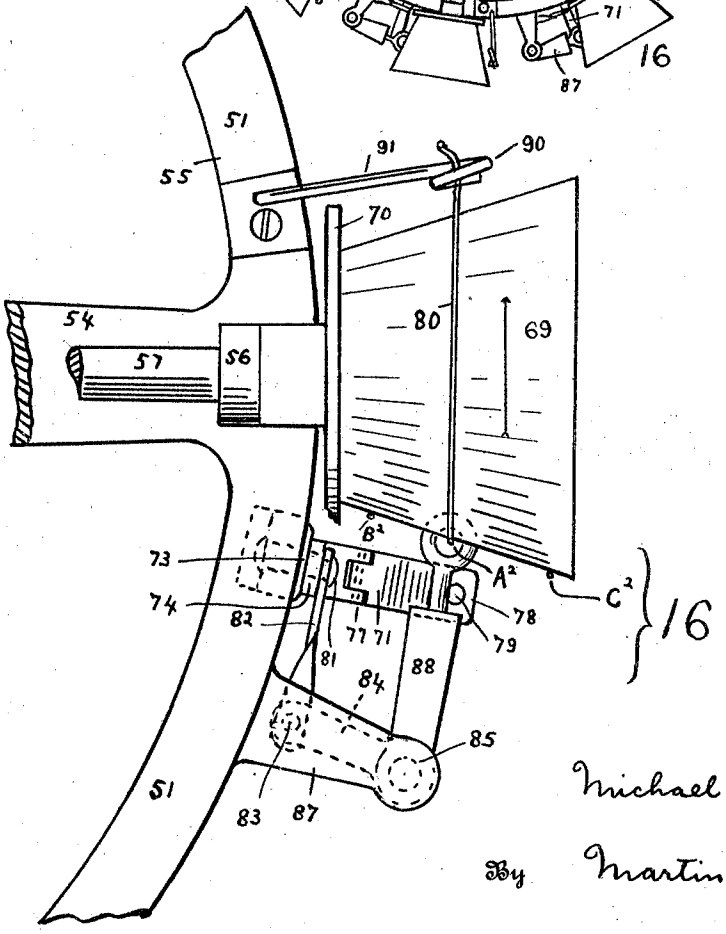

Fig. 6.

Inventor

Michael F. Robischon

By Martin & Rendell

Attorneys

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5 SHEETS—SHEET 5.

