Fig. 8 illustrates the cylinder or plain needles. These fit into grooves of the cylinder and by the cams are raised and lowered at the foot (32a) to form the stitch at the top or hook of the needle; (32c) is the latch of the needle, and (32e) is the heel.

The belt (Fig. 9) is placed round the cylinder in the groove (A., Fig. 6) and prevents the needles from coming against the yarn guide and being broken or bent.

ACTION OF THE MACHINE.

In knitting plain work the handle (7) is moved round towards the back from the top; this operates the driving wheel (8) which in turn moves round the cog ring (2), and coming in contact with the lug (4a) of the cam shell (4) drives it (the cam shell) round. For the direction in which to turn the handle see illustration Fig. 1. Here the handle is at the top and is to be pressed down towards the back. This is called the Forward movement; the reverse way is called the Backward movement. It will be well to make a few turns of the handle with the needles in the machine and the belt on, but without work upon the needles, to see the action. It will be seen that the needle first rises somewhat at cam (B., Fig. 5); this is so that the last stitch knitted will pass below the latch. The hook of the needle is now depressed by cam A. (Fig. 5), and at the same time receives the new wool, and as it (needle) passes below the top of the cylinder, the latch (32c, Fig. 8) is closed by the old stitch, which passes over to the inside of the cylinder. For to learn which cams give the different movements to the needles, read the paragraph on the cam shell (page 8) while making the few turns of the handle.
HOW TO WIND THE YARN.

Care should be taken in winding the yarn, or the machine will not work freely and easily.

Fix the winder and swift on to a table in the manner shown (Fig. 10) and the bobbin D on to the winder spindle, take the hank of yarn (A) and place it over the swift (B), raise somewhat the barrel (C) so that the yarn will not fall off the swift, but not to bind the yarn tightly. Now piece the yarn to the bobbin (D) and with the right hand turn the wheel (H), and with the left hand guide the yarn. Wind first the lower end of the bobbin cone shaped, and gradually fill it towards the top, taking care to keep the cone shape throughout, so that the upper part of the bobbin may never have more yarn upon it than the lower part (see Fig. 10 E). Do not wind the yarn too tightly upon the bobbin, nor yet too loosely. Hard and coarse yarns will work easier if, in winding, an oily rag be held in the left hand, and the yarn allowed to pass through it to the bobbin. The weaver's knot (Fig. 11) is the best knot to use for piecing the yarn. Large knots should be avoided.

Fig. 10.

Fig. 11.
A PLAIN SOCK (without the use of the Ribbing Attachment).

TO CAST ON.

Do not interfere with any screws or parts unless directed to do so.

Place a needle with its latch open, that is, pointing downwards, in each cylinder groove. Set the cylinder tension (16) at about 5 for 4 ply fingering wool (note 1). Turn the handle of machine forward (note 2) till the yarn-guide is at the Back (note 3) of cylinder. Place a bobbin of wool on the table immediately below one of the rear holes in the yarn bracket (24). Pass the yarn upwards through the hole, then through the eyelet (25) on the yarn bracket immediately behind the pillar, now under the yarn-grip (27, Fig. 1) and down through the hole in front of the yarn-grip. Now pass the yarn through C and D of the yarn-guide (Fig. 12). Draw into the cylinder about 1 1/2 yards of loose yarn. Take this in the right hand, and with the left pass the set up (50, Fig. 12) from below into the cylinder, with the hooks just below the level of the cylinder top (Fig. 12). With the right hand take hold of the loose yarn near to the yarn guide (that is about 1 1/2 yards from its end A.,

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1.—Learners should knit with a loose tension at first until some practice has been had in the making of socks, as the tighter the tension the more difficult is the manipulation of the needles. The tension should never be higher than 3 except for very fine wools.

2.—For the direction in which to turn the handle see Fig. 1; here the handle is at the top and is to be pressed down towards the back. This direction is called the forward movement; the reverse is the backward movement.

