March 12, 1940. C. BATCHELLER 2,193,018

TABLE TOP

Filed June 25, 1938

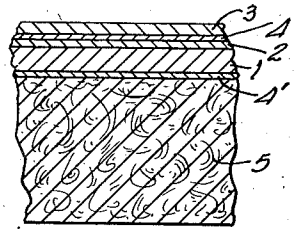


FIG. 1

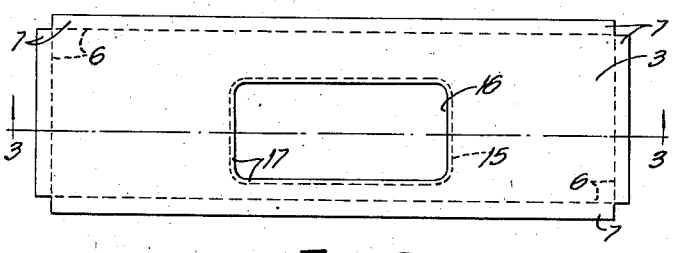


FIG. 2

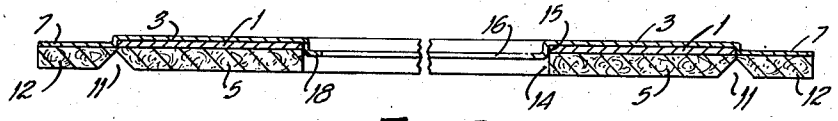


FIG. 3

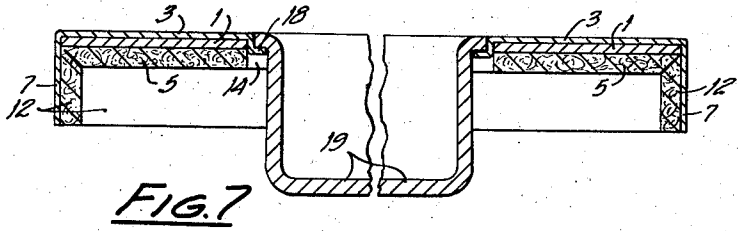


FIG. 7



FIG. 8

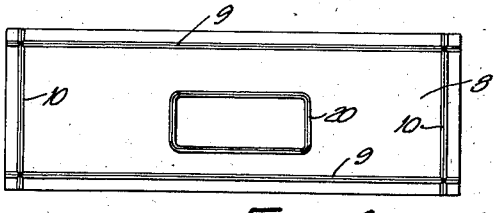


FIG. 4

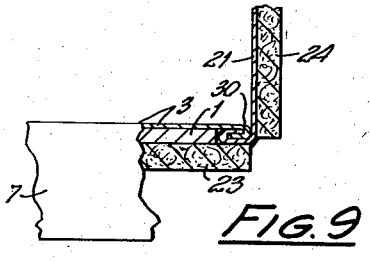


FIG. 9



FIG. 5

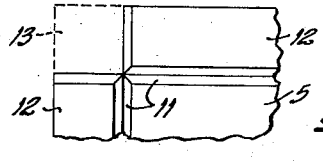


FIG. 6

INVENTOR

Clements Batcheller

by

ATTORNEY

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UNITED STATES PATENT OFFICE

2,193,018

TABLE TOP

Clements Batcheller, Glens Falls, N. Y., assignor to Allegheny Ludlum Steel Corporation, a corporation of Pennsylvania

Application June 25, 1938, Serial No. 215,834

9 Claims. (Cl. 4—187)

My invention generally relates to table tops and, particularly, to a structure formed of a laminated, composite product and to the method of forming the same which structure is primarily adapted for use as table tops.

Ordinarily, sink units are deep stamped from comparatively heavy gauge metal sheets whereby to form a depressed sink, surrounded by a substantially flat metal plate which serves as a table top. These may be formed from a sheet or plate of corrosion resistant, alloy steel or Monel metal but the use thereof is quite limited due mainly to the fact that the amount of metal necessary to provide adequate structural strength with a minimum of buckling or distortion renders the cost of such units, so far as the cost of metal is concerned, very high. Moreover, such stamped metal sink units are objectionable because of the sharp metallic note or ring which is produced when struck and this condition has obtained even though measures have been taken to prevent it. Of course, the high cost of stamped, heavy gauge, metal sink units with table tops is not due entirely to the cost of metal alone, as above indicated, but is also dependent upon die costs and labor entailed in forming the sinks and also losses encountered due to defective products.