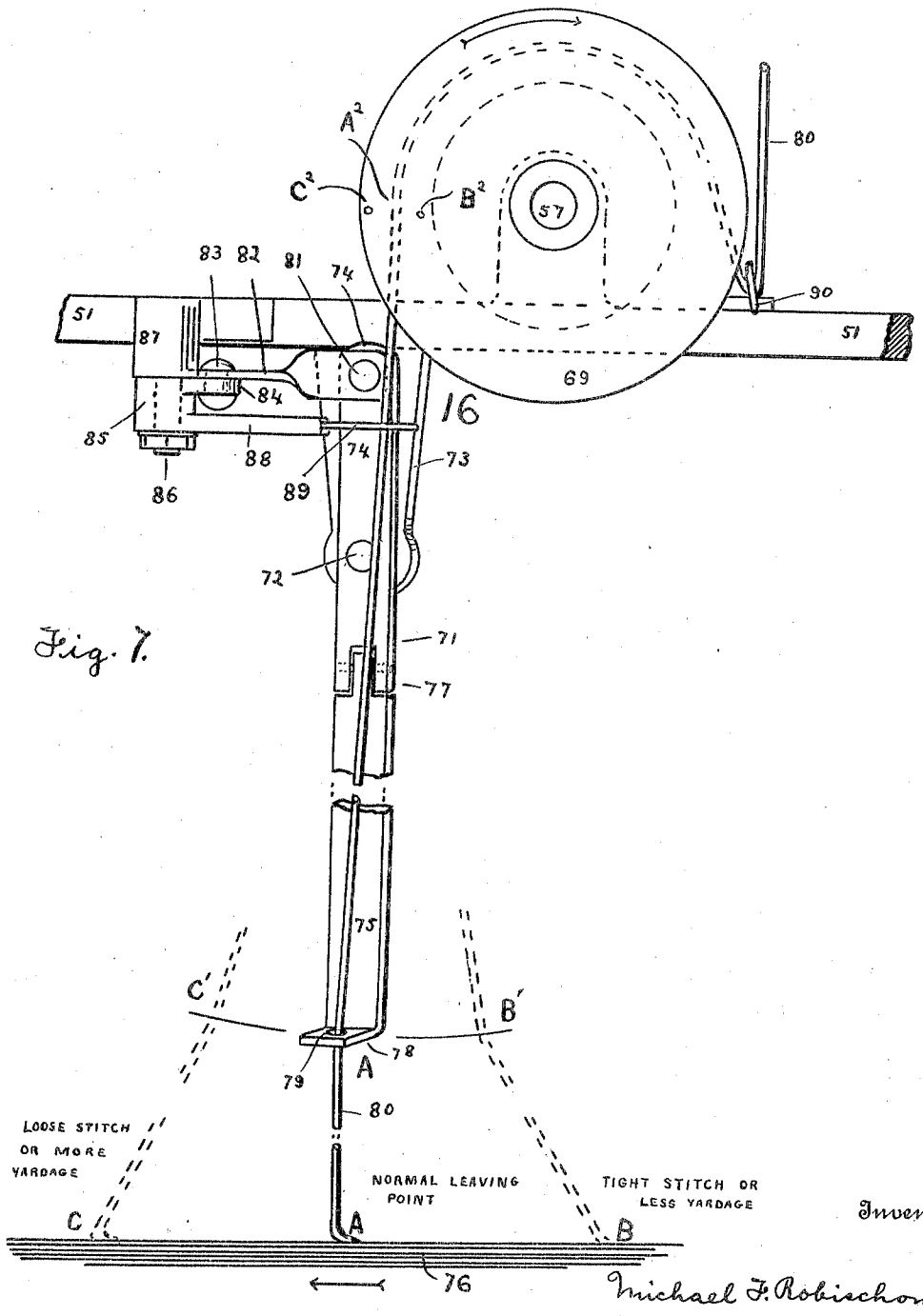

Fig. 7.

Inventor

Michael F. Robischon

By Martin & Rendell

Attorneys

UNITED STATES PATENT OFFICE.

MICHAEL F. ROBISCHON, OF UTICA, NEW YORK.

MACHINE FOR UNRAVELING KNITTED GOODS AND WINDING THE YARN.

1,399,657. Specification of Letters Patent. Patented Dec. 6, 1921.

Application filed September 15, 1919. Serial No. 323,711.

To all whom it may concern.

Be it known that I, MICHAEL F. ROBISCHON, a citizen of the United States, and a resident of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Machines for Unraveling Knitted Goods and Winding the Yarn; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the reference-numerals marked thereon, which form part of this specification.

My present invention relates to machines for unraveling knitted goods and winding the yarn so obtained.

In the manufacture of knitted goods there is always some fabric spoiled which in practice heretofore has been found good for nothing but waste because the expense of unraveling or unwinding the yarn has been greater than the value of the yarn obtained. During recent years this portion of spoiled fabric has increased due partly to the use of less skilled and less careful operators and at the same time the value of the silk, wool and cotton yarn has greatly increased. Heretofore as far as I am aware no practical machine has been made for unraveling such spoiled knitted goods and saving the yarn. One great difficulty has been to provide a machine that would practically and automatically adjust its different unraveling devices to the different amount of thread coming from each feed of the knitted fabric.

It is the purpose of my invention to provide a practical and efficient machine for unraveling knitted goods and in a complete form for winding up the separate threads of the yarn so obtained; and further to have the machine of such construction that its several unraveling or drawing elements and also the winding spools will automatically and separately be regulated to correspond to the permanent or temporary variations in the amount of yarn coming from the different feeds of the knitted fabric.

A further purpose is to provide a machine of the character described which is simple in construction and operation and which will combine sufficient delicacy of operation and adjustment as to enable the machine to accomplish the purpose in hand and to be used with a great variety of knitted goods.

Another object is to provide a machine of the character described which will perform the work with a minimum of work or oversight by the attendant and which may be run at a speed sufficient to re-claim a large amount of yarn.

