July 5, 1966 C. C. NIELSEN 3,259,679

METHOD OF MAKING A CONCRETE SAFE

Filed June 24, 1964 2 Sheets-Sheet 1

Fig. 1.

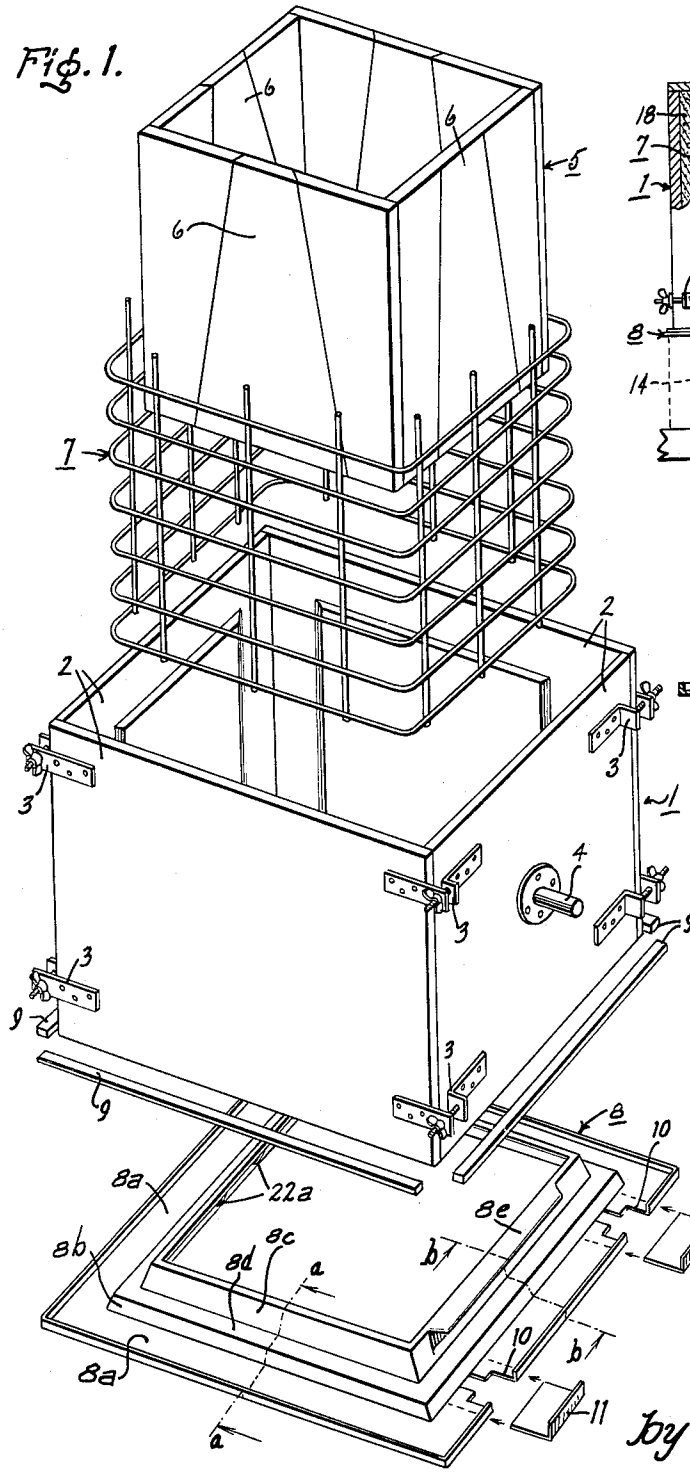
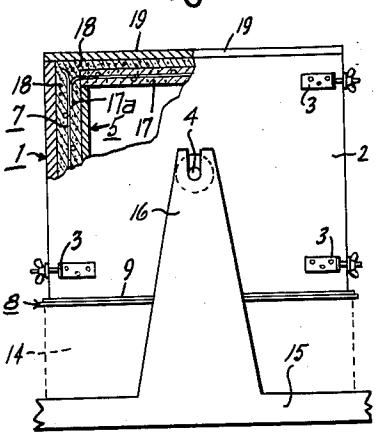


Fig. 4.



