

(Specimens.)

C. H. YOUNG.

WIDENED TUBULAR KNIT FABRIC AND THE ART OF KNITTING THE SAME.

No. 412,058. Patented Oct. 1, 1889.

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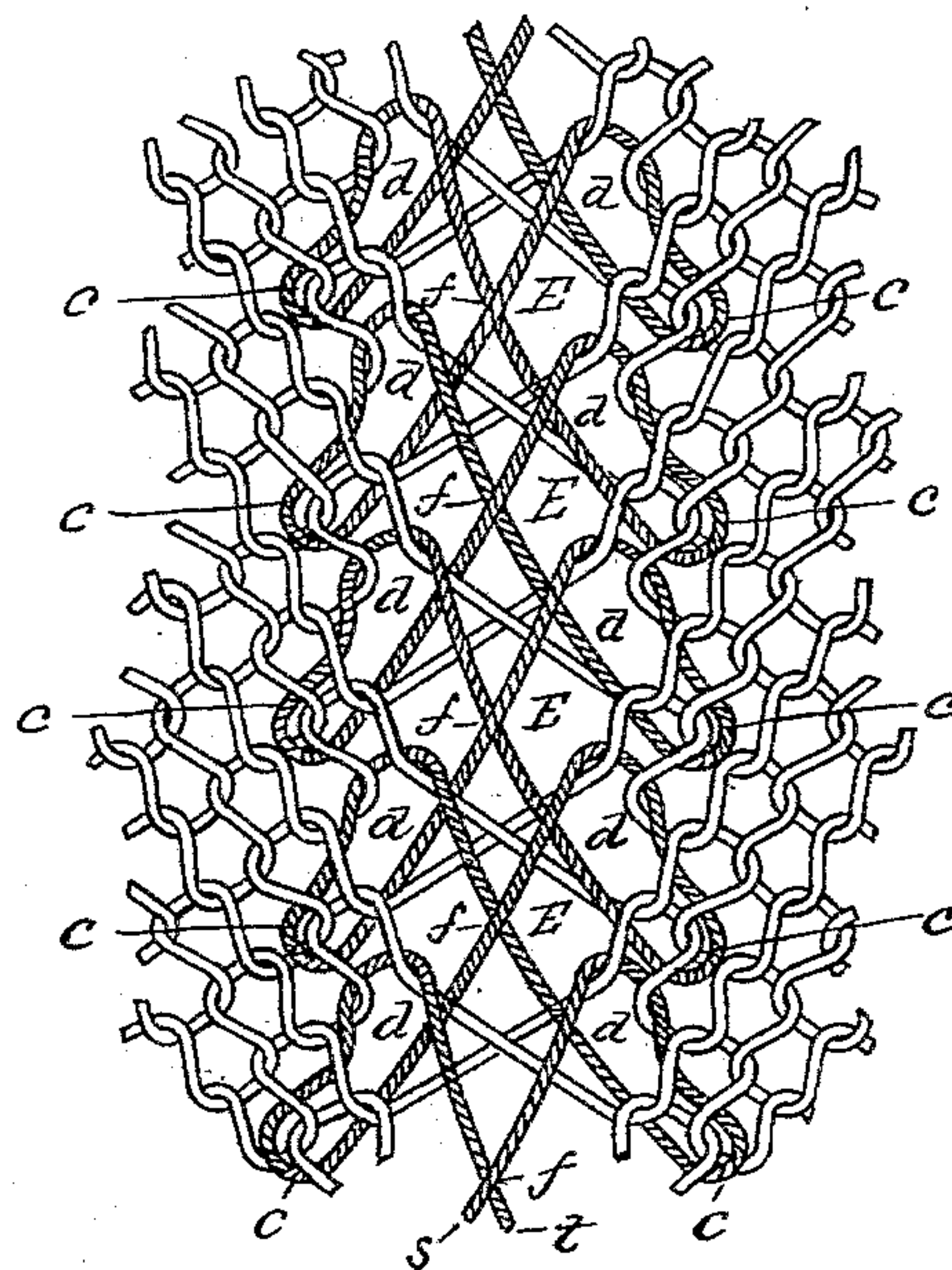