It is another object of my invention to provide a machine of the character described which is especially adapted for use upon tubular knitted goods produced from a plurality of feeds and to have such machine especially compact and convenient and accessible for that line of work.

Further purposes of my invention are to provide means and combinations of parts and elements especially well adapted to produce the general ends sought.

Figure 1 is a view partly in side elevation and partly in vertical section of all but the lower part of a machine embodying my invention.

Fig. 2 is a vertical central sectional view of the fabric holding rack but for the sake of clearness omitting all parts not shown on said section and including certain parts shown in Fig. 1 showing adjacent parts of the machine in side elevation.

Fig. 3 is a top or plan view of the machine but for the sake of clearness showing only the winding mechanism.

Fig. 4 is a top view of the fabric holding reel on line 4—4 of Fig. 1.

Fig. 5 is a top view of the drawing mechanism as seen on line 5—5 of Fig. 1.

Fig. 6 is a top view of a single unit of the drawing mechanism on an enlarged scale.

Fig. 7 is an outer side elevation of a single unit of the drawing mechanism on a similar enlarged scale and showing in dotted lines the different positions of a thread according to whether it is coming faster or slower than normal speed relative to the rest of the machine.

It will be understood that the drawings and specification herein show and describe a machine especially adapted to unraveling the yarn from tubular knitted goods which have been formed with a plurality of feeds and that said form of machine is the preferred and most convenient and useful embodiment of my invention. It will be understood, however, that as indicated by some of the claims hereinafter set forth my invention is not limited absolutely to use upon tubular knitted goods.

Referring to the drawings in a more par-

ticular description it will be seen that the machine comprises a rack 15 adapted to have placed thereon a quantity of tubular knitted goods which is to be unraveled, the unwinding or drawing mechanism including a plurality of unwinding or drawing units generally designated by the numeral 16, and in the complete embodiment of my invention, means for winding up the different threads of yarn that have been unraveled including separate spools or other receptacles 17 with means for moving said spools or receptacles at the proper speed for winding up the individual thread passing to each spool, and means for distributing the several threads along the length of the several spools together with proper frame-work for supporting the different parts of the machine and operating the parts of the machine by power.

The frame comprises a rigidly-supported post 18 and the following separate brackets extending therefrom, viz: a bracket 19 near the floor or the lower end of the post for supporting the lower end of the rack 15; a bracket 20 above the level of the upper end of the rack to which bracket there is hingedly connected an extension 21 at the outer end of which is mounted a depending stub shaft 22 normally engaging and supporting the upper end of the rack shaft 23; immediately above the bracket 20 another bracket 24 for supporting the unwinding or drawing mechanism; thereabove another bracket 25 for supporting the yarn-receiving spools 17 and means for rotating the same and still further above on said post another bracket 26 for supporting the means for distributing the different threads of yarn along the length of the spools or other receptacles 17. Part way down on the post 18 and rigidly secured thereto is a frame 27 in which is mounted the lower end of the main drive shaft 28 of the machine and which shaft extends upward parallel with the post 18 and is conveniently journaled in projections provided upon the brackets 25 and 26, said shaft 28 being on the outside of the post 18 or away from the rack 15 and unwinding or drawing mechanism and the winding mechanism. The shaft 28 may be driven through a bevel gear 29 at its lower end which meshes with a bevel gear 30 upon the inner end of a short shaft 31 journaled in an upright portion of the shaft frame 27. On the outer end of said shaft 31 is mounted the drive pulley 32.

The rack 15 is shown as of the collapsible and extensible type in order to enable the machine to be readily adapted to operate upon tubular knitted goods of various sizes. The rack is composed of rack shaft 23, upper and lower heads 33 and 34 respectively mounted upon the shaft 23, slats 35, slat clips 36 at the opposite ends of said slats, links 37 pivotally connecting the slat clips 36 to ears 38 projecting outward from the rack heads 33 and 34 and top and bottom rings 39 and 40 respectively. The slats 35 are of sufficient number to hold the tubular knitted goods approximately in a circle. By reason of the upper head 33 being adjustable lengthwise of the rack shaft 23 as by means of set screw 41 and through the pivotal connection of the links 37 with the slats 35 and the respective heads it will be seen that the upper head 33 may be readily raised or lowered upon its shaft and so the diameter of the rack readily adjusted to accommodate it to knitted goods of varying sizes. When the rack has been adjusted to the desired size the top and bottom rings 39 and 40 are brought down and up respectively against the recess provided upon the slat clips and operate to keep the slats from moving or sagging while the upper ring 39 affords a continuous surface past which the threads of yarn being unraveled from the fabric upon the rack may pass without catching upon the ends of the slats or the slat clips.