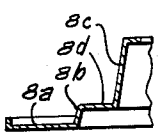


Fig. 2a.

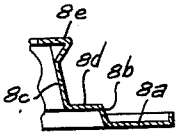
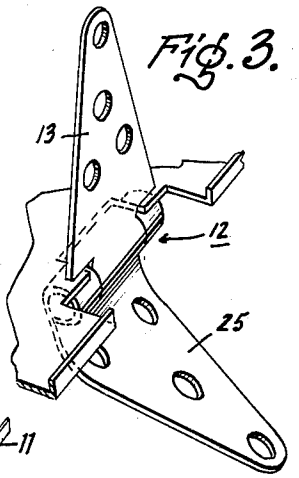


Fig. 2b.

Fig. 3.



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Fig. 5.

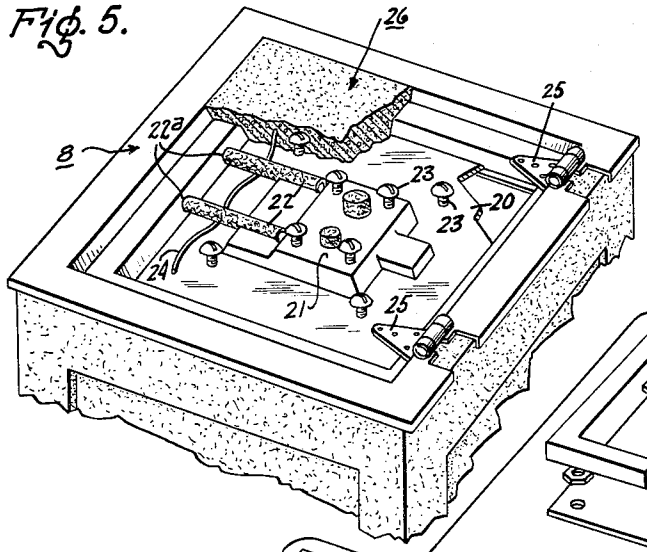


Fig. 6.

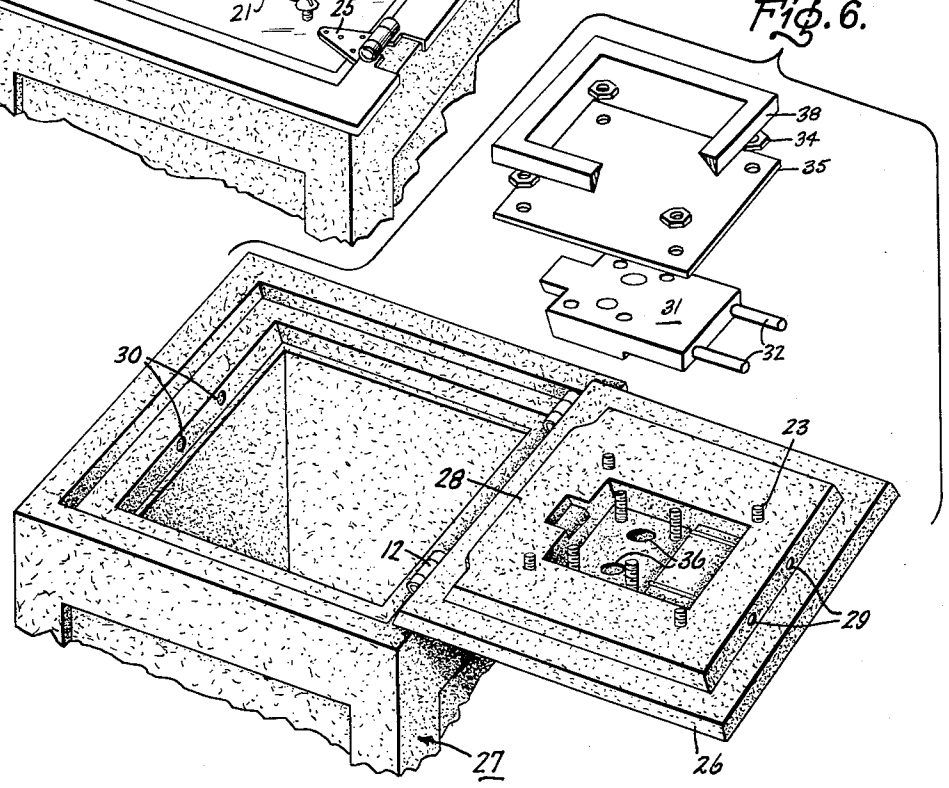
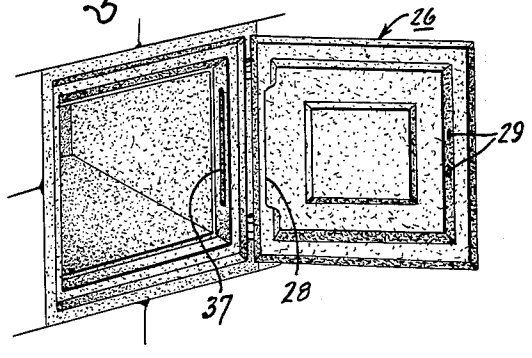


