April 8, 1941. G. W. VOS 2,237,897

FOLDABLE SHEET MATERIAL CUTOUTS

Filed May 8, 1940 2 Sheets-Sheet 1

Fig. 1.

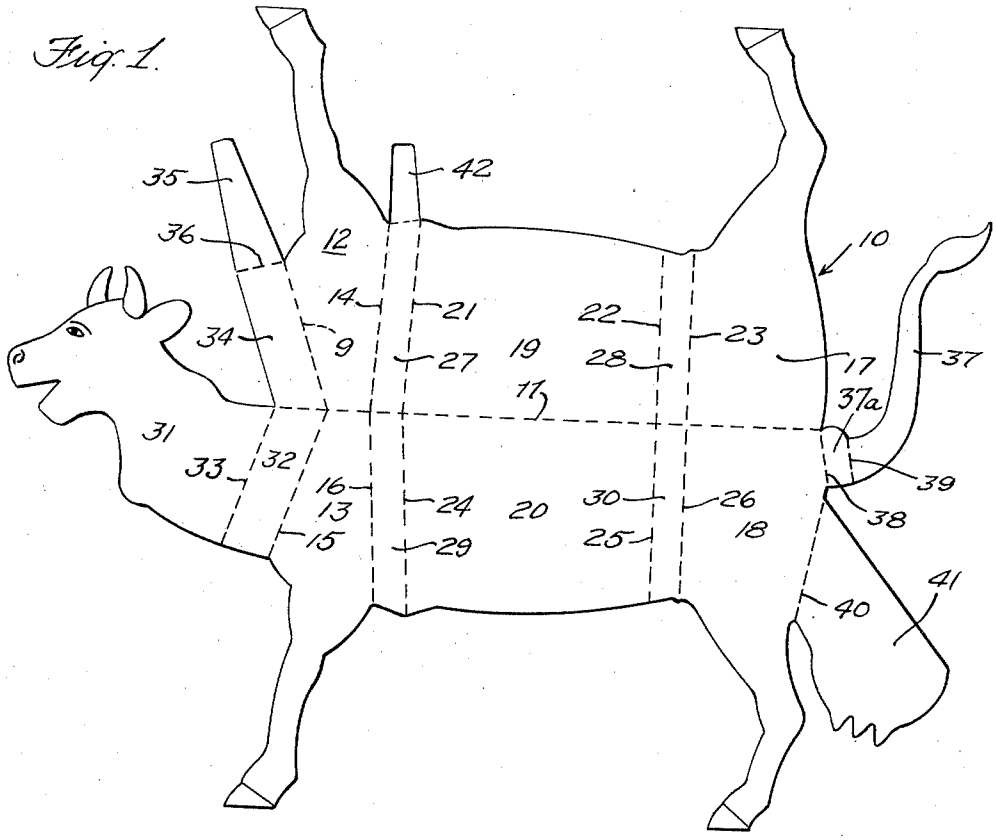
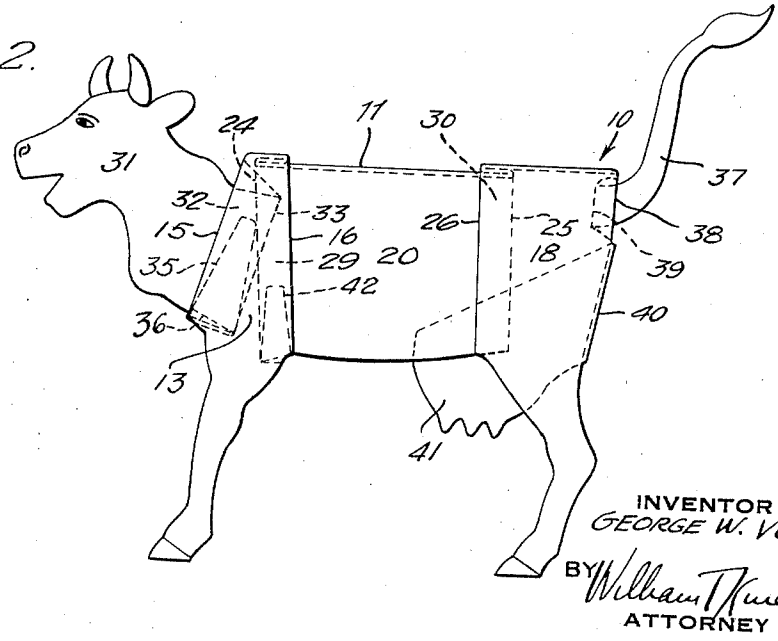