Metals in sheet or strip form, when employed in forming table tops such as those used with sinks and for cabinets and the like are ordinarily of about a 20 or 24-gauge thickness. Sheets of corrosion resistant, alloy steels of this gauge, though admirably suited for the purpose, are of somewhat greater weight than, for example, like sheets of ordinary carbon steel, their cost is much greater and they may be quite easily dented or otherwise distorted when subjected to an impact force.

It is, therefore, a first object of my invention to provide a table top particularly adapted for uses such as those above pointed out and formed of a composite product comprising a surface element of corrosion resistant metal and preferably a corrosion resistant alloy steel, said product being characterized by the facts that, due to the construction employed, it is inherently of sufficient structural strength for adaptation to the uses contemplated and the corrosion resistant surface thereof is much less susceptible to denting or distortion than a sheet of corrosion resistant, alloy steel of the gauge ordinarily employed for such purposes.

Other objects of my invention reside in the provision of a table top particularly designed for use with sinks; in providing a composite product of the character above pointed out and in the method of forming a table top therefrom.

With these and other objects in view, my invention includes the novel constructions and those steps in the method of forming table tops described below and illustrated in the accompanying drawing, in which—

Fig. 1 is a magnified, fragmentary sectional view through the composite product of my invention;

Fig. 2 is a plan view illustrating the preformed, composited elements employed in making my table top;

Fig. 3 is a fragmentary sectional view, somewhat enlarged, taken in about the plane 3—3 of Fig. 2 and illustrating a partially formed table top;

Fig. 4 is a plan view of a press plate employed in preforming the molded sheet element of my composite product;

Fig. 5 is a fragmentary, sectional elevation view illustrating the method of preforming the molded sheet element;

Fig. 6 is a fragmentary plan view of a corner zone of the preformed, molded sheet with a corner thereof broken out;

Fig. 7 is a view somewhat similar to Fig. 3 but illustrating a completed table top with a sink element supported thereon;

Fig. 8 is a sectional view illustrating a partially completed, modified construction; and

Fig. 9 is a fragmentary view, partially in section, illustrating the structure of Fig. 8 in finished form.

In the following, although I have referred to a table top construction particularly intended to form a table top for a sink, it is to be understood that the term "table top" is intended to include table and cabinet tops, cabinet panels, table tops with splash backs for sinks and like elements.

I have discovered that light gauge sheets of corrosion resistant metals and, particularly, sheets of corrosion resistant alloy steel, preferably those coming within the ranges of so-called "stainless" steels, when composited to a comparatively heavy gauge sheet of carbon steel, are particularly adapted for use in fabricating table tops for the purposes herein contemplated.

Under cold rolling processes, corrosion resistant alloy steels may be produced in strip form in thicknesses of the order of about from 0.004" to about 0.010" or 0.011". These strips are usually formed in widths of about 27" or 28" and in lengths of about 500 feet or greater. Taken alone, these strip products, although desirable because

of their enduring qualities, lightness in weight per unit of area and lustrous surface appearance, are limited in the uses to which they may be put mainly because of lack of sufficient structural strength.

However, when a corrosion resistant, alloy steel sheet or strip product of the foregoing character is composited to a sheet of ordinary carbon steel, in the aggregate forming a composite sheet of, for example, about 20 to 24-gauge thickness, the corrosion resistant surface thereof is harder than that of a like gauge, corrosion resistant, alloy steel sheet and cannot be so easily dented or deformed. When a composite metal sheet product of the foregoing character was subjected to Rockwell tests, it showed a corrosion resistant surface hardness which was considerably greater than that of a specimen of corrosion resistant, alloy steel of a thickness substantially equal to that of the composite product.