Fig. 7.



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METHOD OF MAKING A CONCRETE SAFE

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4 Claims. (Cl. 264—242)

This invention relates to an improved process for economically producing safes for the protection of papers and other valuables out of fireproof reinforced concrete.

The art of safe making has been highly developed so as to insure safes which has substantially airtight doors, are fire resistant, and are designed to withstand attempts at unauthorized entry for significant periods of time. A usual method of construction is to employ metal sheet or plate on the inside and outside with an insulating material between. Some older safes were cast of solid metal, such as Franklinite iron, using a thin sheet of wrought iron to contain the Franklinite within the mold during pouring and also to become a jacket for the safe.

Reinforced concrete has also been developed, as well as heat resistant concretes. These materials have more often been associated with stationary building structures such as piers, walls, bridges, etc., and have not been associated with fabricated objects having moving parts. Although concrete structures are more economical than metal structures of the same weight, there are many problems in pouring and forming which are not evident in metal casting. By employing the process to be disclosed, concrete can be substituted for the customary materials used to construct safes.

Accordingly, one object of the present invention is to provide an improved method for producing a fire-resistant burglar-proof safe out of reinforced concrete.

Another object of the present invention is to provide a process for pouring a concrete safe body with closely matching door at very low cost.

The subject matter which I regard as my invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. My invention, however, both as to organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken together with the accompanying drawing in which:

FIG. 1 is an exploded perspective view of the forms and reinforcement for the safe body,

FIGS 2*a* and 2*b* are cross-sectional views of the metal form for the door outline,

FIG. 3 is an enlarged perspective of the hinge detail,

FIG. 4 is a horizontal elevation of the completed form for the safe body after pouring,

FIG. 5 is a perspective of the form after inverting but prior to pouring the safe top,

FIG. 6 is another perspective, illustrating the method of insertion of the locking mechanism and completion of the top, and

FIG. 7 is a perspective of the completed safe of reinforced fire-resistant concrete.

Briefly stated, the invention is practiced by pouring a heavily reinforced safe body in an inverted position upon a thin form having the proper outline for the safe door, inverting the form, pouring the safe door using the same form together with hinges and special inserts to provide recesses for the locking mechanism, and then completing the safe with the necessary hardware.

Referring now to FIG. 1 of the drawing, an outer form

1 for the safe body consists of four walls **2** detachably connected by temporary connectors **3**. Trunnion pins **4** are attached to two opposite side walls. A collapsible inner form **5**, made up of beveled sections **6** is constructed so as to fit inside the outer form **1** with about 2½ inches all around to provide the proper thickness for the safe wall. A cage **7** of reinforcing rods is preformed so as to fit in the space between the inner and outer form.