Fig. 2.




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Fig. 3.

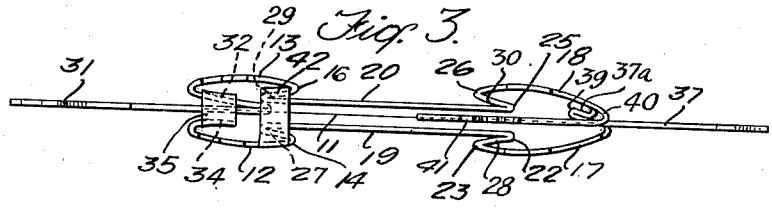



Fig. 4.

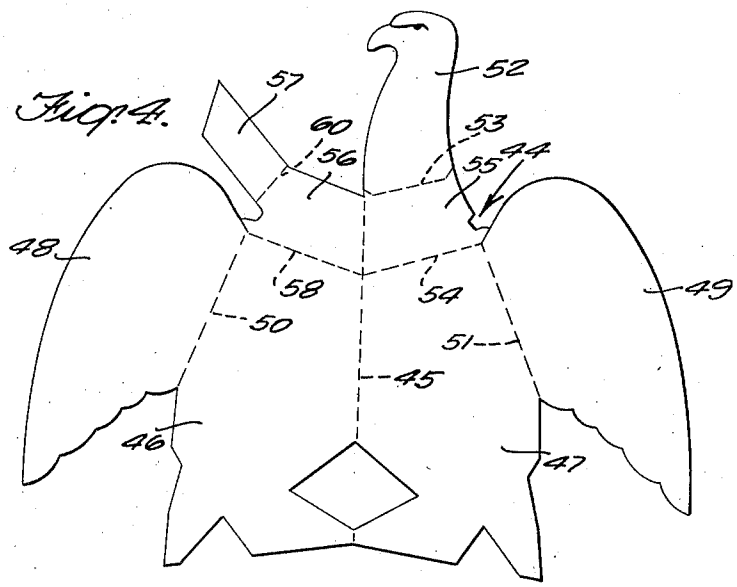
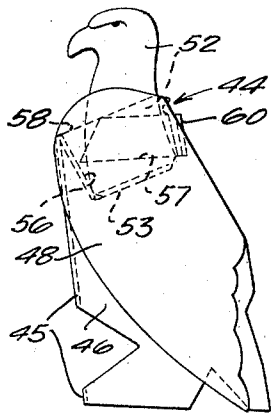



Fig. 5.



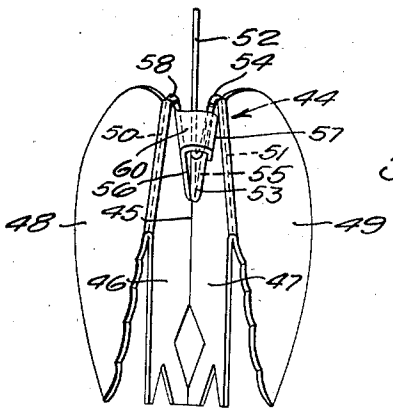




Fig. 6.

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# UNITED STATES PATENT OFFICE

2,237,897

## FOLDABLE SHEET MATERIAL CUTOUTS

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Application May 8, 1940, Serial No. 333,906

9 Claims. (Cl. 46—157)

This invention relates to foldable sheet material cutouts such as, for example, for toys, dolls, animals, displays, and the like.

