United States Patent

Walger et al.

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[45] Jan. 25, 1972

[54] FIRE-RESISTANT BAG

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[73] Assignee: **Minx Products, Inc.**, South El Monte, Calif.

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[52] U.S. Cl. **150/3**, 150/16, 150/21, 150/42, 190/53

[51] Int. Cl. **A45c 11/22**, B65d 33/16

[58] Field of Search 150/3, 2.1, 1.6, 42; 190/53; 229/65

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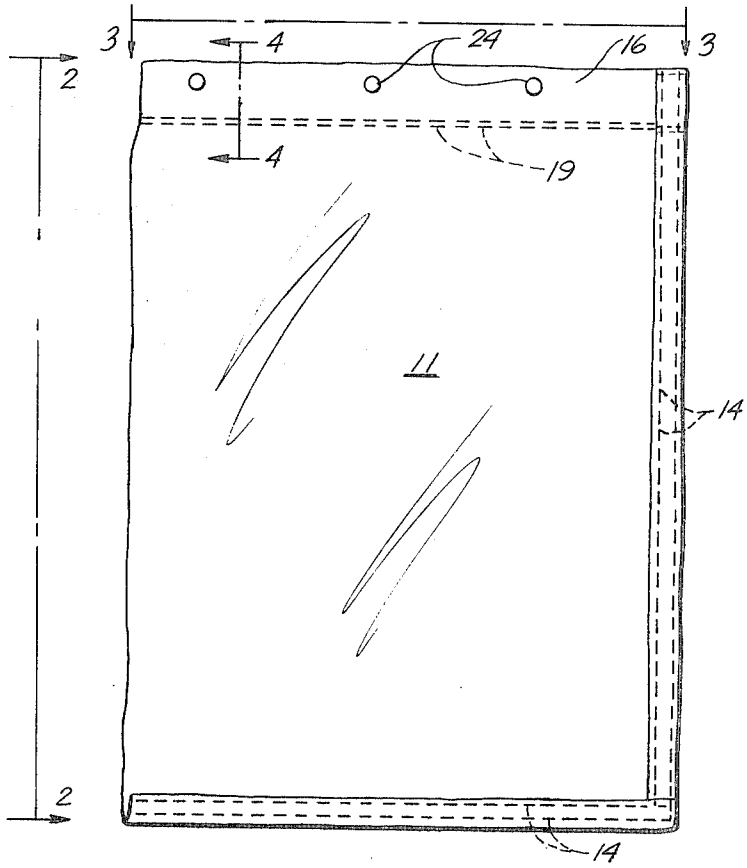
[57] **ABSTRACT**

A fire-resistant bag for carrying valuable documents or money. The bag has a multilayer sidewall with plies which are separated by heat-insulating air spaces. Each ply includes a sheet of asbestos or similar heat-insulating material, and one ply has a metal-foil outer face for reflecting heat. A zipper closure is provided, and the zipper is protected from direct exposure to flame by multilayer lips or flaps on the bag which cover the zipper. Snap fasteners secure the zipper cover in place when the bag is closed.