Fig 1

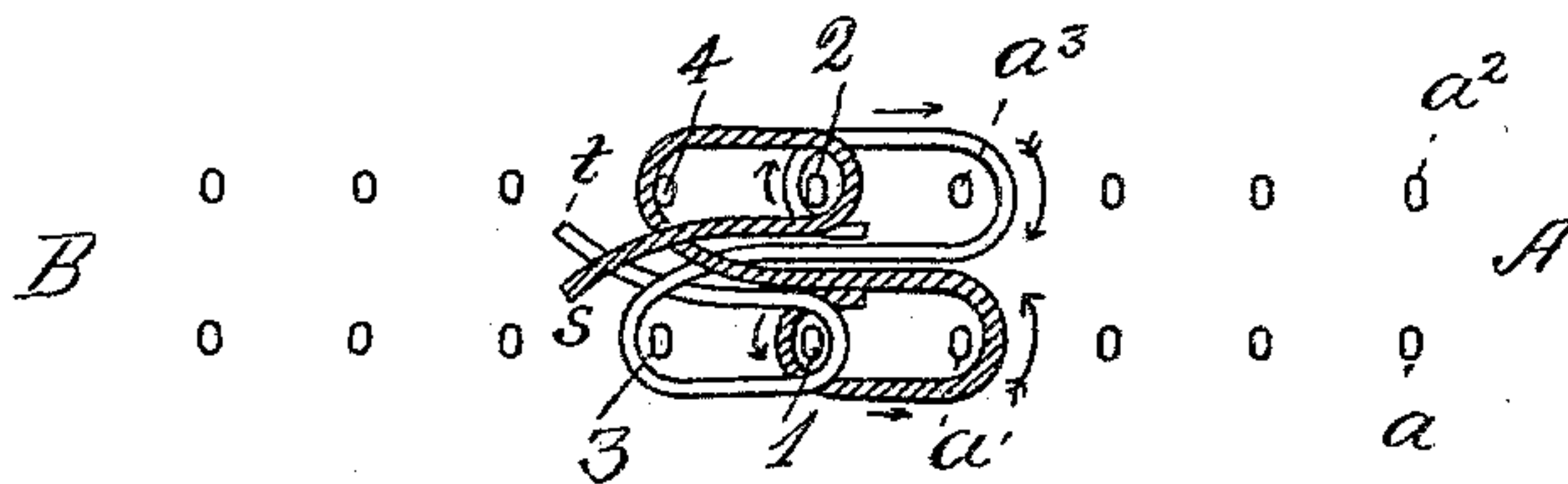


Fig. 2.

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# UNITED STATES PATENT OFFICE.

CHARLES H. YOUNG, OF MANCHESTER, NEW HAMPSHIRE.

WIDENED TUBULAR-KNIT FABRIC AND THE ART OF KNITTING THE SAME.

SPECIFICATION forming part of Letters Patent No. 412,058, dated October 1, 1889.

Application filed June 17, 1887. Serial No. 241,604. (Specimens.)

*To all whom it may concern:*

Be it known that I, CHARLES H. YOUNG, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Widened Tubular-Knit Fabrics and the Art of Knitting the Same, of which the following is a specification.

My invention relates to widened tubular-knit fabrics; and it consists in improvements in the art or process of knitting the same and in the article produced by such improved mode of knitting.

In an application for Letters Patent of the United States filed by me April 6, 1886, Serial No. 107,936, I have shown and described a machine adapted to knit a tubular fabric on two rows or ranks of needles, two yarns and yarn-guides being employed, the knitting being accomplished by simultaneously feeding one yarn to one row or rank of needles and the other yarn to the other row or rank and crossing the yarns at the ends of the two ranks of needles.

For a clear understanding of my present invention I will describe it as practiced on the machine described in the aforesaid application, to which reference is made, though it will appear obvious to skilled knitting artisans that my present improvements are not confined to said machine, but may be carried out on any machine operating on the same principle.

My present improvements are particularly adapted to the production of sleeves of shirts, legs of drawers, and like articles, or knitting gussets in the body of shirts or drawers or the like, where quite rapid or abrupt widening of the tubular fabric is necessary in order to make the completed article fit the limbs of the wearer, though the invention may be applied equally well to the knitting of stockings, leggins, or other tubular fabrics which require shaping or fashioning.

It is the object of my invention to provide a mode whereby the "eyelet-holes," so called, that would otherwise be formed in the fabric by bringing additional needles into operation may be closed and the fabric finished in the process of knitting. I accomplish this object by employing two supplementary threads or yarns at the point where the wid-

ening is performed, which supplementary yarns are looped or connected with the loops of the main or body yarns and drawn across the wide or open meshes or eyelet-holes that would be formed at the base of the new or added wales, thus closing the eyelet-holes and completing the web or fabric.

Reference is to be had to the accompanying drawings and to the letters of reference marked thereon, forming a part of this specification, in which drawings—

Figure 1 represents on an exaggerated scale a portion of a knit fabric embodying my invention, the fabric being shown as unduly distended along the line where the widening is performed. Fig. 2 is a diagram hereinafter referred to in explaining the steps followed in performing the method constituting a part of the improvements.