One of the objects of this invention is to provide a simple, practical and inexpensive foldable or folded device of sheet material like suitably heavy paper, cardboard, or the like, to make up or represent animals, dolls, toys, and various other objects. Another object is to provide an embodiment or representation, by folding of sheet material, of objects of the above-mentioned nature that will give the appearance or illusion of lateral dimension or transverse depth or thickness and hence have an appearance of naturalness. Another object is to provide a representation of the above-mentioned nature capable of being made of relatively light sheet material yet mechanically strong and dependable, even though comprising such sheet material in folded form, and capable, furthermore, of lasting mechanical action, particularly when the device is used for display purposes. Another object is to provide a device of the above-mentioned character which may be inexpensively manufactured as by cutting and scoring of sheet material like cardboard, and that is capable of ready, easy and quick folding and securing. Another object is to provide a foldable cutout of the above-mentioned nature that will lend itself to wide range of decoration or printing or the like, and that will be well adapted to quantity and inexpensive manufacture. Another object is to provide a simple and thoroughly practical method of folding a blank of sheet material into a representation of the above-mentioned character. Another object is to provide a simple and practical method of folding, and securing against unfolding, a blank of sheet material of the above-mentioned nature into a representation of the above-mentioned character. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts and in the several steps and relation and order of each of the same to one or more of the others, all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which are shown by way of illustration several of the various possible embodiments of the mechanical features of my invention,

Figure 1 is a development or plan view of a blank or cutout ready to be folded;

Figure 2 is a side elevation of the folded cutout, and

Figure 3 is a bottom view of Figure 2 to show certain folds and interrelationships, the folds being somewhat exaggerated to show the construction more clearly;

Figure 4 is a development or plan view of a blank showing another mode of carrying out certain features of my invention;

Figure 5 is a side elevation of the blank of Figure 4 in folded form, and

Figure 6 is an elevation as seen from the right in Figure 5 showing certain of the folds and interrelationships somewhat exaggerated to bring them out more clearly.

Similar reference characters refer to similar parts throughout the several views of the drawings.

For purposes of illustration of certain features of my invention, let it be assumed that the article or object to be constructed out of a sheet material like cardboard, paper, or the like, is to be a cow in a standing posture and with its head directed somewhat upwardly and likewise its tail directed somewhat upwardly. Figure 1 shows the cardboard as it is cut out and scored, the full lines representing the outline or lines of cutting and the broken lines representing score or fold lines, to form the foldable blank or cutout generally indicated by the reference character 10. The main body portion of the blank 10 I preferably divide by a central longitudinal axis or fold line 11 to either side of which it is cut out or shaped and preferably also scored to form or outline certain portions of the body of the animal. Thus, an area 12, to one side of the axis 11 and bounded by score lines 9 and 14, outlines the front right shoulder and leg; to the other side is an area 13, bounded also by score lines 15 and 16, that forms the left front shoulder and the left leg. While the shoulder portions are preferably symmetrical, the leg portions of these areas need not be symmetrical where it is desired that the legs be ultimately displaced, as, for example, to represent walking. In generally like manner an area 17 represents the right hind quarter with a hind leg, an area 18 to the other side of the axis 11 represents the left hind quarter with left hind leg, these areas being longitudinally separated from the shoulder areas 12 and 13 by the side or flank areas 19 and 20, respectively, and where certain effects of appearance are desired to be achieved, as later

pointed out, I provide between successive areas to each side of the axis pairs of score lines to permit the formation ultimately of bellows folds.

Such pairs of score lines are shown in Figure 1 at 14—21, 22—23, 16—24 and 25—26, leaving between them relatively narrow areas 27, 28, 29 and 30, respectively.