3.—Definition of Right, Left, Front, Back:—Right: On the Right side of the cylinder you will find one of the posts (which divides the grooves) filed off at the top; this post is the right half mark, and will in the following be called Right. Left: Likewise on the Left side of the cylinder there is a post filed off at its top, and will in the following be called Left. Front: The word Front signifies the cylinder post which is midway between the Left and Right (really the post nearest the operator). Front half is that part of cylinder which is nearest the operator, and extends from Left to Right half marks. Back: The word Back signifies the cylinder post which is furthest from the operator and midway between Right and Left. Back half is that part of cylinder which is farthest from the operator, and extends from Right to Left half marks.
and pass it alternately round a hook of the set up and a needle in the manner and in the direction shown in Fig. 12). It is not necessary to pass the yarn round every needle, but every second needle, and from the needle to the nearest hook of the set-up (the hooks of the set-up may have more than one loop upon them). Continue in this way round the machine until you come to the depressed needles. All this time the left hand has been holding the set-up from below, now hang a weight stand (51) with one weight (52) upon the set-up. Turn the handle forward (see note 2), that is, in the same direction as the needles have been looped (note 5) till the yarn-guide is at the front (see note 3). The looping can be continued until each alternate needle has a loop upon it and the circle is completed. Continue the looping for two or three needles beyond the circle and break off the remaining yarn, leaving the end (A) in the cylinder. See that all the needle latches are open, hold down the set-up with the left hand and knit six times round (note 6), stopping with the yarn-guide at front of machine (note 7).

5.—The Loop is that portion of the yarn which hangs over the needles.

6.—If one or more needles do not form a new stitch each time round, and leave the yarn loose on the needle hooks, or two loops on one needle, the probable cause is insufficient weight or too tight a tension. First add another weight to the set-up, and loose the tension one spot (take care to screw up the thumb nut again after altering the tension). Each needle will form its own separate stitch, but if by accident when looping the yarn has been passed over two needles, these two needles will be making one stitch instead of two. To remedy this fault raise one of the two needles as high as possible out of action (see note 8) until once round has been knitted; now depress that needle into action again and it will make its own separate stitch. Dropped stitches can be picked up after the sock has been taken from the machine.

7.—For practice it is advisable that the learner should repeat the starting of the work up to this point several times, and to take the work off the needles break the yarn immediately in front of the yarn-guide, and holding the set-up in the left hand, turn the handle twice round.
FORMING OF THE WELT.

Fig. 13 (see also Fig. 14).

First raise out of action the back half of the needles (note 8). Turn the handle forward until the yarn-guide stands at the Back, now raise out of action the Front half of needles. Up to this point old or waste yarn may be used, as the sock proper is not yet begun. Piece the yarn from which the sock is to be made. Draw from the bobbin through the yarn-guide to the inside of cylinder about a yard of the new yarn. Break off the old yarn at the knot and allow it to lie in the set-up. Take two inches of the new yarn at its end and double it so as to form a loop. Hold its loop between the thumb and forefinger of the right hand. Place the loop over the needle which formed the last stitch knitted. Keep this loop (B, Fig. 14) in its place by a finger of the left hand, pressing it against the cylinder; then take the yarn (which for the distance of a few needles will be double) across the back of the next needle Forward (note 9), round its side to the front, across the Front and through to the back between it and the needle on which the first loop was made, now across its Back again to the next needle forward (the yarn will be double for a few needles by reason of the loop) and across its back and round it in the same way as the last needle, and so on (see Figs. 13 and 14). Proceed in this manner, wrapping the yarn round each needle, and finishing with the needle next the one on which the loop was first placed (see Fig. 14, E.). Now draw the loose yarn back through yarn-guide to the bobbin. Turn the handle backwards until the yarn-guide stands at the Front of the machine. Commencing with the one on which the loop was placed, put down in action the Back half

8.—To raise needles out of action lift them in their grooves as high as possible, that is, until the needle feet touch the under side of the belt. The raising of any needle can only be performed when it is not in touch with the cams.

9.—Forward means the direction in which the yarn-guide travels when knitting round.
of the needles. See that the latches of all needles are open. Commence knitting with the needle on which the loop was placed (B.), draw back to the bobbin any loose yarn from the yarn-guide until the yarn passes directly from the last needle looped (E.) through the yarn-guide, take care that the yarn is fed into the hook of each successive needle, and turn forwards until the yarn-guide stands at the Back. At the same time hold down the set-up with the left hand (see note 10), put down the Front half of the needles and turn the handle forward until the yarn-guide stands at the Front. (See note 11.)

Top. Tighten the tension 1 spot and set the counter to 100 (see note 12), knit 40 rounds.

Leg. Loose the tension 1 spot, set counter to 100, knit 50 rounds.

Ankle. Tighten the tension 1 spot, set the counter, knit 40 rounds, and stop with the yarn-guide at Front.