The lower end of the rack shaft 23 rests and rotates in a shallow socket 42 provided in the bracket 19. The rack is normally held in its upright position by means of its upper end projecting into a shallow socket 43 in the lower end of the stub shaft 22 which depends from the bracket extension 21. A pulley 44 upon the short shaft 22 is connected by a belt 45 to a pulley 46 upon the drive-shaft 28. The lower end of the shaft 22 is provided with downwardly extending projections 47 which coöperate as a jaw clutch with upwardly extending projections 48 upon a collar 49 secured to the rack shaft 23 just below its upper end. As the extension 21 is hinged to the bracket 20 so that said extension 21 may have its outer end moved upward it will be seen that the upper end of the rack shaft may be readily disconnected from its short drive shaft 22 and that the rack may then be bodily tipped as far as necessary to one side as shown in dotted lines in Fig. 2 for the purpose of loading a length of the tubular knitted fabric upon the rack. The rack may then be returned to its normal upright position and upon bringing down the hinged extension piece 21 the rack is again secured in position and operatively connected to the drive shaft of the machine. A knob 50 upon the right-hand side of the bracket 20 extends up into a corresponding socket in the lower side of the bracket extension 21 and serves as a stop to prevent the extension dropping beyond normal position when the operator is loading the rack and also serves as an anchor against sidewise movement of the extension 21 when the same is lowered to hold the rack in normal position.

The bracket 24 supports the unwinding

or drawing mechanism which comprises a platform 51 and the proper number of drawing units 16 and part of the gearing for driving said drawing mechanism. The platform 51 is shown as having a hub portion 52 which at its lower surface rests upon the outer end of bracket 24 and its upper surface is provided with an annular centrally located flange 53 while from the hub portion 52 extend spoke-like arms 54 supporting the rim 55 of the platform from which rim extend upward ears 56. The ears 56 and the central upstanding flange 53 afford bearings for the shafts 57 of the several drawing units 16 and also for the shaft 58 through which the power is brought on to said platform for driving the different drawing units. In the inner side of the brackets 26 and 25 there is supported a jack shaft 59 driven by chain 60 by means of sprocket wheel 61 on said jack shaft and sprocket wheel 62 on the main shaft 28. Below the bracket 25 this jack shaft 59 is provided with a bevel gear 63 meshing with a bevel gear 64 on the left-hand end of the shaft 58 of the drawing mechanism platform. Within the box formed by the annular flange 53 the shaft 58 and the several shafts 57 are provided with small bevel gears 65 and 66 respectively all of which are in mesh with a horizontally located bevel gear 67 mounted in the bottom of the box formed by said flange. The circular plate 68 serves as a cover for the box formed by the flange 53 to keep dust or lint from the gears contained in the box.

The outer end of each drawing unit shaft 57 projects beyond the ear 56 and has secured thereto the thread-engaging member of the drawing unit which is a roller 69 of tapering or truncated cone form with its larger end outward as more particularly shown in Figs. 1, 5 and 6. The inner end of the roller is preferably provided with a radially extending flange 70 to prevent the thread from running off at that end of the roller.

The machine here illustrated is constructed to operate upon the ordinary tubular knitted fabric which has been formed by a knitting machine having eight feeds. Accordingly my machine is equipped with eight drawing units one for each feed of the fabric to be unraveled. The fabric holding rack 15 when the machine is in operation will be moved in a clock-wise direction as viewed from above or its inner edge will move from right to left as indicated in Fig. 7. This direction of movement and the extent of movement given to said rack when the machine is in operation is such as to keep the point A designating the normal point where each thread of yarn leaves or is unraveled from the fabric substantially below the drawing unit 16 which is to provide the draw or pull for unraveling said thread from the fabric.