An area 31 represents the head and neck and it will be seen that this area may, while attached to the portion of the blank 10 to one side of the axis 11, extend well beyond the other side of the axis 11. The area or portion 31 is in effect an extension of the shoulder area 13 excepting for a relatively narrow transverse area or portion 32 formed by score lines 15—33. Portion 32 has a symmetrical portion 34 on the other side of the axis 11 and portion 34, being in effect an extension leftward of the portion of the blank to the upper side of the axis 11, is provided with a tongue or flap member 35, a score line 36 facilitating ultimate folding thereof.

At the rear or right-hand end, a tail area 37 is an extension of the blank 10, preferably of a portion to one side of the axis 11, score lines 38 and 39 forming a transverse foldable portion 37a and permitting formation of a bellows fold. The tail portion 37 may, as shown, extend across the line of the axis 11. To one hind quarter portion, such as the area 18 and defined therefrom by a fold or score line 40, is a flap-like extension 41 shaped at its lower end to represent the udder.

In Figures 2 and 3 the blank 10 is shown in folded relation to give the desired representation. In effecting the folding, the blank 10 may first be creased, as it were, along the various fold lines to facilitate bringing the various parts or folds into their final positions or relationships. Thus, the portions 31, 32, 34 of Figure 1 are folded downwardly about the fold lines 15—9 but the head and neck portion 31 is folded in reverse direction relative to the portion 32, so that the portions 13, 32 and 31 overlie one another and portions 13 and 31 are in effect joined by a bellows fold; this is better shown in Figure 3.

In a generally similar way, transverse folding of the blank 10 along the transverse fold lines 14—16 and 21—24, also as better appears from Figures 2 and 3, achieves a joining of the areas 12 and 19 and of the areas 13 and 20 by a bellows fold, while transverse folding along the fold lines 22—25 and 23—26 effects the interpositioning of a bellows fold between areas 19 and 17 and between areas 20 and 18. The tail portion 37 is folded first inwardly about fold line 38 and then in reverse direction about fold line 39, thus bringing area or portion 37a inwardly in between the portions 17 and 18 and giving a bellows fold connection of the tail area 37 to the main body portion, as better appears in Figure 2. The flap or extension 41 is folded inwardly about the fold line 40 to bring it against the inner face of those portions of the blank 10 to one side of the axis 11. The blank 10 may now be folded about the fold line 11 about which also certain of the bellows-like folds above-mentioned also become folded, giving a relationship like that shown in Figure 2, the folding about the line 11 being throughout 180°. Thus, to one side (see Figures 2 and 3) the shoulder portion or area 13 with its leg extension becomes exposed and is made to stand out since, along the fold lines 15 and 16, there exist neat, smooth folds and hence a double thickness of the sheet material; a similar effect appears on the other side of the animal with respect to the shoulder portion or area 12. The bellows folds, moreover, hold the areas or portions 12 and 13 spaced somewhat, adding to the effect of thickness, while along the central longitudinal or median plane, as viewed in Figure 3, and in which plane the axis or fold line 11 extends, lies the head and neck portion 31 which, when the folded structure or animal is viewed, thus somewhat physically stands out, bringing about contrast between the head and neck portion and the two side shoulder portions 12 and 13, giving a three-dimensional illusion or effect. A substantially similar action and effect are achieved for the tail portion 37 and the hind quarters 17 and 18, the tail portion 37 falling in the central median plane (see Figure 3) and the hind quarters 17 and 18 being displaced to either side thereof and in respective side planes coincident with the shoulder portions 12 and 13. Here again, the illusion of third dimension or transverse width is effected. The extension or flap 41, the lower end of which is outlined to simulate the udder and becomes exposed while the remainder thereof remains concealed in between the portions of the blank folded about the axis 11, will be seen to be brought also into the median plane, and the exposed udder portion is actually as well as in appearance displaced inwardly from the flank and hind quarter on each side of the animal so that the effect of perspective or third dimension is present irrespective of which side the folded device is viewed from.

Where the bellows folds produced by the pairs of fold lines 14—21, 22—23, 16—24 and 25—26 are employed, and it will be understood that they may be omitted, if desired, they aid in giving greater naturalness of appearance, effecting lateral displacements of various side portions of the object and bringing certain of them into greater lateral relief, giving an effect not unlike the protrusions of shoulder bones and hip bones in the actual animal.