Furthermore, a composite sheet product of the foregoing character is much lighter in weight than an equivalent sheet of corrosion resistant alloy steel and the cost thereof is considerably lower.

However, for the purposes herein contemplated, the composited corrosion resistant and carbon steel sheets should be adequately reinforced, as hereinafter pointed out, and a table top formed of the resulting, composite product will be found to be particularly adapted for the purposes herein set forth because, among other things, of its durability, structural strength, lightness in weight, resistance to denting or deformation due either to impact or the presence of moisture and low cost. It is also characterized by the practical absence of metallic sound or ring when struck.

In forming the composite product of which my table top is fabricated, I prefer first to composite the thin, corrosion resistant, alloy steel sheet, which may be of a thickness of the order hereinabove pointed out, with a carbon steel sheet, which may be of a thickness of about 0.016" and, thereafter, said metal sheets are secured to a molded sheet product. In order to secure the metal sheets together and effect a strong bond therebetween, one surface of the carbon steel sheet 1 (see Fig. 1) is first galvanized as indicated at 2 and the galvanized surface is then treated to render it roughened or rugose whereby to aid to a considerable extent in effecting an extremely strong bond between the carbon steel sheet 1 and the thin sheet 3 of corrosion resisting, alloy steel.

To roughen a galvanized surface, it may be subjected, for example, to a sand blast or pickled in sulphuric acid or, of course, other means may be resorted to in order to provide the desired roughness of the galvanized surface. The surface of the corrosion resistant, alloy steel sheet is also preferably roughened and the roughened surfaces of the two metal sheets are then placed together with a suitable adhesive therebetween for bonding purposes.

Due to the fact, that the two metal elements when placed together and subjected to pressure, do not permit the ingress of air therebetween, an adhesive, which may be termed a thermoplastic resin, should be employed because adhesives of the ordinary type require the presence of air to enable the solvent therein contained to evaporate and produce congelation. The thermoplastic resin, which I prefer to employ, is one which, when applied as a liquid in a film to the roughened surface of both metal elements and permitted to dry, becomes substantially non-tacky at ordinary temperatures but becomes adhesive when subjected to heat and pressure, or, pressure alone, when of sufficient magnitude.

A suitable adhesive having the foregoing properties is one which may comprise as essential ingredients nitrocellulose, a synthetic resin and at least one solvent, and the synthetic resin is preferably present therein in such proportion that a film of the adhesive when dry is substantially non-tacky at ordinary temperatures or even slightly elevated temperatures but is adhesive under pressure and heat or under a comparatively high pressure alone. An adhesive of this character is also moisture or water proof and is not susceptible to oxidation but is quite durable. Furthermore, it has high dielectric properties thereby preventing electrolytic decomposition of the metals.

In compositing the carbon steel and corrosion resistant, alloy steel sheets together, a film of thermoplastic resin of the foregoing character is applied to the roughened surfaces of each sheet element and permitted to dry and, thereafter, said elements are superposed with the dried film 4 of thermoplastic resin therebetween and subjected to heat and pressure whereby to effect an extremely strong bond therebetween. For example, the superposed sheets may be placed in a hydraulic hot-plate press and subjected to a pressure of about 50 pounds per square inch under a temperature of from about 300° to about 550° F. for a period of about 8 minutes.

In accordance with my invention, the composited, metal sheets are securely bonded to a sheet of a hard, stone-like, molded product, indicated at 5 in Fig. 1.

The molded sheet produce which I prefer to use is preferably an asbestos fibre board or panel which comprises principally asbestos fibres and a cementing agent. For example, the molded sheet produce may comprise the following:

Short asbestos fibres (waste fibres)	pounds	200
Calcined magnesite (200 mesh)	do	40
Bentonite (colloidal clay, 200 mesh)	do	12
Water to plasticize	gallons	20

A typical formula of another example of a suitable, molded sheet product is as follows:

	Pounds
Portland cement	365
Asbestos fibres	665
Bentonite (colloidal clay, 200 mesh)	50
Calcined magnesite	25

Water for workability.