Heel—Narrowing. This is the part of the heel section B.C.E. of Fig. 15 (page 18).

The heel and toe are usually knitted with an extra ply of yarn for to thicken and strengthen these parts. Place the bobbin of thickening wool below the other hole at the back of the yarn-bracket, pass the end through this hole and tie it to the other yarn; it will now be drawn through the remaining holes into the work.

Raise out of action the Back half of needles (see notes 7 and 8). Hook the yarn on to the take-up between the yarn-grip and the front eye of the yarn-bracket (note 13). Knit forward 10.—After the yarn has been wound round the needles in the manner described there are two loops upon each needle, so that the first round of knitting will be harder to turn and will require more force.

11.—The instructions up to this point should be repeated many times for practice.

12.—The counter is the circular plate (9) at the right side of the base plate, and counts the number of rounds knitted in circular web. The pointer must be started at 100 and will travel one point for each round knitted.

13.—The take-up is the part on the yarn-bracket with a weight at one end and a hook at the other. It is used when working the yarn-guide back and forward for to take up the loose yarn between the yarn-guide and the last stitch. The yarn-grip pinches the yarn to the yarn-bracket at each taking up, thus preventing the yarn coming from the bobbin, and as the yarn is left loose at the needles the weight on the take-up falls and draws up the loose yarn from the needles. The take-up can also be used for knitting a tight stitch in circular web. The weight on the take-up is adjustable to give more or less weight for coarse or fine yarns.
still the yarn-guide stands at back. Lift out of action the first
working needle on the right side (that is, the needle which
knitted the last stitch). Knit backwards across the needles in
action, stopping with the yarn-guide at Back (see note 14).
Lift up the left end needle and knit Forwards across the needles,
ending with yarn-guide at Back. Lift up the next right hand
end needle and knit Backwards across the needles, stopping
with yarn-guide at the back on the left side, and lift
the next left hand needle. Knit Forwards to the Back, raise
the next right hand needle. Insert the heel wire with weight
stand (see note 15), and continue knitting across and raising
one needle each time until only 14 or 16 remain in action. The
last needle to be raised will be at the Left; now knit Forward to
the right, leaving yarn-guide at Back.

If, owing to the length of knitting, the weights touch the
ground, the set-up must be removed, and the buckle (28, Fig. 1)
put on in its place. When knitting, there must always be enough
weight on to keep down the work.

Heel—Widening. This is the portion of the heel B.E.F. of
Fig. 15 (page 18). The yarn-guide stands at the Back on the
Right side; now depress the last needle raised on that side, lift
the yarn from the front of that needle, and pass it round from
the left side so that it will come out to the front between the
needle just depressed and the next raised needle, direct to the
yarn-guide. (See that the latch of the needle is open, or the
stitch will be dropped.) Knit backwards across needles in action

14.—It is not necessary always to go right to the back, but a sufficient
distance beyond the last stitch knitted that the cams are clear of the
needles.

15.—After knitting some rows of the heel or toe it will be found that,
owing to some needles having knitted more stitches than others, the weight
does not pull down the work evenly; to overcome this difficulty, the heel-
wire (the bent wire with two points) is used.

(a) Hook the heel-wire into the fabric 7 or 8 rows below the top of
the cylinder, and hang on to it the other weight stand with one weight.
The hooks of the heel-wire should be extended and hooked in the fabric
below (about the fourth needle in the work on either side of the heel). The
heel-wire can be moved higher up (about every fourth time across) and
as the number of needles in action decreases, the points should be brought
closer together.

(b) Sometimes when knitting the heel, learners will find that the end
needle has not formed its stitch. This is owing to there being insufficient
weight on that particular part for to keep down the work. This fault
must be expected by beginners, and will be best overcome by practice.
The left hand can greatly assist the weights by holding down from below
the corners of the work when knitting. If a stitch or more has been missed
the belt must be opened, the needle taken out, and the stitch caught up,
after which the needle can be put back into the machine, the belt closed,
and the needle raised. (See page 19, how to pick up dropped stitches.)