The flap member 35 in the form of an extension of the portion 34, upon completion of the folding up of the blank 10 into the relationships above described, is folded upon the fold line 36 throughout 180° and is tucked upwardly in between the portion 13 and the portion 32 and hence into the angle between the portions 13 and 32, as appears better in Figure 3, effecting a holding together of the two halves of the blank along a line at the edge opposite from the axis or fold line 11. Such holding action may be elsewhere achieved as well, for example, as by providing the portion 27 (Figure 1) with a flap-like extension 42, which is tucked upwardly in between the part 13 and the portion 29 between which it is frictionally held and gripped. Such a holding flap thus holds the two parts of the blank to either side of the axis 11 against material unfolding while permitting sufficient spreading to give the pairs of legs a transverse spacing sufficient to make the folded device self-supporting or capable of standing on its own four legs, the small amount of spreading apart, furthermore, accentuating the perspective or naturalness of appearance of the udder. The holding flap or flaps also achieve a permanence of holding action suitable to insure against collapse or distortion of the article or object or animal thus made up, it being noted that the holding flap members are preferably of substantial length so that, once tucked into place, there is little chance of their becoming unfolded in ordinary usage.

In Figures 1–3 the central axis or fold line 11 is along the upper center line of the object or in the case of the cow along the upper center line of its torso. In Figures 4, 5 and 6 I have shown

how certain features of my invention may be carried out by placing the fold line elsewhere. Thus, the blank 44 of Figure 4 is cut out, as shown by the full lines, and is scored, as indicated by the broken lines, and is proportioned to give when folded a representation of a bird, such as an eagle in standing position. The broken line 45 of Figure 5 extends along the longitudinal central axis and to either side thereof are outlined two body portions 46, 47 of the bird having extensions 48 and 49, respectively, in the outline of wings and separated therefrom by score lines 50 and 51. A head and neck portion 52 is in the form of an extension of the body portion 47 and has two transverse fold lines 53, 54 forming an intermediate portion 55. Juxtaposed to portion 55 is portion 56, preferably similar thereto and being in effect an upward extension of the side portion 46. Extension 56 has an extension 57 forming a holding flap foldable about the score line 60.

Score lines 54—58 and score line 53 are used to effect folding to bring about a bellows fold, as is better shown in Figure 6, whence folding along the longitudinal fold line or axis 45 proceeds but now upwardly, the wing portions 48 and 49 being folded downwardly about their respective fold lines 50 and 51. Thus, the head and neck portion 52 (Figure 6) is brought into the central median plane to either side of which are displaced the body portions 46 and 47 and also the wing portions 48 and 49, the holding flap 57 being folded over the score line 60 throughout 180° and tucked in between the side body portion 47 and the part 55 which forms part of the bellows fold between the neck and head portion 52 and the rest of the device.

As with the embodiment of Figures 1–3, naturalness of appearance is achieved, various companion side parts being displaced to either side of the median plane in which the head and neck lie, and thus adding to the effect of naturalness of appearance and of transverse dimension or thickness, an effect aided by the bellows fold or folds and the locking flap and coacting parts. In the illustrative form of Figures 4, 5 and 6 it is preferred, as shown, to place the holding flap close to the neck portion, leaving some opportunity for some spreading apart of portions downwardly and to the rear, again and thereby simulating naturalness of the bird itself, while also achieving sufficient spreading at the lower edges of the portions 46 and 47 so that the latter rest upon a supporting surface and, aided, if desired, by the tip ends of the wing portions 48 and 49, achieve stable equilibrium of the folded object.