A molded product of the type represented by the above formulae is characterized by its comparatively great strength and toughness and by the fact that, even when very thin, it shows no tendency to warp or buckle when moist or wet. Furthermore, it may be molded or rolled to provide a smooth surface and the product may be easily worked, if desired, as by sawing, grinding, drilling and like operations.

Of course, products other than those of the type above described may be employed in making my composite product but a board or sheet of the character pointed out is very desirable because of its properties which render it of particular value in forming a composite product which is primarily designed for the fabrication of table tops as herein indicated.

In bonding the molded sheet, which preferably is of a thickness of about ⅜" but not less than ¼",

to the composited metal sheets and to the back of the carbon steel sheet, I prefer to employ a thermoplastic resin of the character above pointed out which is applied as a liquid in a film to the surface of the carbon steel sheet and the molded sheet, permitted to dry and then, by superposing the sheet elements with the dried film of adhesive 4' therebetween and subjecting said elements to heat and pressure substantially in the manner hereinbefore set forth, a strongly bonded, composite product is produced.

In forming a table top from my composite product, the respective elements thereof, in accordance with my invention, are preformed before being composited as illustrated by way of example in the drawing. The carbon steel sheet 1 is formed substantially to conform with the dimensions of the finished table top as represented by the dotted lines 6 in Fig. 2. The corrosion resistant, alloy steel sheet 3 is blanked out to provide lips 7 which are adapted to extend beyond the carbon steel sheet and on each side thereof whereby ultimately to form, in part, flanges along the sides of the table top. The molded sheet 5 is also preformed substantially to conform to the configuration of the corrosion resistant, alloy steel sheet 3.

In forming asbestos sheet or board products, they are usually removed in their plastic, formative stage as "sheet mats" and placed upon relatively heavy gauge, steel press plates having a very smooth, oil-film lubricated surface. Several of these press plates with their respective plastic mats are stacked one upon the other and, under pressure, are allowed to remain in the stack until sufficiently hydrated to permit stripping from the press plates. In preforming the molded sheet product before combining it with the metal elements, I employ a press plate, indicated at 8, which is provided with V-shaped elements 9 extending longitudinally of the plate and similar V-shaped elements 10 which extend transversely of the plate, these elements intersecting in zones adjacent the corners of the press plate. The V-shaped elements 9 and 10 are arranged to form intersecting grooves in the finished, molded product which extend entirely across and lengthwise thereof and which when said sheet is positioned beneath the carbon steel sheet 1 will lie substantially beneath the transverse and longitudinal edges thereof. The plastic mats may be placed upon press plates 8, stacked and pressed in the ordinary manner and, when finished, will contain the grooves 11, the sides of which are preferably arranged substantially at right angles to each other or slightly in excess thereof and with the apex close to but slightly spaced below the top of the molded sheet whereby the end portions 12, which may extend on all sides of the sheet, may be bent downwardly to form flanges. After the molded sheet has become hardened the corners thereof indicated in dotted lines at 13 Fig. 6 may be broken out as illustrated so that the finished, molded sheet then conforms substantially in configuration to the corrosion resistant, alloy steel sheet 3. When, of course, the elements are placed in superposed position and properly aligned, as illustrated in Fig. 2, the grooves 11 will underlie the edges of the carbon steel sheet 1 and the marginal lips 7 of the corrosion resistant, alloy steel sheet will overlie the marginal portions 12 of the molded sheet product. The metal sheets 1 and 3, being first secured together as above indicated, and in properly aligned relationship, are then aligned with and superposed upon the molded sheet product 5 and secured thereto as above indicated, the marginal lips 7 being thereby bonded directly to the marginal portions 12 of the molded sheet as illustrated in Fig. 3. Thereafter, of course, the marginal portions may be bent down as illustrated in Fig. 7 to provide a table top with flanged sides abutting each other at the ends thereof. Suitable means, of course, or an adhesive may be provided to prevent relative movement between the table top and the flanged sides thereof and the ends of the metal facing of the sides may be soldered or otherwise secured together.