Each drawing unit includes a thread controlled arm 71 pivotally mounted as upon pivot 72 provided upon a hanger 73 depending from the platform 51. The pivot 72 extends substantially radially relative to its portion of the circle of the platform 51 so that the upper short end 74 and the lower and longer end 75 of said arm 71 swing roughly in the line of the periphery of the circle of the platform above and the circle of the knitted goods 76 upon the rack 15 below said arm.

Preferably a hinge-joint 77 is provided in the longer portion 75 of the arm 71 below the pivot 72 which allows the portion of said arm below said rule-joint to swing in and out relative to the circle of the fabric below the arm in order to enable the machine to adapt itself readily to different sizes of tubular knitted fabric. It will be noted, however, that the axis of the hinge-joint 77 is at right angles to the pivot 72 so that the hinge-joint 77 does not interfere with the normal swinging action of the thread-engaging arm 71 upon its pivot 72. In other words force applied to the lower end of said arm 71 to swing it sidewise as viewed in Fig. 7 is not interfered with at all by the hinge-joint 77. The extreme lower end of the lower portion 75 of the arm 71 is turned out forming a short finger 78 provided with a central perforation or eye 79 through which the thread 80 to be operated upon by this drawing unit is led upward from the fabric 76 below.

The upper end 74 of the thread-controlled arm 71 is pivotally connected as by pin 81 to a horizontally arranged link 82 the left end of which as seen in Fig. 7 is pivotally connected as at 83 to the inwardly extending arm 84 of a bell-crank 85. This bell-crank is pivoted upon a vertically arranged pin 86 depending from the outer end of a bracket 87 projecting from the outer edge of the platform 51 and preferably as indicated in Fig. 7 a little below the level of said platform. The other arm 88 of said bell-crank 85 projects to the right as shown in Fig. 7 and in the general direction of its drawing roller 69 and swings horizontally so that the yarn guide 89 projecting from or provided in the end of the bell-crank arm 88 may be swung along a line roughly corresponding to the near edge of the drawing roller 69 as viewed from above and as more particularly shown in Fig. 6.

The thread 80 after being led through the eye 79 in the lower end of the thread-controlled arm is led upward and through the eye provided in the said yarn-guide 89 which is relatively close to and a little below the drawing roller 69. From the said yarn guide 89 the thread 80 is led up and over

and substantially half way around the surface of the drawing roller 69 and then downwardly and to the left as viewed in Fig. 7 through a pig-tail or hook 90 provided upon the outer end of a finger 91 which projects outward from the adjacent portion of the platform 51. From this hook 90 the thread 80 is conducted to the winding mechanism to be hereinafter described.

As the machine so far described is a fully operative machine and may be used with any proper form of mechanism for winding the different threads as they are unraveled from the goods, I will now describe the operation of the machine so far shown.

The drawing rollers 59 are shown as rotating clockwise as viewed from without the machine or as seen particularly in Fig. 7. The drawing rollers 69 will be composed of some material or preferably will have their surface covered with some material as cloth so that assuming the thread 80 to be led half way about said roller as indicated in the drawings and especially when subject thereto beyond to a proper or yielding tension said rollers will engage the thread with sufficient grip or friction to draw or unravel the thread from the fabric therebelow.

It will be understood that in a machine organized as indicated the several drawing rollers 69 of the machine will be rotated at the same speed. On the other hand it is well known that the great difficulty of unraveling knitted goods having a plurality of feeds comes from the fact that the amount of yarn consumed by the different feeds in the formation of a fabric will vary greatly and of course the amount of yarn unraveled from said different feeds will vary in a similar way. This variance may be caused from a variety of reasons such as difference in the construction or adjustment of the different feeds of the knitting machine or different kind or character or quality of yarn used at the different feeds of the knitting machine. The variance mentioned may also be permanent or temporary, that is one thread of yarn being unraveled may be in much greater amount or much less amount than the average of the other threads all the way through that portion of knitted fabric or the variance may be only temporary due to temporary or accidental causes in a knitting machine. The mechanism herein described will automatically adjust itself to unwind the varying amounts of yarn present in the different feeds of the particular piece of fabric being unraveled.

Assuming that the amount of yarn to come from any given feed of the knitted fabric is the average amount, the thread 80 as it comes up from the knitted fabric 76 will leave the fabric at point A indicating the normal leaving or unraveling point of an average thread and will pass substantially straight upward through the eye 79 at the lower end of the thread-controlled arm 71 as shown in Fig. 7 and through the yarn-guide 89 being at about central position of its range of movement the said thread will be led on to the roller 69 about mid-way of the length of the said cone-shaped drawing roller 69 or at point A^2.

