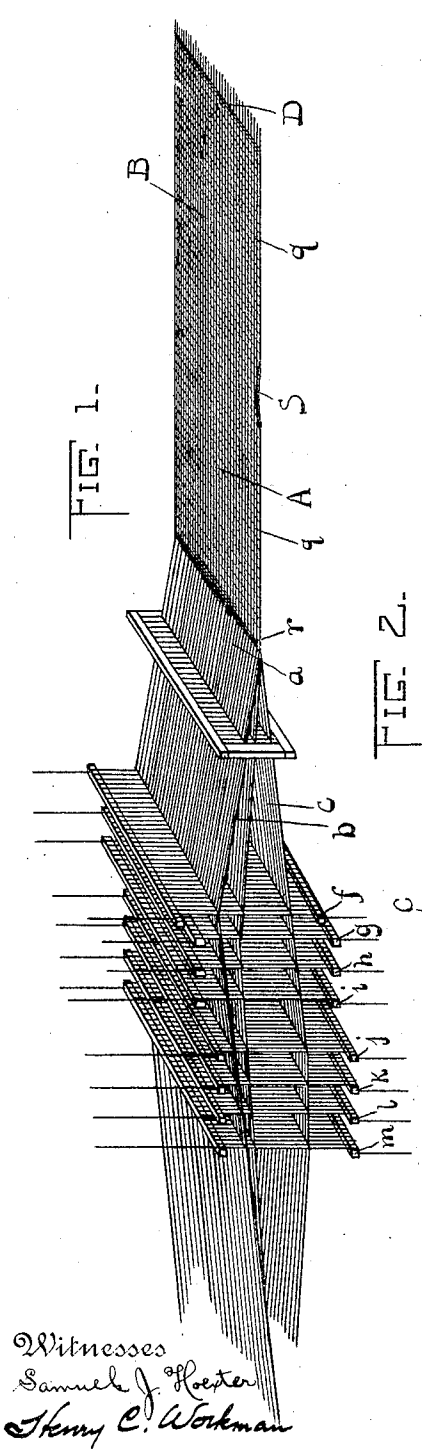
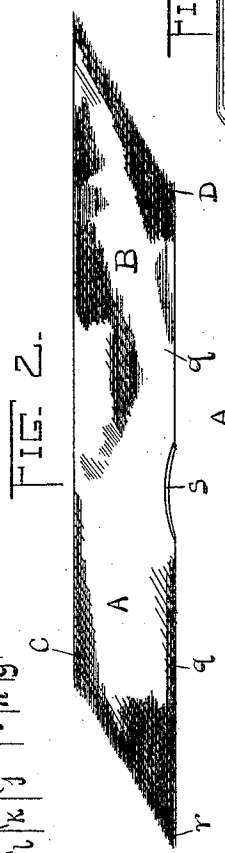
No. 822,155. PATENTED MAY 29, 1906.

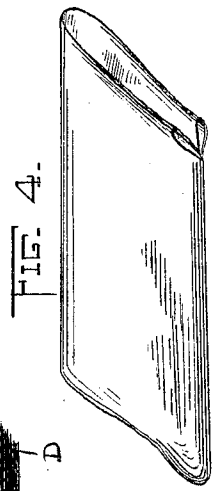
K. SANO.

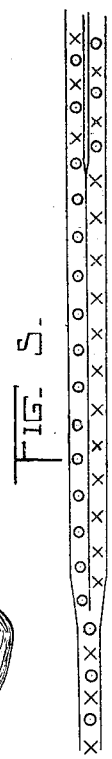
SEAMLESS BAG OR SACK AND THE PROCESS OF MAKING THE SAME.

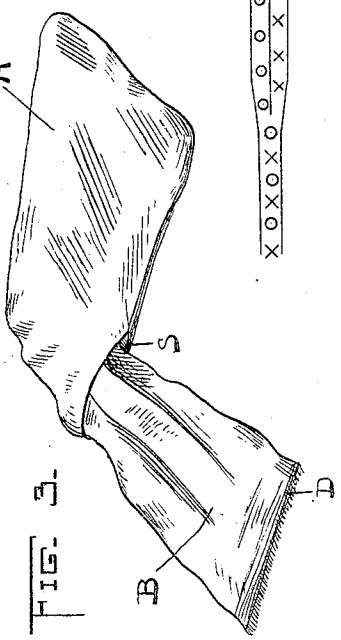
APPLICATION FILED APR. 20, 1905.











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SEAMLESS BAG OR SACK AND THE PROCESS OF MAKING THE SAME.

No. 822,155. Specification of Letters Patent. Patented May 29, 1906.

Application filed April 20, 1905. Serial No. 256,600.

To all whom it may concern:

Be it known that I, KASHICHI SANO, a subject of the Emperor of Japan, residing at No. 14 Shin-emon-cho, Nihonbashi-ku, in the city of Tokyo, Japan, have invented a new and useful Seamless Bag or Sack and the Process of Making the Same, of which the following is a specification.

My invention relates to seamless bags or sacks, the sides and bottoms of which are integral with the body of the bag or sack, the whole bag or sack being seamless.

My invention also relates to the method of making or weaving said sack or bag.

The objects of my invention are to produce a seamless bag or sack of the character indicated and the method by which said bag or sack is made, and, further, to produce a bag the inside and outside of which may be interchanged without altering the original shape and character of the bag, and, further, the method of producing said bags with a minimum amount of labor and cost in manufacturing.

The manner in which the invention is accomplished is set forth in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view showing the bag in process of weaving, together with such parts of the apparatus as are necessary to an understanding of the invention. Fig. 2 is a perspective view of a section of the fabric from which a bag is made. Figs. 3 and 4 are similar views showing the process of manipulating the fabric to produce the bag shown in Fig. 4. Fig. 5 is a diagrammatic view illustrating the shuttle movements to produce the fabric from which the bags are made.