Where the table top is to be employed as a table top for sinks, the respective, composited elements 1, 3 and 5 are preformed with openings therein which, when the elements are arranged in superposed positions as illustrated, are adapted substantially to register with each other. The opening 14 in the molded sheet 5 and the opening 15 in the carbon steel sheet 1 may be of substantially like size but the opening 16 in the corrosion resistant, alloy steel sheet 3 is preferably of substantially like configuration but somewhat smaller than openings 14 and 15 whereby to provide an inwardly extending flange 17. After or during composition of the elements, flange 17 may be depressed to form a ledge 18 extending about the opening in the composite product which is preferably slightly spaced below the upper surface of the table top and to an extent sufficient to permit a flanged sink element 19 to be supported thereon with the rim of said sink substantially flush with the upper surface of the table top. The sink, of course, may be soldered or otherwise secured to the element 3 and, in appearance, will closely resemble an integral sink and table top construction.

In forming the opening 14 in the molded sheet 5, I prefer, in the formative stages of the product, to form a frangible section substantially in the same manner employed in forming the grooves 11 which section, when removed from the sheet, will provide the opening 14. This is preferably accomplished by providing an annular element 20 which conforms in size and shape to the opening 14 and which is accurately positioned and mounted upon the press plate 8 with the upper edge thereof arranged to penetrate the plastic mat substantially to but short of the upper surface thereof. Of course, when the molded product has been removed from the press plate in hardened condition, the frangible section defined by the element 20 may easily be broken away at the time the corner portions 13 of the molded product are also removed.

In Figs. 8 and 9 I have shown a slightly modified construction wherein a table top and a splash back or upstanding flange therefor may be formed which, in width including the width or height of the splash back is in excess of that of the corrosion resistant, alloy steel strip employed. For example, assuming a 27" wide, corrosion resistant, alloy steel strip is provided and it is desirable to form a table top substantially 24" in width provided with a downwardly flanged edge on one side and on the opposite side with an upstanding splash back, for example, about 6" in width or height, it is necessary to combine two corrosion resistant, alloy steel sheets and, in so doing, it is desirable that the zone in which they are joined together is rendered substantially imperceivable. A construction affording this desired result is attained by overfolding the marginal portions of a first corrosion

resistant, alloy steel sheet 3 with the marginal portion of a second sheet 21 as illustrated at 30 in Figs. 8 and 9 and arranging the overfolded portions thereof, when composited with a carbon steel sheet and molded sheet product as hereinabove indicated, to lie adjacent the side of the carbon steel sheet 1. The molded sheet 23 to which the corrosion resistant and carbon steel sheets are secured may be preformed as herein described but may be provided on one side with a score 22 as illustrated rather than a V-shaped groove, which score extends longitudinally of the sheet and is arranged substantially to underlie the overfolded portions of the sheet elements and preferably beneath the overfolded edge of sheet 3. The score 22 extends upwardly within the molded sheet 23 but terminates slightly below the upper surface thereof whereby the marginal portion 24 of the sheet 23 may be bent upwardly as illustrated in Fig. 9 to provide a splash back for the table top and the corrosion resistant surface of the table top and splash back will appear as substantially integral surfaces.

From the foregoing, it should be apparent that by preforming the molded sheet product in the manner herein described supplemental work such as grooving the back thereof and cutting out openings therein such as that adapted to receive the sink are eliminated and it is merely necessary to remove predesigned portions thereof before compositing with the metal sheet elements. Thereafter, of course, it is merely necessary to bend down the marginal portions to provide flanges or upturning one side thereof to form a splash back as the case may be to form the finished table top. Furthermore, by preforming the carbon steel sheet substantially to the dimensions of the upper surface of the table top, those zones of the metal sheets or laminae which are bonded together are not subjected to a flanging operation thereby precluding the production of stresses which may tend to impair the bond therebetween.

It is to be understood that though I have referred to a corrosion resistant, alloy steel sheet and preferably to an alloy steel coming within the ranges of so-called "stainless" steels as the preferred facing element of my composite product, I may employ other corrosion resistant metals and it is to be further understood that by the term "carbon steel", I intend to include low carbon irons.

The term "sheets" as herein employed as descriptive of the respective laminae of my composite product is intended to include units of plate or strip dimensions; and by the term "soldered", I mean to include welded or other like manners of joining the elements together.