Assuming now that the amount of thread or yarn coming from the feed being handled by the drawing unit 16 in question is less than the average per revolution of the machine it will be obvious that the point where the said thread leaves the fabric 76 will tend to move ahead upon the rotating body of fabric or toward the right as seen in Fig. 7. This movement is caused by the fact that the drawing roller tends to still draw the average amount of thread and the rack holding the knitted goods is being rotated at a rate to keep the point of the thread leaving the fabric below the drawing unit for the threads having the average amount of yardage of the piece of knitted goods being handled. The thread being unraveled will seek the extra yardage required to accommodate itself to the normal condition of the machine by having the leaving or unraveling point of said thread advance upon the fabric or to the right or somewhat toward the position indicated at B by the dotted line thread in Fig. 7. This movement of the thread toward the right will be with sufficient power to carry the lower end of the delicately adjusted thread-controlled arm 71 more or less to the right or toward B′ as indicated in Fig. 7. The result of this will be to move the upper end 74 of the said arm 71 to the left as shown in said Fig. 7. This movement is communicated through link 82 to the inwardly extending arm 84 of bell-crank 85 which will obviously cause the other arm 88 of the bell-crank to move inward and swing the yarn-guide 89 inward or toward the smaller portion of the cone-shaped drawing roller 69 as plainly seen in Fig. 6. The effect of this will be to guide the thread 80 toward the smaller diametered portion of the drawing roller or toward a position such as indicated in Fig. 6 by B^2.

Inasmuch as the drawing roller 69 is rotating at a given rate of speed it will be obvious that as the thread is guided toward the smaller end of the cone-shaped roller the roller will draw proportionately less thread due to the smaller periphery of the portion of the roller thus engaging the thread. In this manner the drawing action of this unit of the drawing mechanism will automatically reduce the amount of thread drawn by it to the amount of thread at that time available from its feed of the knitted goods. If the feed being operated upon by that drawing unit is permanently tight, that is with less thread than the average of the feeds in

the piece, the drawing mechanism will keep the thread guided more or less as need be toward the smaller end of the roller. If the reduced amount of thread from the given feed is only temporary the device, it will be seen, will automatically reduce the drawing as long as such reduced drawing is necessary and then the parts tend to return toward an intermediate position or the normal position so that the thread will come back to normal position upon the roller as at A^2.

If on the other hand the particular feed being operated upon by a given drawing mechanism has either temporarily or permanently a loose stitch or greater yardage than the average of feeds from the piece of knit goods in the machine the point where the thread 80 leaves the edge of the knit goods 76 will tend to run behind upon the circle or parts to the left as seen in Fig. 7 so that the leaving point will come to be in the position indicated by the letter C and the thread will pass upward in a slanting position as indicated by the dotted lines extending up through C'. This falling behind or passing to the left of the unraveling point is caused by the drawing mechanism having theretofore been adapted to a normal amount of yardage of thread and also to the fact that the rack 15 is rotated at a speed adapted only to the average amount of yardage of the different feeds of the knit goods being handled. As the thread thus moves to the left it will soon carry with it to a greater or less extent the lower extremity 78 of the thread-controlled arm 71. Obviously this will cause the upper end 74 of that arm to move to the right as viewed in Fig. 7 thereby carrying the link 82 also to the right and thereby causing the arm 84 of bell-crank 85 to move toward the roller 69 and the other arm of said bell-crank carrying yarn-guide 89 to pass to the right as the parts are seen in Fig. 6 or in other words more or less toward the larger end of the cone-shaped roller 69 or to a position such as indicated at C^2. As the larger part of the cone of course has a proportionately larger periphery the roller will at once begin to draw a greater amount of yarn and will continue so to do as long as the extra yardage is present in the feed being operated upon by that drawing unit. As soon as that feed ceases to have greater yardage than the average the unraveling point of its thread will return to normal position and thereupon in an obvious manner the yarn guide 89 will be returned to an intermediate or normal position such as A^2.

