Nov. 24, 1959 R. D. WISENBURG 2,913,729

PERFORATED GLOVE

Filed May 28, 1957

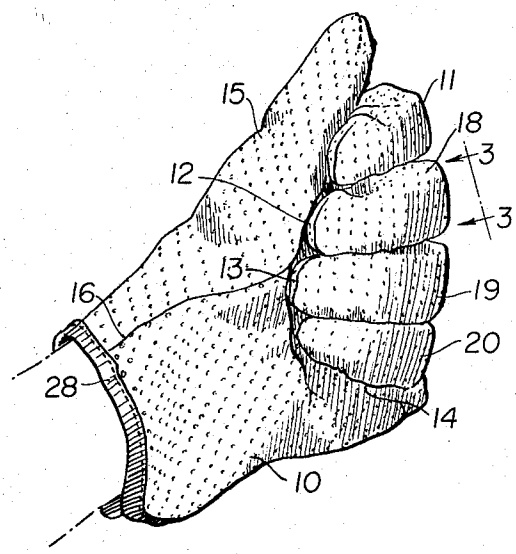


Fig. 1

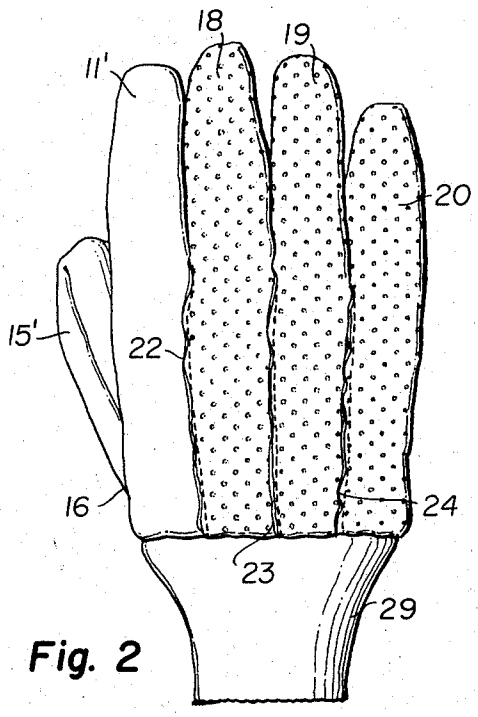


Fig. 2

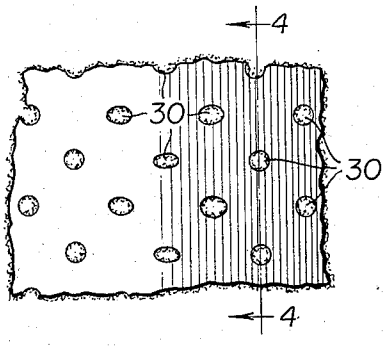


Fig. 3

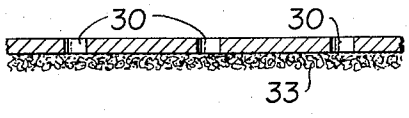


Fig. 4

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United States Patent Office 2,913,729 Patented Nov. 24, 1959

2,913,729

PERFORATED GLOVE

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Application May 28, 1957, Serial No. 662,290

2 Claims. (Cl. 2—167)

This invention relates to the art of making gloves and more particularly to an improved work glove.

In the manufacture of work gloves one of the principal problems to be met is size. Only one or a very few sizes are made. It is difficult to manufacture one glove which is comfortable on all adult human hands.

Another and related problem is that work gloves must be very inexpensive. To obtain a low cost glove with good wearing properties, plastic coated woven fabrics are often used. These materials form a glove which is somewhat stiff and uncomfortable to the wearer.

It has been discovered that if a plastic coated woven fabric is perforated, very desirable properties are obtained. One of these properties is that the material becomes softer and more flexible. It has been discovered that an entirely unexpected property is obtained. As a glove made from this perforated material is flexed, the perforations tend to distort around the knuckles and other areas of flexure. This distortion permits the glove to stretch and conform to the wearer's hand.

