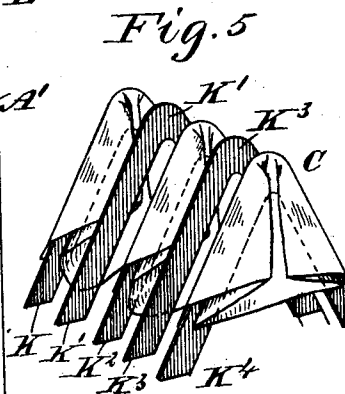
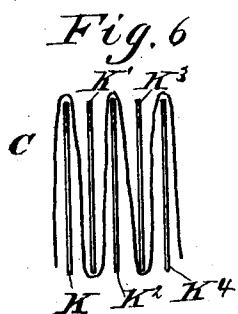
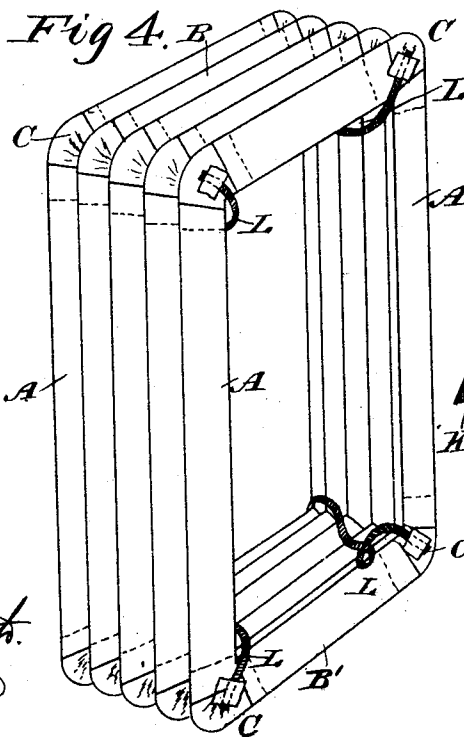
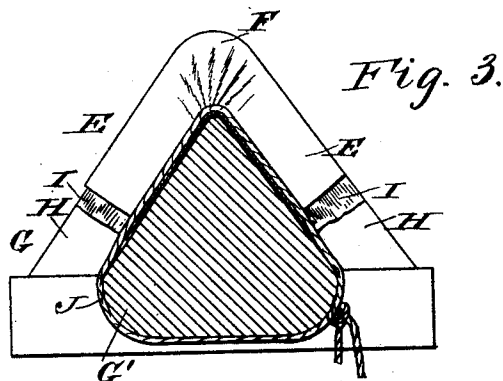
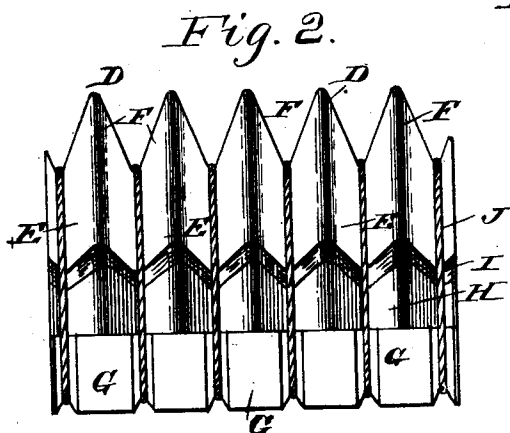
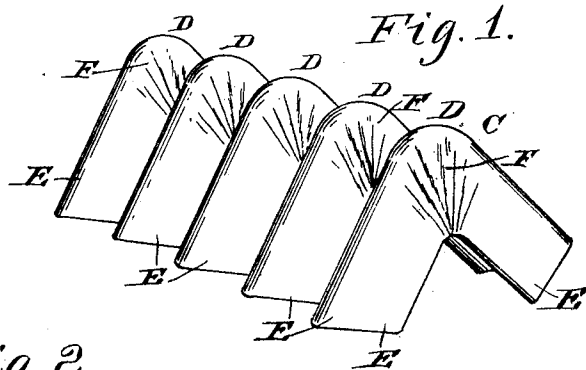


(No Model.)

J. G. GAREIS.
BELLOWS.

No. 476,740.

Patented June 7, 1892.



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UNITED STATES PATENT OFFICE.

JOHN G. GAREIS, OF BROOKLYN, NEW YORK.

BELLOWS.

SPECIFICATION forming part of Letters Patent No. 476,740, dated June 7, 1892.

Application filed July 15, 1891. Renewed May 5, 1892. Serial No. 431,929. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. GAREIS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Bellows, of which the following is a full, clear, and exact description.

The invention relates to rectangular bellows, such as are used in accordions, photographic cameras, and other instruments or apparatus.

The object of the invention is to provide new and improved bellows, which are simple and durable in construction, perfectly air and light tight, permit easy and convenient opening and closing of the bellows and have each row of corners formed of a single piece of leather or similar material.

The invention consists of a corner strip formed of a single piece of material and containing a series of corners arranged adjacent to one another.

The invention also consists of certain parts and details and combinations of the same, as will be described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of the finished corner strip. Fig. 2 is a side elevation of the corner strip, as arranged on the block, in the process of manufacture. Fig. 3 is a transverse section of the same. Fig. 4 is a perspective view of the improvement. Fig. 5 is a perspective view of a modified form of the device for making the corner strip, and Fig. 6 is a sectional side elevation of the same.