In the views the same reference-letters are applied to similar or corresponding parts.

In order to carry out my invention, the fabric is woven by arranging the warp *a* on a loom in the manner that is well understood by those skilled in the art. The warp is divided by six heddles *f g h* and *j k l*. Of these four—for instance, *f g j k*—are arranged so as to weave a double or tubular fabric from the warp *a*, which, for this purpose, is separated into the upper warp *b* and the lower warp *c*. Two other heddles *h* and *l* are for the purpose of weaving a single fabric from the warp *a*. In addition to the heddles above named other heddles—for instance, *i* and *m*—may be used in order to form any desired design on the fabric or bag.

The process of weaving is so performed and the shuttle so operated in connection with the heddles *h* and *l* as to produce, first, a single fabric D of suitable length. This portion will form the bottom of the bag. Next the heddles *f*, *g*, *j*, and *k* are operated in connection with the shuttle so as to weave a tubular fabric A B to form the body or sides of the bag of this tubular fabric. The fabric A B is woven to desired length and then an opening *s* is formed in the fabric at the edge, as illustrated, said opening being formed in the process of weaving, as will appear elsewhere in the specification. Next the process of weaving the tubular fabric is resumed to form a length A equivalent to the length B. Next the loom is operated to make a single fabric C. From this point the operations, as above described, are repeated in succession until the warp is exhausted. By this means a continuous fabric is produced in which there are single-fabric portions and tubular portions alternating in succession with the opening *s* at an intermediate point of the tubular portions.

Fig. 5 illustrates, by means of circles and crosses, the shuttle movements distinguishing the "let in" and "let out" of the shuttle or weft. The portion of the fabric shown in Fig. 5 corresponds to the portions *r*, *q*, and *s* in Fig. 2.

By referring to Fig. 5 at the portion marked *r* the fabric is shown single or flat, the appropriate heddles being adjusted to give this result. The crosses in Fig. 5 are, for the purposes of this description, assumed to indicate the weft-threads laid by the shuttle in its motion away from the operator and the circles to represent the weft-threads laid by the shuttle in its movement toward the operator. The portion of Fig. 5 indicated by *q* is the part woven tubular. Upon referring to this figure it will be noted that the shuttle passes from the operator through the warp forming the lower ply of the fabric and approaches the operator through the warp forming the upper ply of the fabric, thus forming a seamless tube. In the portion marked *s*, which indicates the opening *s*, the shuttle passes from the operator through the warp forming the upper ply of the fabric, then toward the operator through the warp forming the lower ply of the fabric, then returns through the warp forming the lower ply of the fabric, and again approaches the operator through the warp forming the upper ply of the fabric, and

so on until a length of fabric is thus woven to form the opening *s* of the length desired. This results in selvage edges for the openings *s*, as will be readily understood by those skilled in the art.

The fabric having been made in the manner above described, the next operation is to cut said fabric into lengths between two consecutive single-fabric portions C and D. Fig. 2 illustrates one of the sections or lengths of the fabric so cut off. It will be seen that each section is of single fabric at each end with the tubular body or intermediate portion, the opening *s* being substantially midway between the single fabric or closed end portions. In order to form the bag from one of the sections illustrated in Fig. 2, the portion A of the fabric between the opening *s* and one end—say C—is turned inside out by pulling through the opening *s*. This may be done by inserting the hand through the open-*s*, grasping the end portion C, and pulling the same outwardly through the opening *s*. The result of this operation is illustrated in Fig. 3, the portion A having been reversed or turned inside out. Next the portion B is pulled inwardly through the opening *s* and passed inside the portion A. This produces a bag such as is shown in Fig. 4. This bag is seamless throughout, the sides and bottom being homogeneous or integral with the body or sides of the bag. The bag, it will be seen, is doubled and may be reversed—that is, the inside and outside portions interchanged. This reversing may be done by returning the fabric to the condition shown in Fig. 2 and then first pulling the closed end portion D through the opening *s* and proceeding as before.

By referring to Fig. 4 it will be seen that a draw-string may be inserted through the opening *s*, by which the bag may be closed and tied.

It will be noted by referring to Figs. 3 and 4 that when the bag is reversed the fair side of the fabric forms the outer and inner surfaces of the bag and the raw surfaces and unfinished edges made by cutting across the single-fabric portions *c* and *d*, being within the double walls and bottom of the bag, are thus concealed. This makes a bag having finished outer and inner surfaces.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A seamless double bag having a draw-string opening formed therein in the process of weaving said bag.

2. A seamless double bag having the right or fair side of the fabric forming the outer surface and the inner surface thereof, and the rough side and the unfinished weaving or raw edges within the double walls and bottoms of the bags.

3. A fabric for the purposes described having its ends single and the portion intermediate the ends tubular with an opening in said tubular portion.

4. A fabric for the purposes described, said fabric being woven in one piece tubular in form, the end portions thereof being closed, and an opening woven in the tubular portion intermediate the ends.

5. The process of making a seamless double bag which consists in weaving a tubular fabric with closed ends and an opening intermediate the ends, reversing the portion of the fabric between the opening and one end through the opening, then reversing the other portion of the fabric between the opening and the other end through the opening and arranging the latter portion within the former portion to form a bag, substantially as described.

6. The process of making a seamless double bag which consists in weaving a fabric in successive single and tubular portions with an opening in each tubular portion intermediate the single portions, separating said fabric into sections each section having a single portion at each end thereof, drawing one of the single end portions of a section from inside the tubular portion outwardly through the opening, then drawing the other single end portion through said opening and into the inside of the first tubular portion, substantially as described.

KASHICHI SANO.

Witnesses:
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