5 Claims, 10 Drawing Figures



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SHEET 1 OF 2

FIG. 2

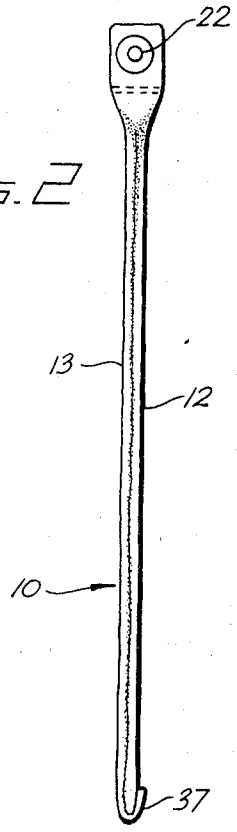


FIG. 1

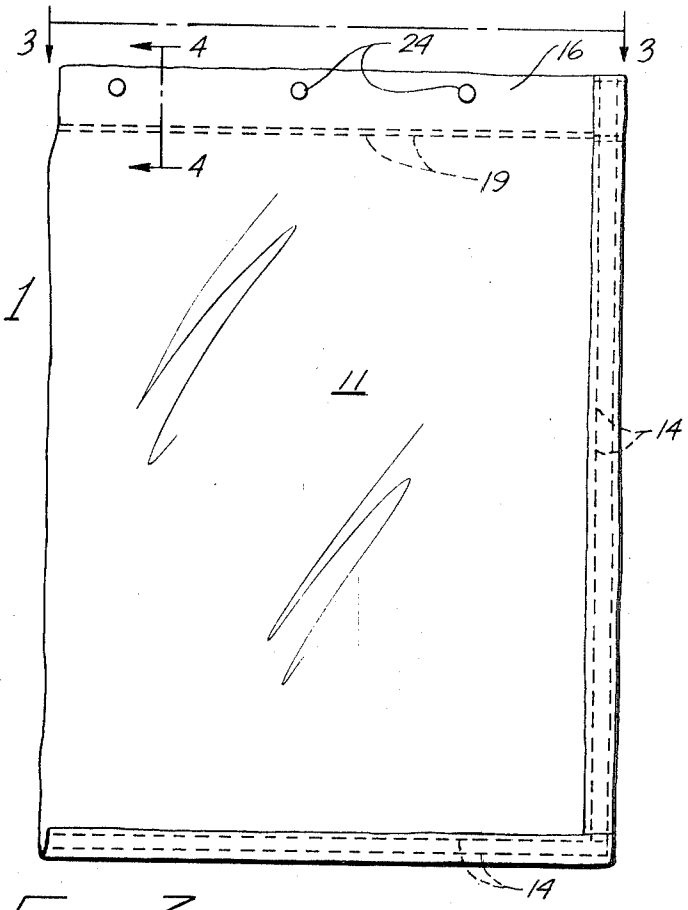


FIG 3

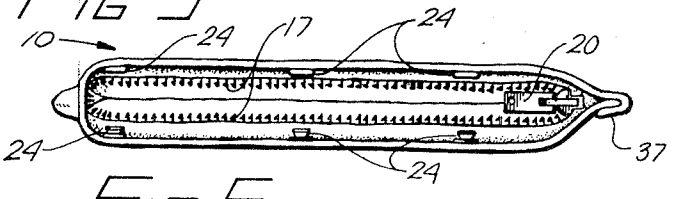
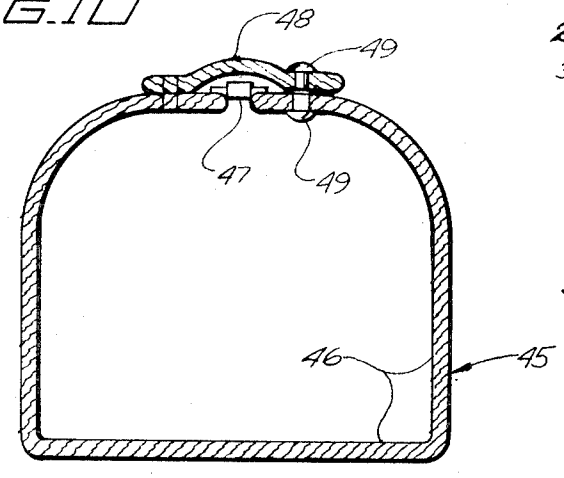