Accordingly, one of the principal objects of this invention is to provide a novel and improved glove made from a perforated plastic coated fabric which tends to flex and stretch when in use. This flexing and stretching provides a glove which better conforms to hands of various sizes and a glove which is comfortable to the wearer.

A further object of the invention is to provide a novel and improved glove which is cool to the wearer. Previously known plastic coated woven fabric work gloves have been very warm and uncomfortable when worn for work such as summer gardening and many industrial jobs. The perforations provide ventilation and thereby a cooling effect.

Perforations in a work glove present a serious problem. Dirt will tend to pass through the perforations and defeat one of the principal purposes for wearing a work glove. It has been discovered, however, that if the inner surface of the woven fabric is napped the nap fibers tend to cover the inner ends of the perforation and filter out dirt.

For these reasons, another object of the invention is to provide a novel and improved perforated plastic coated woven fabric work glove which has inherent dirt filtering characteristics.

It has also been discovered that a perforated glove has improved grip characteristics. When lifting such objects as cardboard cartons the perforations increase the surface friction between the glove and the carton and therefore the grip characteristics of the glove.

For these reasons, a still further object of the invention is to provide a novel and improved work glove with superior gripping characteristics.

Yet another object of the invention is to provide a process for making a strong and durable glove having all of the foregoing objectives.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

Figure 1 is an elevational view of one of the improved gloves when flexed and in the position it assumes when a wearer closes his hand;

Figure 2 is a top plan view of one of the improved work gloves made in a slightly modified form with respect to Figure 1;

Figure 3 is a fragmentary view of the portion of the glove seen from the location indicated by the line 3—3 of Figure 1 and on a materially enlarged scale with respect to Figure 1; and

Figure 4 is a sectional view of a portion of the glove as seen from the plane indicated by the line 4—4 of Figure 3.

In the drawings, a palm section is indicated by the numeral **10**. The palm section **10** includes an index finger portion **11**. The index finger portion **11** is cut so that part of it can be folded over and sewed together to form the entire covering for the wearer's index finger.

The palm section **10** also has a second finger portion **12**, a ring finger portion **13**, and a fourth finger portion **14**. In Figure 1 a part of each of these finger portions **12, 13, 14** is visible. The particular construction is not a part of the present invention. The construction provides a glove which is preferred for practicing this invention. In this preferred construction the entire face or inner section of the glove and the entire index finger are cut from a single piece of fabric which has been identified as the palm section **10**. The well known "Gunn" cut style patterns may also be used in which the palm section is cut so that the index finger portion **11** is only the inner part of the index finger.

A thumb section **15** is provided. The thumb section is sewed to the palm section **10** along a seam indicated by the numeral **16**. A second finger section **18**, a ring finger section **19**, and a fourth finger section **20** are also provided. The index finger portion **11** and the finger sections **18, 19, 20** extend to the wrist to cover the back of a user's hand. The second finger section **18** is sewed to the palm portion along the seam indicated at **22**. The second and ring finger sections **18, 19** are sewed together at **23**. The ring and fourth finger sections **19, 20** are sewed together along the seam indicated by the numeral **24**. The seams **22, 23, 24** extend along the back of the glove.

In the embodiment of Figure 1 a tape **28** is sewed along the wrist end of the glove. In the embodiment of Figure 2 a stretch wrist portion **29** is provided.

All of the material used in the embodiment of Figure 1 is perforated. In the case of the embodiment of Figure 2 the second, ring, and fourth finger sections **18, 19, 20** are the only part of the glove made from perforated material. As will be apparent, various combinations of perforated and non-perforated material are possible according to the conditions and demands of any given application for which the glove is made. However, a glove made in accordance with this invention has perforations in areas of flexure, such as the knuckles.