What I claim is:

1. A table top formed of a composite product comprising a carbon steel sheet of comparatively heavy gauge having secured to one side thereof a comparatively light gauge sheet of corrosion resistant metal and having secured to the other side thereof a hard, molded sheet product comprising principally asbestos fibre and a cementing agent.

2. A table top formed of a composite product comprising a carbon steel sheet of comparatively heavy gauge, a sheet of comparatively light gauge, corrosion resistant metal and a molded sheet product comprising principally asbestos fibre and a cementing agent, said corrosion resistant and molded sheets being secured to and on opposite sides of said carbon steel sheet by a layer of thermoplastic resin.

3. A table top formed of a composite sheet product comprising a lamina of carbon steel of comparatively heavy gauge having one surface thereof galvanized, a lamina of corrosion resistant metal secured thereto, and a lamina comprising a hard, molded sheet product comprising principally asbestos fibre and a cementing agent secured to the other surface of said carbon steel lamina; said laminae being secured together by a layer of thermoplastic resin.

4. A table top formed of a composite sheet product comprising a lamina of carbon steel of comparatively heavy gauge having one surface thereof galvanized, a lamina of corrosion resistant, alloy steel secured thereto, and a lamina comprising a hard, molded sheet product comprising principally asbestos fibre and a cementing agent secured to the other surface of said carbon steel lamina; said laminae being secured together by a layer of thermoplastic resin.

5. A flanged table top comprising laminae of comparatively light gauge, corrosion resistant metal, comparatively heavy gauge carbon steel and a molded sheet product comprising principally asbestos fibre and a cementing agent, said laminae being secured together by a layer of thermoplastic resin with said carbon steel as a core element and said flanged sides comprising laminae only of said corrosion resistant metal and said molded sheet product secured together.

6. A flanged table top comprising laminae of comparatively light gauge, corrosion resistant metal, comparatively heavy gauge carbon steel and a molded sheet product comprising principally asbestos fibre and a cementing agent, said laminae being secured together by a layer of thermoplastic resin with said carbon steel as a core element; and said element being provided with an opening therein adapted to receive a sink of substantially like configuration.

7. A flanged table top comprising laminae of comparatively light gauge, corrosion resistant metal, comparatively heavy gauge carbon steel and a molded sheet product comprising principally asbestos fibre and a cementing agent, said laminae being secured together by a layer of thermoplastic resin with said carbon steel as a core element; and said table top being provided with an opening therein but the opening in said corrosion resistant lamina being somewhat smaller than that in said carbon steel lamina and the edges thereof being slightly depressed to form a peripheral flange adapted to support a sink within the opening of said table top.

8. A flanged table top comprising laminae of comparatively light gauge, corrosion resistant metal, comparatively heavy gauge carbon steel and a molded sheet product comprising principally asbestos fibre and a cementing agent, said laminae being secured together by a layer of thermoplastic resin with said carbon steel as a core element; and the laminae of said table top being provided with substantially registering openings, spaced from the sides thereof, but the opening in said corrosion resistant lamina being somewhat smaller than that in the other laminae and the edges thereof being slightly depressed whereby to form a peripheral flange adapted to provide a support beneath the upper surface of said table top for a sink.

9. A table top formed of a composite product comprising a hard, molded sheet product comprising principally asbestos fibre and a cementing

agent, a sheet of comparatively heavy gauge carbon steel superposed on said molded sheet and secured thereto with said molded sheet extending therebeyond on opposite sides, two sheets of comparatively light gauge corrosion resistant metal arranged in side by side relation but with adjacent edges overfolded and secured together, one of said latter sheets being secured to said carbon steel sheet with said overfolded portions adjacent one edge thereof and with portions of said sheets overlying and being secured to those portions of said molded sheet which extend beyond said carbon steel sheet, the under side of said molded sheet being grooved substantially beneath the edges of said carbon steel sheet whereby to permit bending of said sheet on one side to provide a downwardly extending flange and on the other side in the zone of the overfolded sheets to provide an upwardly extending flange.

CLEMENTS BATCHELLER.