(c) Another possible cause of faulty work at the corners of the heel or
toe is—if the yarn take-up is not drawing back all the loose yarn between
the yarn-guide and the last needle in work. The reason may be that the
weight on the take-up is not low enough, or that the yarn-grip is not
acting right, but is allowing the take-up to draw yarn from the bobbin
instead of from the needles.
and stop with the cams clear of the needles; depress the corres-
ponding end needle of the Left side, place the yarn behind it as
before. Knit forward across the needles in action and repeat,
depressing one needle each time across and at the same side on
which the yarn-guide stands (always put the yarn behind the
needle depressed and see that the latch is open). Continue this
until all needles which were raised for the first half of the heel
have been depressed (that is, up to the half mark on each side),
but with the last needle on each side put the yarn not only round
that needle but also round the next needle to it (note 16), the
first needle of the back half. Depress only the one needle as
usual and knit backwards, place the yarn round the two corre-
sponding needles at left, depress the one needle and knit for-
ward, stopping with the yarn-guide at Front. Lift the yarn out
of take-up, put down the Back half of needles, break off the
splicing yarn.

Foot. Set the counter to 100. (Notice that all the needle
latches of Back half are open.) Knit forward about 70 rounds
and stop with the yarn-guide at Front.

Toe—Narrowing. This represents H. to K. of Fig. 15.
Use the thickening yarn also in the toe, and proceed as directed
for Heel Narrowing until only 14 needles are left in action.

Toe—Widening. This represents K. to L. of Fig. 15. Pro-
ceed as directed for heel-widening, except that when you come
to the last needle on each side put the yarn round that needle
only, instead of the two needles as was done in the heel. After
the last needle on the Left has been depressed, stop with the
yarn-guide at the Front. Depress the Back half of needles, take
the yarn out of take-up, break off the splicing. Knit four rounds
(note 17), break the yarn at the needles, remove the weights,
hold down the fabric with left hand and turn handle for one or
two rounds. when work will leave the needles, take off the buckle.

To Join the Toe. Place a damp cloth upon the toe and press
it with a hot flat-iron, sew up with the mending stitch.

Mending Stitch. Take the end of the yarn and ravel off the
four extra rows knitted. Do not break off the ravelled yarn, but
thread it with a darning needle and sew the toe across. (See
Fig. 16, page 18.) Take the first and second loops at the corner
of the opening (both of the same side), pass the needle right
through them; then in the same way pass the needle through the
first and second loops on the opposite side, now return to the one
side, take the second and third loops, pass the needle through
them (in at the second and out through the third); proceed to the

16.—The reason for putting the yarn behind the two needles each
side of the half-mark is to prevent a hole being left at the corners of the
heel (B. of Fig. 15). The yarn is not put behind two needles at the end
of the toe widening.

17.—The four rounds do not form part of the sock, but are afterwards
ravelled out for stitching the toe.
other side and do the same, that is, taking one new loop each
time, first passing the needle in the centre of last loop and out of
the new loop. With a little practice the joining when finished
will present the same appearance as the other stitches, and the
seam cannot be detected. The stitches of the seam must not be
drawn tighter than those of the knitting.

To Finish the Sock. Separate the casting-on rows from the
sock at the welt. Take hold of the end of the casting-on yarn
which was placed inside before commencing the welt and draw
it until the yarn breaks, when the casting-on rows can be
separated from the sock and will leave a clean and elastic welt.
Another way is to cut the casting-on rows away from the sock
just below the welt, and then to pick out the loose bits of yarn
close up to the welt.

To improve the appearance of the sock place it upon a
wooden sock block (note 18), lay it upon an ironing table, and
with a damp cloth over the sock, pass a hot flat-iron over it.
Leave the sock upon the block a few minutes.

ILLUSTRATION OF THE SOCK.
As it leaves the machine after being knitted according to fore-
going instructions.

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Fig. 15 shows the sock before the toe has been joined.
Fig. 16 shows the mending stitch used for joining the toe.

18.—For the prices of these wooden blocks see inside Front Cover.
TO PICK UP DROPPED PLAIN STITCHES.

On the Machine.

Take off the belt, lift the weights off, take out the needle where the stitch was dropped, hold the fabric up until the dropped stitch is high enough to allow you to catch it in the hook of the needle (from behind the fabric, that is, between the cylinder and the fabric). Where the stitch has dropped are cross threads, each representing what should be a stitch. These stitches must be formed on the needle by hand; push the needle through the stitch on which it is hooked until the stitch passes behind the latch, now catch the first cross thread in the hook and draw towards you until the old stitch has passed off the needle; continue this with all the cross stitches up to the top; replace the needle in its groove and with latch open, put on the belt, attach weights, and continue knitting.