FIG 5

FIG. 10



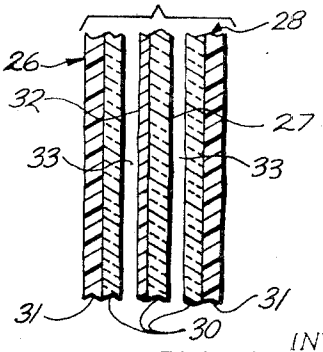


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FIG. 4

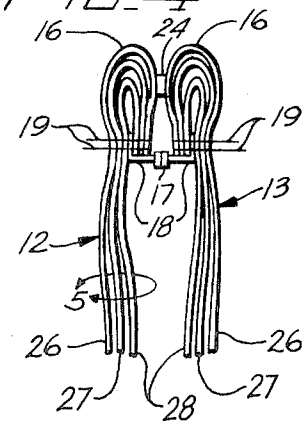


FIG. 6

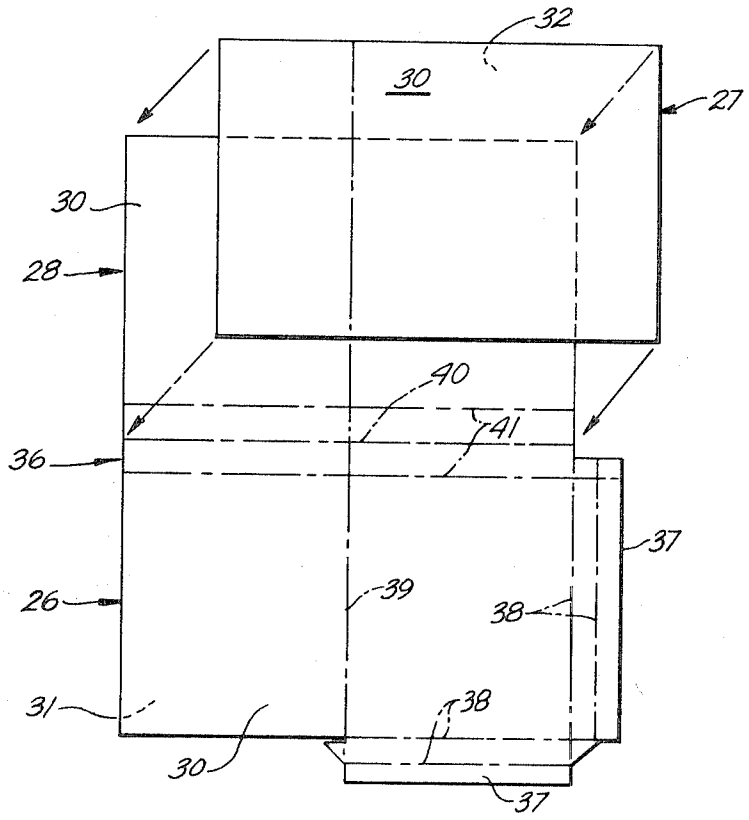


FIG. 7

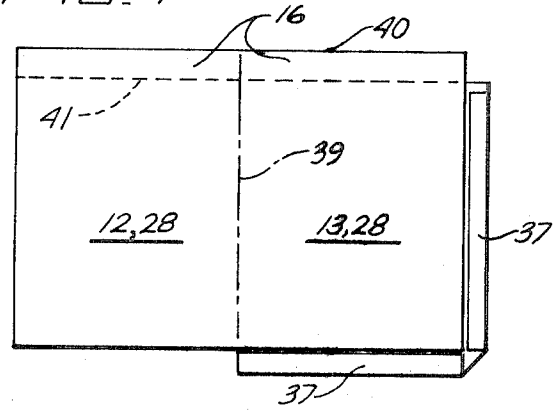


FIG. 8

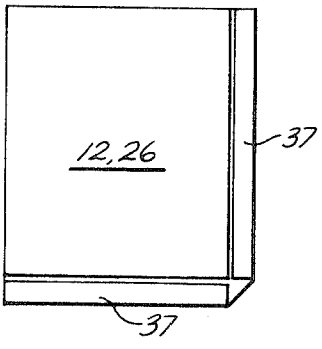
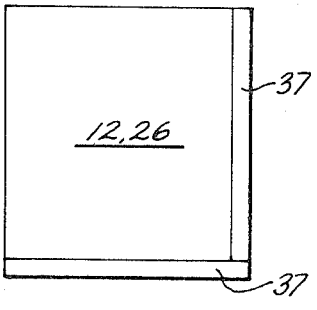


FIG. 9



FIRE-RESISTANT BAG

BACKGROUND OF THE INVENTION

A variety of bags or satchels are available for use by bank messengers and others responsible for transporting valuable papers. These known containers protect the stored papers adequately except during exposure to fire. A conventional bag will be severely damaged and its contents burned after only brief exposure to a gasoline fire as could occur in an automobile accident. Major losses have occurred in vehicle fires when currency, securities, punched cards and similar documents were completely destroyed while stored in a conventional messenger bag.