Having reference to the diagram constituting Fig. 2, let it be supposed that knitting has been "set up" and proceeded with for one or more courses on the needles  $a a' a^2 a^3$ , and that it is desired to widen by bringing into operation two additional needles 1 2. The supplementary yarns  $s t$  being looped or otherwise connected with the loops of the main or body fabric at a proper point, and the needles 1 2 having been raised at the time, preferably, when the yarn-guides are toward the end A of the two ranks of needles, yarn  $s$  is laid into the hooks of needles 1  $a'$  and yarn  $t$  into the hooks of needles 2  $a^3$  as indicated by the bent arrows, and said needles 1 2 are depressed. Upon the return of the carriers toward the end B knitting will be performed on the needles  $a a' a^2 a^3$ , as before, needles 1 2 being held down, the former having in its hook a loop of supplemental yarn  $s$  and the latter a loop of yarn  $t$ . As the yarn-carriers pass back from the end B to the end A, needles 1 2, with the needles  $a a' a^2 a^3$ , are brought permanently into operation, and the main yarns are fed thereto in the same manner as to the other needles. Needles 3 4 may now be raised and yarn  $t$  laid into the hooks of needles 3 1 as yarn  $s$  was fed to needles 1  $a$ , and yarn  $s$  laid into the hooks of needles 4 2 as yarn  $t$  was fed to needles 2  $a'$ , and said needles 3 4 are retired as needles 1 2 were retired or depressed, and the operations before described are repeated.



In this way two needles may be brought into operation each time that the yarn-carriers move toward the end A of the two ranks of needles, so that two additional needles will  
 5 be brought into operation in the knitting of each four courses, there being two courses or a double course between the points of widening in which no widening takes place, and widening performed very rapidly or abruptly.  
 10

In case it should be desired to carry the supplemental yarns from one point of widening to another without disconnecting them from the fabric, said supplemental yarns may  
 15 be laid into the last one or two needles of each rank or row regularly in action, and in this way knit said supplemental yarn with the main yarns in the formation of the regular or body fabric.

By the widening process described the supplemental yarns will be made to form the base of the new or added wales, as represented at *d d*, Fig. 1, to be interlooped or connected with the adjacent wale one course below the  
 20 loops *d*, as indicated at *c c*, and to be drawn across what would otherwise be an eyelet-hole E, as at *f*.

It is obvious that the supplemental yarns *s t* might be fed to more than one of the needles in each rank regularly in action, as well  
 30 as to the new or added needle, and that said yarns might be fed to the needles in an order or manner opposite to that described—that is, in a direction opposite to the bent arrows;  
 35 but these variations would not constitute a departure from the essential features of my invention, which consists in bringing into operation additional needles, feeding two supplemental yarns thereto and to a needle or  
 40 needles already in action, so that the supplemental yarns will be drawn across the wide meshes or eyelet-holes which would otherwise be formed at the base of each new wale.

It is to be further noted that the widening  
 45 process can be carried on at both ends A B of the two ranks or rows of needles, so that

a tubular web may be widened on both sides or at opposite points.

In an application filed of even date herewith I have described a process of widening  
 50 in which a single supplemental thread is employed in a manner somewhat similar to the present process; but in that case the widening cannot be performed so rapidly as under the present invention, nor can the supplemental  
 55 yarns be knit in so closely or be manipulated so advantageously.

Having thus described my invention, what I claim is—

1. A widened tubular-knit fabric having  
 60 two supplemental yarns looped or connected with the main or body yarns, said supplemental yarns being drawn across the wide meshes or eyelet-holes formed by the main  
 65 yarns at the base of the new or added wales, as set forth.

2. In the art of knitting a tubular-knit fabric produced on two rows or ranks of needles, the improvement consisting in widening by  
 70 bringing into action two new or additional needles, feeding a supplemental yarn to each and to an adjacent needle or needles already in action, retiring such new or added needles and knitting a course with the main yarn on  
 75 the needles already in action, then bringing into action the new needles holding loops of the supplemental yarns and knitting thereon and on the needles before in action with the  
 80 main yarn, drawing the supplemental yarns across what would otherwise be an eyelet-hole formed at the base of the new or added wale, and uniting such supplemental yarns with the loops forming the body or main fabric, as set forth.

In testimony whereof I have signed my name  
 85 to this specification, in the presence of two subscribing witnesses, this 7th day of June, A. D. 1887.

CHARLES H. YOUNG.

Witnesses:

ARTHUR W. CROSSLEY,  
 C. F. BROWN.