Thus, it will be seen that there has been provided in this invention a foldable cutout and method of folding the same, and a folded representation of an article or object of the earlier above-mentioned nature, in which the various objects hereinbefore set forth, together with many thoroughly practical advantages, are successfully achieved. It will be seen that the device is of a thoroughly practical nature, that the folded object is durable and sturdy and dependably resistant against unfolding or distortion, it being noted that the various folds, particularly the bellows folds, may be made to extend in directions and in regions to give truss-like reinforcement or strengthening of the sheet material of the device. Also, it will be seen that naturalness of appearance and the illusion of substantial third dimension are dependably achieved. Furthermore, it will be seen that folding of the blank is simple and is readily achieved and that I am enabled to obtain dependable securing of the blank in its folded relationship without having to resort to troublesome or other extraneous fastening or securing means.

As many possible embodiments may be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinabove set forth, or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. An object simulation comprising a blank or cutout made of a sheet material, the blank being folded upon itself along an axis to bring the two portions of the blank to either side of said axis substantially together, one of said portions having an extension interfolded therewith so that a part of said extension is accommodated and concealed between said two portions and another part projects out from in between said two portions, said latter part of the extension lying in substantially a central or median plane through said axis of folding with said two portions in planes somewhat laterally displaced from said median plane.

2. A device as claimed in claim 1 in which the interfolding between said extension and the portion of which it is a part comprises a bellows fold.

3. A device as claimed in claim 1 in which the interfolding between said extension and the portion of which it is a part comprises a bellows fold, and flap means connected to the other of said two portions and folded and tucked into coacting relation to at least a part of said bellows fold for holding said two portions against material unfolding.

4. A device as claimed in claim 1 in which the interfolding between said extension and the portion of which it is a part comprises a bellows fold, the other portion having an extension folded inwardly into juxtaposition to said bellows fold, and means for holding together said last-mentioned extension and at least a portion of said bellows fold.

5. A device as claimed in claim 1 in which the interfolding between said extension and the portion of which it is a part comprises a bellows fold, the other portion having an extension folded inwardly into justaposition to said bellows fold, one of said extensions having foldable means for interengagement with the other extension.

6. A device as claimed in claim 1 in which the interfolding between said extension and the portion of which it is a part comprises a bellows fold, the other portion having an extension folded inwardly into juxtaposition to said bellows fold, the last-mentioned extension having a foldable flap member folded about at least one portion of said bellows fold for thereby restraining unfolding of one portion relative to the other.

7. A blank or cutout for folding up into a representation of an object comprising a sheet of material like paper or cardboard having a score line to form an axis of folding with portions to either side thereof outlined by lines of cutting and score lines to represent respectively the two sides of the object, at least one of said portions having an extension, said extension having an outer part which represents another portion of the object to be simulated and an inner part intermediate of said outer part and the junction between said extension and said first-mentioned

one portion, said inner part of said extension having a score line at said junction and extending at such an angle to the general axis of said extension that, upon folding of the latter about said score line into a plane intermediate of the planes of the two portions, said inner part of said extension is concealed between said two portions and said outer part is exposed from in between said two portions.

8. A blank or cutout for folding up into a representation of an object comprising a sheet of material like paper or cardboard having a score line to form an axis of folding with portions to either side thereof outlined by lines of cutting and score lines to represent respectively the two sides of the object, at least one of said portions having an extension, said extension having an outer part which represents another portion of the object to be simulated and an inner part intermediate of said outer part and the junction between said extension and said first-mentioned one portion, said inner part having two spaced score lines one of which is at said junction and the other of which extends crosswise of said inner part and intermediate of said junction and the end of said inner part so that said inner part is foldable upon itself about said second-mentioned score line and is foldable inwardly about said first-mentioned score line and in between said two side portions of said blank to form a bellows fold, leaving said outer part of said extension projecting out from in between said two side portions.

9. The method of folding a cutout to simulate an object or the like which comprises folding the blank about a score line substantially 180° to bring two portions thereof substantially together and folding an extension of one of said portions relative to both portions so that a part of said extension is accommodated and hidden between said two folded-together portions and the remaining part of said extension projects from in between the two portions and lies substantially in a plane intermediate of the planes of said two folded portions.

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