A door outline form **8** serves to provide a base for pouring the safe body. This form **8** is made of sheet metal of uniform thickness, for example of 26 gage steel, although it could be formed of a rugged plastic. The form, which can be seen in cross-section at two different locations in FIGS. 2*a*, 2*b*, has a wide ledge **8***a* all around, on which rest the walls of the outer form. These are held spaced in the proper position by spacers **9**. Reference to FIGS. 2*a*, 2*b*, shows that the walls of form **8** include two vertically sloping surfaces **8***b*, **8***c*, with an intermediate flat ledge **8***d*. On FIG. 2*b*, the vertically sloping surface **8***c* is shown to be interrupted with a protrusion **8***e* which will act as a door security locking flange in the completed safe. It should be apparent that the form **8** has a tiered outline from its periphery inward.

In order to incorporate the hinge into the safe body, cutouts **10** are made in the ledge **8***a* to receive the hinge. Temporary covers **11** are shown to prevent leakage of concrete through the cutouts **10** after insertion of the hinge. Reference to the enlarged view of FIG. 3 shows a hinge **12** in place prior to pouring, with one leaf **13** in an upright position as it would appear extended between the walls of the inner and outer forms. As will be amplified later, the hinges are for opening and closing the safe door, but provide none of the security measures of the safe. Therefore, ordinary strap hinges as shown serve to economically provide this function.

FIG. 4 illustrates the form as it appears during pouring of the safe walls. Temporary blocking **14** is used to support the door outline form **8**. A trunnion form support **15**, with uprights **16** can be employed to hold the outer form by the trunnion pins **4** for ease of inverting the form later on.

The walls are poured as illustrated in the broken away part of FIG. 4. Preferably I employ a fireproof concrete composed, for example of a known mixture such as 30% Portland cement, 20% sand, 40% lightweight aggregate such as "exploded" sand or shale, and 10% asbestos fibers. A vibrator device may be useful to compact the mixture and provide a smoother appearance.

A precast reinforced concrete coverpiece **17** is employed to cover the inner form **5** and to start the bottom of the safe. It is placed as shown when the concrete reaches the top of the inner form **5**, with extending reinforcing rods **17***a* bent so as to become part of the side wall. The pouring continues to fill the space **18** to the desired level above the cover piece **17**. A top **19** may be employed if desired to provide a smooth surface. After the concrete hardens the safe is inverted so that it appears as in FIG. 5 with the door outline form now on top.

Further reference to FIG. 5 illustrates additional preparation and parts employed preparatory to pouring the door of the safe. A plate **20** is disposed on the interior lip of the central opening of the door outline form **8**. It should be apparent that this plate **20** could also be an integral part of the form **8**. Attached to plate **20** is a pattern of the impression of the lock mechanism to be

used. Two tubes **22** of disposable plastic such as Styrofoam serve as cores to provide cavities for the sliding lock bolts. Tubes **22** have been inserted in holes **22***a* (see FIG. 1) prior to pouring the safe body so that aligned holes will eventually exist in door and safe body. Holders (not shown) beneath plate **20** support machine screws such as **23** which are of the proper length so that the heads will be imbedded in the concrete. The space above plate **20** is heavily reinforced, illustrated symbolically by the single piece of reinforcing **24**. The free ends **25** of hinge **12** are placed in this space also so as to be covered.

Next the door for the safe is poured, using the same mixture of concrete as described previously. It is of particular importance to note that the same form is used for the door outline as previously, except that now the concrete is on the other side of this uniformly thin piece of metal. Therefore the door outline will be exactly as shown in the views of FIGS 2*a* and 2*b* of the drawing. There will be a locking lip portion **28** on the door which extends into a mating recess in the wall of the safe, corresponding to the hump **8***e* on the form cross section shown in FIG. 2*b*. The edges of the door will perfectly match the edges of the door outline in the safe walls.

FIG. 6 illustrates the remaining steps necessary to complete the safe. The door **26** is opened on hinges **12**, shearing off tubes **22**, and swung away from the walls **27** of the safe. The locking lip portion can be seen at **28**. Holes **29** and **30** in the door and safe walls respectively are provided by removing the ends of the sheared-off plastic tubes **22**. A suitable lock mechanism **31** with extendable or sliding locking bolts **32** is fitted into the recess formed by the pattern **21** and held in place with screws **23** and nuts (not shown). Next nuts **34** and coverplate **35** are applied, also using the previously set machine screws **23**. The locking mechanism may be either combination or tumbler type, and access is had to the means to operate the lock through the hole **36**. If desired, the lock may be sealed inside by pouring additional concrete over the cover plate **35**, this being held in place until drying by form **38**.