When one of these gloves was made for the first time, it was feared that the glove might not be useable as a work glove because of the dirt problem. Only after one of these gloves was made and tested was it discovered that dirt in fact was not a problem if a napped material was used. It was also discovered that this glove has several other material advantages. The glove is flexible, it feels better and fits the wearer's hand better than prior known plastic coated gloves.

The reasons for these phenomena are not fully understood. The explanation is believed to be presented in Figures 3 and 4. In those figures the perforations in the back of the stalls are indicated by the numeral **30**. It will be noted that some of the perforations shown in

Figure 3 are distorted. This is a pictorial attempt to disclose what actually happens when the glove is worn. The glove stretches because the perforations distort. The result is a glove which is comfortable to the wearer.

In Figures 3 and 4 the size of the perforations have been greatly exaggerated for purposes of illustration. The preferred diameter of the perforations in the actual glove material is less than the diameter shown in Figures 3 and 4. It has been determined that an optimum balance between dirt resistance and flexibility can be obtained if the perforations are about 1/32 to 3/64 inch in diameter and spaced about 9/32 of an inch apart.

It should also be noted that perforations are arranged in uniformly spaced relationship and in straight rows. These rows are each at an angle to the axis of the fingers. The holes thus have an appearance of a diamond pattern. The reasons are not fully understood, but this diamond pattern appears to most fully utilize the discoveries of this invention. Tests indicate that the flexibility and gripability of the glove is optimum if this diamond relationship is utilized.

One of the further discoveries of the invention is best understood by reference to Figure 4. The inner surface of the fabric material is napped. This nap is indicated by the numeral **33**. The napped fibers are so arranged as to extend around and usually across the perforations **30**. The combination of the smallness of the perforations and the filters formed by these napped fibers **33** has proved to be more than adequate as a dirt penetration inhibitor.

In making the glove a fabric, preferably woven cotton, has its inner surface **33** napped. A coating of plastic is applied to the outer surface. Of presently known materials, polyvinyl chloride in a plastisol is the preferred coating material. A suitable formula employs polyvinyl chloride or polyvinyl chloride-polyvinyl acetate copolymers. The acetate in the copolymer is less than 5%. The formula is:

Material—	Parts by weight
Polyvinyl chloride	100
Plasticizers	110
Light and heat stabilizers	4
Pigments	10

One method for forming the perforations is by punching the holes with a machine which is normally used for punching holes in sheet metal. After the holes are formed the various glove sections are cut to the shapes previously described. These sections are then sewed together to form the finished glove.

This plastisol is applied to the fabric with a knife-type spreader and cured at 350° F. After the plastic coating has been applied to the fabric the perforations **30** are formed. It has been discovered that the plastic coating bonds the fibers together and prevents raveling. Further, the plastic coating affords sufficient strength to the material to make a very sturdy and workable glove.

The preceding information discloses an improved inexpensive work glove which is both flexible, comfortable, cool, and dirt-free. A process for the manufacture of such a glove has also been disclosed.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

I claim:

1. A glove comprising, fibrous fabric palm and back portions, fibrous fabric finger and thumb stalls, the glove having a plurality of areas of flexure, the fabric being perforated in at least some of said flexure areas, the fabric having inner and outer surfaces, the inner surface having napped fibers, some of the napped fibers being disposed across each of the perforations to form dirt filters, and a plastic coating on at least one surface of the fabric and adhered to at least some of the fibers of the fabric, and said coating being a reinforcement bond between said adhered to fibers.

2. A glove comprising, fabric palm and back portions, fabric thumb and finger stalls, said fabric comprising a dimensionally stable and stretch resistant woven natural fiber material having inner and outer surfaces and a reinforcement plastisol coating on the outer surface thereof, at least some of the fibers of the fabric being impregnated by the coating, said coating being a reinforcing bond between said impregnated fibers, the inner surface of the material having napped fibers, said stalls including finger joint areas, the fabric having perforations formed in at least some of the finger joint areas to provide stretchable joint areas, each of said perforations having an inner end and a filter across the inner end, said filters each being comprised of a plurality of said napped fibers projecting over said inner ends.

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