The bellows is provided with the usual sides A A' and ends B B', each made with the usual folds, adapted to open and close when the bellows are drawn or pushed lengthwise. The adjacent sides A A' and the ends B B', respectively, are connected with each other by a single corner strip C, made of leather or other suitable material sufficiently pliable to permit an easy opening and closing of the bellows. Each corner strip is formed with a series of corners D, arranged one alongside the other, and each formed with the two legs E, fastened onto the adjacent corners of the

corresponding folds of the sides and ends A A' B B', respectively. The legs of each corner continue at their upper ends into the rounded-off corner proper F, which is formed on its sides with creases or folds fastened one upon the other by paste, glue, or other adhesive substance, the said folds or creases being smooth, so that the sides of the corner F have a fairly-smooth appearance.

In order to produce a corner strip C, several different devices may be employed to accomplish the said result. As illustrated in Figs. 2 and 3, the block G is provided, formed with a triangular core G', with triangular ridges H, arranged one alongside the other on each side of the triangular core. Over the apex of the block G, across the ridges H, is placed the strip of paper I, and on top of this strip of paper is placed the strip of material to be formed into the corner strip C. The strip of material is coated on its under side with paste, gum, glue, or other similar adhesive substance, so that the paper adheres to the under side of the strip. The operator then takes a piece of cord J and passes it between the first two adjacent ridges E and over the strip of material, so as to bind the latter down, the outer ends of the strip being preferably tacked on the outer end of the block ends of the block G. By drawing the cord J tight the leather is formed over the first and adjacent ridges, and by means of a bone is smoothed so as to make the paper and material lie close to the outer surfaces of the ridges H, the strip of material being glued onto the paper, so as to hold the folds and creases in the proper position to form smooth sides on the corners. The same operation is repeated with a second piece of cord between the next two adjacent ridges—that is, the material is smoothed down onto the sides of the ridges, so that the creases formed at the corners F adhere to the paper and to one another and form solid and smooth sides at each corner F, as well as on the legs E.

The above-described operation is repeated between each two adjacent ridges, the strip of material being of sufficient length to form a corner-strip having as many corners, as desired.

When the several corners of the corner strip have been finished in the manner described,

the cords J are taken off and the finished corner can be readily lifted from the block G, the strip of paper I, however, forming an inner lining for the corner and serving to hold the creases at the sides of the corners F in position.

The strip of paper I is preferably selected somewhat wider than the strip of material is made, the projecting ends of the paper being trimmed off after the corner is finished.

Another method for forming the corner strip is illustrated in Figs. 5 and 6, in which a series of angular plates K K' K² K³ K⁴ are used. The material to be formed into the corner is first passed over the outer side of the first angular plate K, then downward on the inner side, then a second angular plate is placed on the material adjacent to the first plate K, then the material is moved upward, then a third plate is placed on the material and the material is bent downward over the face of the plate to form the second corner, then the fourth plate K² is placed on the material and the latter again passed upward on the outer side of the said plate, and then the next plate K⁴ is placed on the material and the latter is passed downward over the surface of the said plate, and the above-described operation is repeated with the plates alternately inside and outside of the material, as is plainly illustrated in the drawings, the material forming the corners for the corner strip. It is understood that in passing the material up and down over the several plates, the material is smoothed by bones or other tools to smooth the folds and creases incident to passing the material over the said plates. When the several corners have been finished, the outside plates K' and K³ are lifted out of the corner strip, while the other plates are withdrawn from underneath and leave the finished corner-strip. If desired, a lining of paper may be arranged under the corner strip in a manner similar to that described above in reference to Figs. 2 and 3.

The corner strip C has the legs of its several corners fastened to the ends of the sides and ends of the bellows by paste, glue, or other means. If desired, the folds of the sides or ends can be placed on the ridges H of the block G previous to the formation of the corner, so that the legs E of the corners are finished directly on the folds of the sides and ends of the bellows. I prefer, however, to manufacture the corner strips C separate and attach the same afterward to the bellows on the adjacent ends of the sides and ends.

The corresponding ridges H on opposite sides of the block G have their apexes rounded, so that the several corners F of a corner strip C are likewise rounded, as is plainly

shown in Fig. 1. When the corner strip C is attached to the sides and ends to fasten the same together, as illustrated in Fig. 4, then the bellows have no sharp points, and are consequently less liable to be injured than with the sharp corners now in use. Furthermore, as each corner strip is made of a single piece of material, the entire bellows is rendered completely air and light tight at the corners, which latter are usually the source of injury and leakage in bellows as heretofore constructed.

In order to prevent the bellows from being opened too far, a band L is provided for each corner, the said band being fastened at its ends to the outer ends of the bellows, as illustrated in Fig. 4. The band L is of such size as to permit of the bellows being opened to its normal outer position, but not any farther, as the bands are then drawn tight and prevent farther opening of the bellows. When the bellows close, the band L folds within the bellows, as shown in Fig. 4.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. Bellows provided with corner strips, each formed of a single piece of material and containing a series of corners arranged adjacent to one another, substantially as shown and described.

2. Bellows provided with corner strips, each formed of a single piece of material and containing a series of rounded-off corners arranged alongside of one another and adapted to be fastened by their legs to the folds of the sides and ends of the bellows, substantially as shown and described.

3. Bellows comprising sides and ends, having folds and corner strips, each made of a single piece of material and containing a series of corners adapted to be fastened to the adjacent folds of the sides and ends, substantially as shown and described.

4. Bellows provided with a corner strip formed of a single piece of material and provided with a series of corners arranged alongside of one another, each corner having legs extending at right angles and connected with each other by rounded-off corners, substantially as shown and described.

5. Bellows provided with a corner strip formed of a single piece of material and containing a series of corners arranged adjacent to one another and a lining for the said corners, substantially as shown and described.

JOHN G. GAREIS.

Witnesses:

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C. SEDGWICK.