The bag of this invention is characterized by a multilayer wall construction which provides greatly improved protection for the bag contents in the event of exposure to fire. Each layer or ply of the wall is separated from the adjacent ply or plies by an air space, and one of the plies has a heat-reflecting metal foil on its outer surface. Each ply also includes a sheet of heat-insulating material such as asbestos. These structural features give the wall a high degree of heat insulation, and provide protection against burning or charring for the bag contents for a much longer period when exposed to fire as compared to a conventional bag.

We have found that one of the weakest areas in a conventional bag is a zipper closure which is typically used to seal the bag. Zippers usually have a cloth binding which offers little resistance to fire, and the bag contents may be directly exposed to flame which enters the bag opening past a burned zipper binding or between the zipper teeth. Our invention provides a flap or protective lip which covers the zipper to protect it from flame. The zipper cover is of the same multilayer construction as the bag wall, and provides protection against both radiated and conducted heat.

SUMMARY OF THE INVENTION

The fire-resistant bag of this invention comprises a multilayer wall defining an enclosure with an opening through which bag contents are insertable. The wall has first and second plies which are separated from each other by air spaces over a major portion of the wall area. The first ply is an asbestos sheet with a flame- and abrasion-resistant plastic material coated on its outwardly facing side. The second ply is disposed inwardly of the first ply, and is a laminate of an outwardly facing heat-reflecting metal foil with an asbestos sheet secured to its inner face. A closure means such as a zipper is secured to the wall for closing the bag opening.

Preferably, the wall has a flap portion extending over the zipper to protect it from direct exposure to flame. Snap fasteners are provided on the flap portion for securing it over the zipper. In a presently preferred form, the bag has a triple-layer wall with outer, middle and inner plies, each of which includes a sheet of heat-insulating material such as asbestos. The outer and inner plies have flame- and abrasion-resistant plastic material coated on the respective heat-insulating sheets, and the middle ply has an outer face of a heat-reflecting metal foil.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation of a bag according to the invention;

FIG. 2 is a left side view of the bag shown in FIG. 1;

FIG. 3 is a top view of the bag shown in FIG. 1;

FIG. 4 is a section taken on line 4—4 of FIG. 1;

FIG. 5 is an enlarged portion of FIG. 4 showing the multilayer wall construction of the bag;

FIG. 6 is a plan view of a blank sheet used to form the bag;

FIG. 7 is a view of the blank sheet after a first fold has been made;

FIG. 8 is a view of the blank sheet after a second fold has been made;

FIG. 9 is a view of the blank sheet with all folds completed; and

FIG. 10 is a sectional elevation of another form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1–5, a fire-resistant bag 10 is formed by a continuous wall 11 folded back on itself to define facing sidewalls 12 and 13. The bottom and right side edges of the sidewalls are secured together by several lines of stitching 14. Preferably, one line of the stitching is made with a high-strength material such as dacron, cotton or nylon thread, and the other line of stitching is made with glass thread formed of spun-glass fibers. The glass thread will withstand high temperatures, and will maintain a good seal along the bag edges even if the other line of stitching is destroyed by fire.

Referring to FIG. 4, the upper edges of the sidewalls 12 and 13 are folded inwardly and downwardly to define a pair of double-thickness lips or flaps 16 at the top of the bag. These flaps define an opening through which bag contents can be inserted into the enclosure formed by the sidewalls. A metal zipper 17 for closing the bag opening has a binder or mounting tape 18 sandwiched between the turned-down upper ends of the sidewalls. The mounting tape is secured to the sidewalls by several lines of stitching 19. The zipper has a tab 20 (see FIG. 3) with a hole therethrough. When the zipper is closed to seal the bag as shown in FIG. 3, the tab hole is in alignment with a metal grommet 22 (FIG. 2) fastened to and extending through the upper left edge of the bag wall. A padlock (not shown) can be passed through the tab opening and grommet to lock the bag.

Zipper 17 is recessed below the top of the bag as it is positioned at the bottom of flaps 16, but it could nevertheless be directly exposed to flame when the flaps are separated as shown in FIG. 3. This problem is solved by providing a series of snap fasteners 24 secured to flap 16 at the upper end of the bag. When these fasteners are engaged as shown in FIG. 4, the flaps are drawn against each other to seal the top of the bag and protect the vulnerable zipper against flame.