It will now be seen that I have produced a machine wherein the separate drawing units are well adapted to readily, accurately and automatically adapt themselves to the varying amounts of yarn coming from the different feeds of the piece of knitted goods being operated upon by the machine. It will be noted that the different drawing units will automatically adjust themselves to the average position required by the amount of thread in the different feeds if the feeds vary permanently and that at the same time each of the drawing devices will automatically adjust itself to any temporary or unusual variance in its thread. Particularly it will be noted that the machine is so constituted that each drawing device tends to keep its thread drawn up from the edge of the knitted fabric in a fairly direct line and to keep said thread from running too far behind or ahead. In this way the unraveling points either A, B or C are at all times closely enough under its own drawing unit as to prevent the thread being drawn by that unit from running back or ahead so far as to over-take or conflict with either adjacent thread being drawn by the drawing units to the right or left of the one in question. In other words the machine automatically keeps the unraveling points of different threads distinct and thus prevents the thread from becoming knotted or tangled.

It will be obvious that a machine may be constructed having more than the eight drawing units as shown in the drawings but the machine shown is large enough for all practical purposes. In case the knit goods to be unraveled were formed with less than eight feeds the work can be readily done upon the machine shown as the four or six threads from the fabric will be led up to that number of drawing units and the other two or four drawing units preferably spaced apart will run idle. Where a factory needs to handle only four or two-feed goods a machine can readily be constructed along the lines herein suggested, but having only the desired number of drawing units.

When the machine is to be adjusted to tubular knitted goods of a different size the upper rack head 33 is loosened and then raised or lowered to bring the slats 35 to the proper diameter and the rack is then fixed at that size by tightening the upper head against the rack shaft and also by placing upon the slat clips 36 the proper sized upper and lower rings 39 and 40. These rings will be provided of various sizes according to the diameter to which a rack may require to be adjusted.

The bracket 25 supports a platform 92 in which are revolubly mounted upstanding spindles 93 which are each provided with a drive pulley 94 and thereabove an upwardly facing shoulder 95 upon which rests the lower end of the spindle or bobbin 17 mounted upon the upstanding shank of the spindle. The spindles are driven by having an adjacent pair of them connected by a single belt to a centrally located pulley 96 provided with a sufficient number of

grooves to receive the belts of different pairs of spindles. This central pulley 96 is suitably mounted upon the platform 92 and in turn is driven as by belt 97 from a pulley 98 upon the shaft 59. The draw or winding action of the thread-receiving spool 17 is yielding and adjusts itself to wind up the amount of thread coming to that spool. This yielding drive is obtained through the spools not being positively fastened to the spindles but resting loosely upon the shank of the spindle and resting at their lower ends upon the upwardly facing shoulders 95 of each spindle. In other words there is only a light friction drive derived simply from the weight and friction of the lower end of the spool upon said spindle shoulder 95. If a given thread is coming slow from its feed and its drawing device the spool receiving said thread is retarded by the thread to a similar extent through the bottom of the spool slipping upon the shoulder 95. A further element in the yielding drive is that the spindles are belted very loosely in their pairs and to the central drive pulley 96.

The bracket 26 supports the mechanism for distributing vertically the different threads of yarn along the upstanding spools 17. This mechanism includes a depending shaft 99 revolubly mounted in the outer end of the bracket 26 and carrying at its lower end a cup-shaped cam member 100. The double and oppositely disposed cam surfaces 101 are formed upon the upwardly extending flange 102 of said cup member 100. Resting upon these cams 101 is the bridge piece 103 which carries at its outer extremities an annular platform or ring 104 while at the center of the said bridge there is provided a hub portion 105 revolubly and slidingly mounted upon the shaft 99. The platform 104 is kept from rotating with shaft 99 and is steadied in position by means of vertical rods 106 secured to the platform 104 as by set screws 107 while the lower end of said rods extend into and freely slide in apertures 108 provided in the spool-supporting platform 92. The shaft 99 is provided above the bracket 26 with a sprocket wheel 109 connected by a chain 110 to sprocket wheel 111 upon the main drive shaft 28. Projecting from the outer edge of the annular platform 104 there are provided fingers 112 corresponding in number and location to the drawing units 16. From the fingers 112 depend hooks or loops 113 through which are passed the threads 80 brought up from the hooks 90 of each drawing unit. From each hook 113 the thread 80 passes inwardly to its spool 17 which from mechanism already described winds up the thread of yarn as fast as it is unraveled by its drawing unit. Rotation of the cup-shaped member 100 upon the opposite cams of which rides the bridge 103 in obvious manner causes the platform 104 to be slowly lowered from the position shown in Fig. 1 and thereafter raised again to same position. During such downward and upward movement of the platform 104 it will be seen that the thread hooks 113 carried thereby have distributed the thread lengthwise of the vertically arranged spools 17.