Dropped stitches in plain work may be due to one of several causes, for which see (Faults and Remedies, page 56).

TO KNIT A PLAIN SOCK.

WITH IMITATION RIBBED TOP (with Ribbing Attachment).

Set the indicator or tension at about 5.

Set the needles 3 in, 1 out, all the way round the cylinder, put on belt. Set up the work and form the welt as directed on pages 12, 13, 14. Knit 40 rounds, remove the belt, put needles in all the empty grooves, first catching in their hook the last stitch but one knitted upon the needle adjoining, turn the handle forward until each empty groove has received its needle, now replace belt, loose the indicator one spot; knit forward 50 rounds; tighten the indicator one spot and knit 50 rounds more; stop with the yarn-guide at Front. The Heel, Foot, and Toe are now made exactly as for a plain sock (see pages 16 to 18).

EXPLANATION OF THE RIBBING ATTACHMENT.

See Figs. 1, 2, 17 (pages 4, 5, and 20).

The Ribbing Attachment consists of the arm (18), bolt (30), nut (35), collar (29), cam plate (21), dial (20), driving pin (19), and the dial needles.

The Ribber Arm on which the remaining parts of the Ribbing Attachment are secured is fastened to the cam shell (4) by the wing nut (17), and is thus carried round by it.

The dial in which are the ribbing needles has just half as many grooves as the cylinder, it is secured to the ribber arm by the bolt (30) and nut (35). The dial (20), bolt (30), collar (29),
nut (35), and needles do not revolve with the other parts of the Ribbing Attachment, but are held in position by the lug (36) on the underside of the dial, and by the dial adjusting post (31). The dial height regulating collar (29) has eight slots, which are numbered; it is used to raise and lower the dial. When the spring (37) is in slot No. 1, the dial is at its lowest position, and when it is in slot No. 8, the dial is at its highest position.

Fig. 17 shows the ribbing attachment in position on the machine with the dial lug (36) pressing against the dial adjusting post (31), the ribber arm resting in position on the cam shell and secured by the wing nut (17).

Fig. 18 shows the ribbing cams on the cam plate (21).

Cam 40 is the welting cam which throws out the needle; it can be drawn behind the guide cam (41) by welting cam lever (38) on the top of the cam plate (21). When the lever 38 (Fig. 17) is pressed back with a knob towards the back of the cam
plate, cam 40 is within the guide cam (41), and the ribber needles will not be pressed outward; when lever 38 (Fig. 17) is to the front with the knob against the screw on the cam plate, the cam (40) is out as shown at Fig. 18, and will operate the needles.

Cam 42 is the stitch cam which draws back the needles after they have been pressed forward by cam 40; the wide end of cam 42 is adjustable by the thumb screw (22) on the cam plate (Fig. 17) for to regulate the length of the ribbing stitch; the pointed end of cam 42 is secured by a screw.

Cam 41 is the guide cam which keeps the needles at one level when not being operated by cams 40 and 42; this cam is fixed.

**The Cam Plate** to which the ribber cams are fastened (Fig. 18) revolves round the bolt (30) above the dial, and the needles are operated by the cams on its under side. On the top of the cam plate are the—

**Ribber Stitch Indicator** (22) to regulate the length of the ribber stitch; it is numbered 0 to 4, and is adjustable by a screw and pointer; the nearer the pointer is to 4, the looser the ribbing stitch, and the nearer to 0 the tighter the ribbing stitch. Care must be taken not to get the pointer too far forward towards 0 or the ribber stitch will not be formed.

**The Welting Cam Lever** (38) is used for forming a welt in 1 and 1 rib, by putting out of action the ribber needles. When the lever is pressed back (read description of Fig. 18) the ribber needles are out of action, when pressed forward with the knob against the small screw on the cam plate, the ribber needles are in action.

**The Driving Pin** (19) passes first through the ribber arm and then into the hole (21 B) on the small plate at the back of the cam plate, and by this pin the cam plate is moved round.

**The Dial Adjusting Post** (31, Fig. 17) is connected with the turn-screw (43) by the block (44); its upper end can be moved from side to side by twisting the turn-screw (43) from or towards you; it is used to adjust the ribbing needles to their correct position in relation to the cylinder needles, that is, so that the dial grooves shall be over the cylinder grooves or over the cylinder posts as may be required for different rib stitches. On the under side of the dial is a lug (36, Fig. 17) which must always press against the dial adjusting post from its right side.