Wall 11 is a triple-layer assembly having an outer ply 26, middle ply 27 and inner ply 28 (see FIGS. 4 and 5). Each ply is a laminate which includes a sheet of heat-insulating material 30 which is preferably woven asbestos. This material is commercially available in sheet form, and is typically interwoven with the 20 percent or less of cotton for abrasion resistance. Preferably, the material used is Underwriters Grade sheet asbestos of about 0.023-inch thickness and in a weight of about 12 ounces per square yard.

Outer and inner plies 26 and 28 also include a sheet of tough abrasion-resistant plastic material 31 bonded to heat-insulating material 30. Material 31 is preferably polyvinyl chloride in a fire-resistant grade as available from U.S. Rubber Company. This material bonds satisfactorily to asbestos, and provides an attractive and durable outer and inner surface for the bag. Preferably, the polyvinyl chloride is coated on the asbestos sheet to bring the weight of the ply to about 22 ounces per square yard.

Other plastic sheet materials having similar properties can also be used, but the polyvinyl chloride material has proved satisfactory in appearance and durability, as well as providing protection against abrasion of the relatively fragile asbestos sheet. As shown in FIG. 5, material 31 is the outer surface of outer ply 26, and is the inner surface of inner ply 28. The asbestos heat-insulating sheets are thus protected against abrasion from external objects and from the bag contents.

Middle ply 27 includes a heat-reflecting metal sheet 32 which is preferably aluminum foil of about 0.002-inch thickness bonded to abrasion-resistant material 31. Metal sheet 32 is oriented to be the outwardly facing side of middle ply 27 and it provides a substantial reduction in heat transfer through the bag wall. The three plies which form the bag wall are sufficiently thin and flexible that the bag can be readily flattened and folded for storage.

Preferably, the outer, middle and inner plies are secured together only at their edges, and an air space 33 exists between each pair of plies as shown in FIGS. 4 and 5. Air is a poor conductor of heat, and the air spaces which separate the individual plies provide a further reduction in the passage of

heat from an external fire through the bag wall. Stitching **14** and **19** shown in FIG. **1** permits these air spaces to be present over a major portion of the total area of the bag wall. A handle (not shown) can be secured to the top of the bag if desired, but care should be taken to avoid closure of the inter-ply air spaces by stitching or rivets securing the handle to the bag wall.

A presently preferred method of construction for bag **10** is shown in FIGS. **6–9**. Outer and inner plies **26** and **28** of the bag wall are formed from a single initially flat and generally rectangular blank sheet **36** of woven asbestos and polyvinyl chloride plastic as described above. A pair of tabs **37** extend from the lower right-hand corner of the blank sheet, and these tabs are later folded along dashed lines **38** to form the seamed edges of the finished bag. The main body of blank sheet **36** has a central vertical line **39**, a central horizontal line **40**, and a pair of horizontal top fold lines **41** spaced about 1½ inches on opposite sides of horizontal fold line **40**.

Middle ply **27** is cut from a sheet of laminated aluminum foil and woven asbestos to be the same width and one-half the height of blank sheet **36**. The middle ply is then placed against the upper half of the blank sheet with the lower edge of the middle ply aligned with central horizontal fold line **40**. As shown in FIG. **6**, blank sheet **36** and middle ply **27** are oriented with their asbestos sides facing upwardly so the aluminum-foil side of the middle ply faces the asbestos surface of the upper half of the blank sheet.

With the parts thus aligned, the upper half of blank sheet **36** is folded downwardly along fold line **40** as shown in FIG. **7** to sandwich middle ply **27** between the upper and lower halves of the blank sheet. The top of the folded sheet is again folded downwardly along top fold lines **41** to form flaps **16**, and the left half of the assembled sheet is next folded to the right along vertical fold line **39** to the position shown in FIG. **8**. Tabs **37** are folded inwardly to conceal the raw edge of the blank sheet as shown in FIG. **8**, and the tabs are then folded inwardly again as shown in FIG. **9** over the right and bottom edges of the main body of the bag. The closure zipper is installed, and the bag sidewalls are secured together by sewing the seams with two separate lines of stitching as already described. Installation of grommet **22** and snap fasteners **24** completes the assembly operation.