What I claim as new and desire to secure by Letters Patent is:

1. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently-speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower-speeded part of the thread-engaging member when the thread is tight and to the higher-speeded part when the thread is loose and means for moving the thread-engaging members of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

2. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently-speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower-speeded part of the thread-engaging member when the thread is tight and to the higher-speeded part when the thread is loose and means for moving the thread-engaging members of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for permitting said fabric-hold-

ing rack to move relative to the drawing units whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

3. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently-speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower-speeded part of the thread-engaging member when the thread is tight and to the higher-speeded part when the thread is loose and means for moving the thread-engaging members of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for moving the fabric-holding rack relative to the drawing units whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

4. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently-speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower-speeded part of the thread-engaging member when the thread is tight and to the higher-speeded part when the thread is loose and means for moving the thread-engaging members of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled, means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units and yarn-winding mechanism comprising a separate thread-winding member for each thread adapted to automatically accommodate itself to the amount of thread to be wound.

5. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently-speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower-speeded part of the thread-engaging member when the thread is tight and to the higher-speeded part when the thread is loose and means for moving the thread-engaging members of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled, means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective units and yarn-winding mechanism comprising a separate thread-winding member for each thread and a yielding driving means whereby each winding unit automatically accommodates itself to the amount of thread to be wound.

6. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging tapering roller, a thread guide movably mounted to direct the thread to different points along the length of said roller, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved toward the smaller end of the roller when the thread is tight and toward the larger end of the roller when the thread is loose and means for moving the rollers of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

7. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging tapering roller, a thread guide movably mounted to direct the thread to different points along the length of said roller, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved toward the smaller end of the roller when the thread is tight and toward the larger end of the roller when the thread is loose and means for moving the rollers of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for permitting said fabric-holding rack to move relative to the drawing units whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

8. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging tapering roller, a thread guide movably mounted to direct the thread to different points along the length of said roller, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved toward the smaller end of the roller when the thread is tight and toward the larger end of the roller when the thread is loose and means for moving the rollers of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for moving the fabric-holding rack relative to the drawing units whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

9. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging tapering roller, a thread guide movably mounted to direct the thread to different points along the length of said roller, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved toward the smaller end of the roller when the thread is tight and toward the larger end of the roller when the thread is loose and means for moving the rollers of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled, means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units, and yarn-winding mechanism comprising a separate thread-winding member for each thread adapted to automatically adapt itself to the amount of thread to be wound.

10. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging tapering roller, a thread guide movably mounted to direct the thread to different points along the length of said roller, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved toward the smaller end of the roller when the thread is tight and toward the larger end of the roller when the thread is loose and means for moving the rollers of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled, means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units, and yarn-winding mechanism comprising a separate thread-winding member for each thread and a yielding driving means whereby each winding unit automatically accommodates itself to the amount of thread to be wound.

11. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently-speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted

goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower speeded part of the thread-engaging member when the thread is tight and to the higher-speeded part when the thread is loose, means for moving the thread-engaging members of the various drawing units at a given relative speed and means for movably supporting the fabric to be unraveled whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

12. In a machine for unraveling knitted goods having a plurality of feeds, the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging tapering roller, a thread guide movably mounted to direct the thread to different points along the length of said roller, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, means operatively connecting said thread guide and said arm whereby the guide is moved toward the smaller end of the roller when the thread is tight and toward the larger end of the roller when the thread is loose and means for moving the rollers of the various drawing units at a given relative speed, and means for movably supporting the fabric to be unraveled whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

In witness whereof I have affixed my signature, this 12th day of August, 1919.

MICHAEL F. ROBISCHON.