FIG. 7 shows the safe when completed, placed so that the door operates from the side in the normal manner. It should be noted that the locking lip portion **28** will fit in a perfectly matching recess **37**, this being provided by the portion **8***e* on the door outline form. The bolts **32** on the lock (see FIG. 6) will emerge from holes **29** to enter the perfectly mated holes **30** in the walls of the safe, since the same cores (plastic tubes **22**) were used to form both sets of holes.

As explained previously, the hinges are not necessary to the security of the safe. They may be removed by a burglar and the door will still be held tightly in place by the locking bolts on one side and the locking lip **28** on the other side. While this latter feature has been used before, it usually requires a very expensive construction to insure a perfectly mating door having these features in an ordinary metal safe. By using the method described, however, a secure fireproof safe is obtainable by a relatively inexpensive and simple process.

While the preferred method of practicing the invention has been described herein, other modifications will become apparent to those skilled in the art. Therefore it is desired to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of making a concrete safe comprising the steps of:

providing first form means defining a continuous wall-shaped cavity and open at either end thereof,

providing second form means comprising sheet material of relatively thin uniform thickness shaped to provide a tiered cross-section from its periphery toward its center,

placing the first and second form means together with the second form means on the bottom closing off one open end of the first form means,

filling said first form means with concrete to provide a safe body,

inverting said safe body to place the second form means on top,

filling the other side of the second form means with concrete to provide a safe door, and

opening said safe door and removing the second form means.

2. The method of making a concrete safe comprising the steps of:

providing outer form means defining a safe body exterior,

providing inner form means defining a safe body interior,

providing door outline form means comprising sheet material of relatively thin uniform thickness shaped to provide a tiered outline from its periphery toward its center,

placing said form means together with the inner form means inside of and uniformly spaced from the outer form means, both of said inner and outer form means being disposed on said door outline form means so that it blocks off one end of the space between inner and outer form means,

filling the space between the inner and outer form means with concrete to provide a safe body,

inverting said safe body to place the door outline form means on top,

filling the other side of the second form means with concrete to provide a safe door, and

opening said safe door and removing the door outline form means.

3. The method of making a concrete safe comprising the steps of:

providing a rectangular outer form open at either end thereof and defining a safe body exterior,

providing a rectangular inner form open at either end thereof and defining a safe body interior,

providing a rectangular door outline form comprising sheet material of relatively thin uniform thickness shaped to provide a tiered outline from its periphery toward its center,

placing said forms together with the inner form inside of and uniformly spaced from the outer form, both of said inner and outer forms being arranged to contact the top surface of the door outline form so that it blocks off one end of the space therebetween,

placing reinforcing means in the space between inner and outer forms,

filling the space between inner and outer forms with concrete,

closing off the top end of the inner form and filling the remainder of the outer form with concrete to complete a hollow safe body,

inverting said safe body to place the door outline form on top,

placing additional reinforcing means on the other side of the door outline form and filling it with concrete to provide a safe door, and

opening said door and removing the door outline form.

4. The method of making a concrete safe comprising the steps of:

providing first form means defining a continuous well-shaped cavity open at either end thereof,

providing second form means comprising sheet material of relatively uniform cross-section shaped to provide a tiered cross-section from its periphery toward its center, one side of the second form means defining a substantially vertical wall with a protruding horizontal ridge extending along the vertical wall,

the opposite side of the second form means including expendable rod-shaped members projecting from either side of the form wall,

placing the first and second form means together with the second form means on the bottom closing off one open end of the first form means,

filling said first form means with concrete to provide a safe body defining a recess on one side corresponding to said ridge and holes on the other side corresponding to said rod-shaped members on one side of the second form means,

inverting said safe body to place the second form means on top,

filling the other side of the second form means with concrete to provide a safe door having a flange corresponding to said ridge and holes corresponding to the rod-shaped members on the other side of the second form means, and

opening said door and removing the second form means.

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