In use, documents and other valuables are inserted in the bag, and zipper **17** is closed and locked through grommet **22** if desired. Snap fasteners **24** are then engages to draw together flaps **16** as shown in FIG. **4**. The bag provides a high degree of heat insulation for the contents due to the air spacing and materials used in the several plies of the bag wall. Bag **10** to about 20 inches high, 14½ inches wide, and one-fourth inch thick when empty and flattened, but can be made in other sizes if desired.

An important feature of the bag construction is that snap fasteners **24** draw flaps **16** together to form essentially a line seal which covers zipper **17**. In the event of exposure to a very hot fire, the polyvinyl chloride plastic material on the outer surface of the bag tends to soften, and the adjoining surfaces of flaps **16** fuse and seal together to provide even greater protection for the vulnerable zipper. A high degree of protection is thus given the bag contents even after extended exposure to extreme heat as might arise from a gasoline fire during a vehicle collision.

If a lightweight bag is needed, inner ply **28** can be deleted in the bag wall, and a substantial resistance to fire will still be afforded by the air-spaced outer and middle plies of the wall. It may be desirable in this form of construction to have a thin inner covering sheet of plastic against the inwardly facing asbestos sheet of the middle ply to protect the asbestos against abrasion from the bag contents.

The bag of this invention is not limited to this specific form shown in FIG. **1**, and the invention is equally useful in bags shaped as suitcases or satchels. A typical satchel **45** is shown in cross section in FIG. **10**, and is useful for transporting cancelled checks and the like. Satchel **45** has a floor and wall formed of a three-layer air-spaced material **46** identical to the wall shown in detail in FIG. **5**. A zipper **47** is secured across a top opening of the bag.

A cover flap **48** is secured with separate lines of glass and cotton stitching along one side of the zipper, and the line of snap fasteners **49** permit the flap to be secured over the zipper when the bag is closed. Flap **48** is constructed of the same three-layer air-spaced material as used for the sidewalls and floor of the satchel.

There has been described a fire-resistant bag for transporting currency or other valuable documents or articles. The bag is economically constructed from commercially available laminated materials, and provides substantially improved resistance to high-temperature fires as compared to conventional messenger bags.

We claim:

1. A fire-resistant bag comprising a multilayer wall defining an enclosure with an opening through which bag contents are insertable, the wall having first and second plies which are separated from each other by air spaces over a major portion of the wall area, the first ply being an asbestos sheet having an outwardly facing side with an abrasion-resistant plastic material bonded thereto, the second ply being disposed inwardly of the first ply and being a laminate of an outwardly facing heat-reflecting metal foil with an asbestos sheet secured thereto; a closure means secured to the wall for closing the bag opening, the wall including a multilayer flap portion extending over and protecting the closure means from direct exposure to flame; and fastener means on the flap portion for securing the flap portion over the closure means.

2. The bag defined in claim **1** in which the closure means is a zipper, and the fastener means comprises a plurality of snap fasteners.

3. A fire-resistant bag comprising a triple-layer wall defining an enclosure with an opening through which bag contents are inserted, the wall having outer, middle and inner plies which are separated from each other by air spaces over a major portion of the wall area, each ply including a sheet of fibrous heat-insulating asbestos material substantially coextensive with the wall, an outer face of the outer-ply heat-insulating material and an inner face of the inner-ply heat-insulating material each having an abrasion-resistant polyvinyl-chloride plastic material secured thereto, the middle ply having an outer face of a heat-reflecting foil bonded to the heat-insulating material, and a closure means secured to the wall for closing the bag opening.

4. The bag defined in claim **3** in which the closure means is a zipper, and in which the wall has a zipper-covering portion extending over the zipper for protection from direct exposure to flame, the zipper-covering portion having a plurality of fasteners to secure the portion over the zipper when the bag is closed.

5. The bag defined in claim **4** in which the zipper-covering portion forms a line seal of polyvinyl-chloride plastic material over the zipper when the fasteners are secured.

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