June 16, 1936. R. C. BRADLEY 2,044,049

REGISTER FRAME

Filed Aug. 22, 1933

Fig. 1.

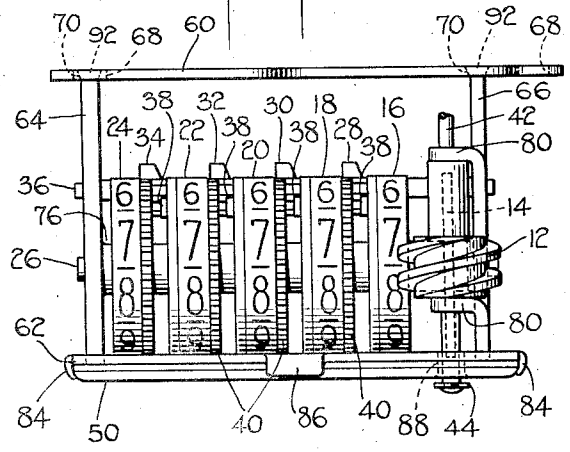



Fig. 4.

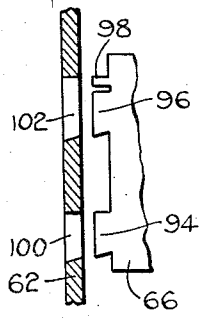



Fig. 5.

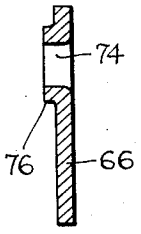



Fig. 2.

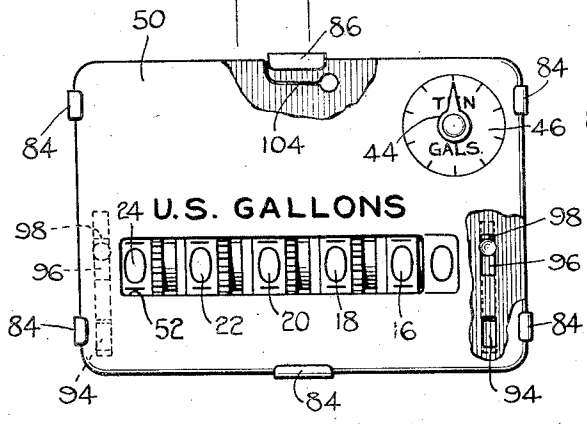



Fig. 3.

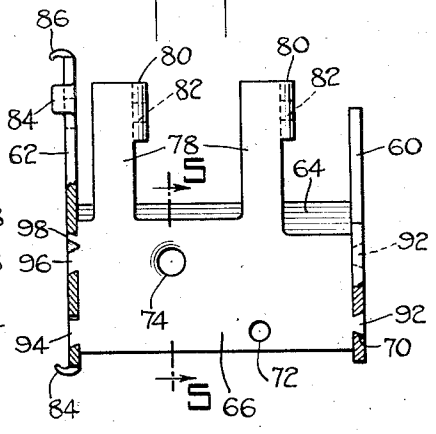
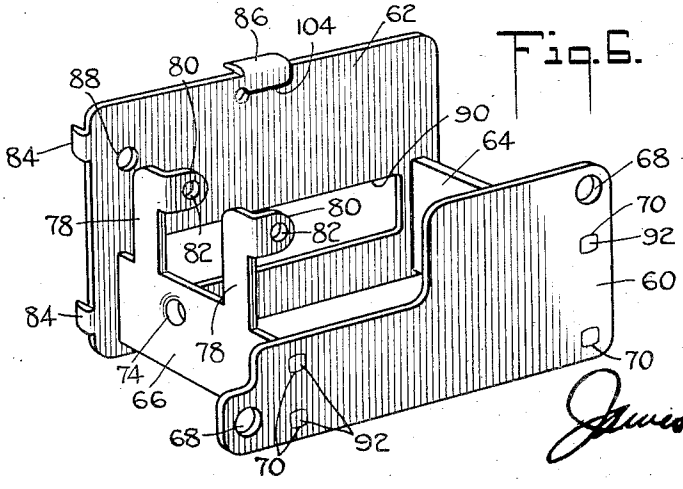



Fig. 6.




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2,044,049

## REGISTER FRAME

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Application August 22, 1933, Serial No. 686,206

4 Claims. (Cl. 235—1)

This invention relates to register frames, particularly the frame holding the totalizing and indicating mechanism of registers.

The primary object of the present invention is to generally improve the frames for registers such as are commonly used with meters. More particular objects of my invention are: to avoid the expense of a cast frame; to avoid the machining of such a cast frame, including the jigging, drilling, and grinding to finish; and to thereby produce a frame at a greatly decreased cost of manufacture. Further objects are to produce a stronger and lighter frame.

The register face is ordinarily made up of an enameled sheet metal plate secured to the cast frame by screws passing through the side edges of the plate. Any distortion of the plate by pressure applied to the top or bottom thereof results in cracking of the enamel from the plate. A further object of the present invention is to overcome this difficulty by providing a front plate on the frame which acts as a backing plate for the register face and stiffens the same against bending. Still another object of my invention is to make the register face and the front plate of the frame removable, both to facilitate assembly of the register during manufacture, and repair of the register at any later time. Still another object of my invention is to avoid cracking and chipping of the enameled register face caused by the provision of mounting holes therein and the tightening of mounting screws thereon.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the register frame elements and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by a drawing, in which:

Fig. 1 is a plan view of a register embodying features of my invention;

Fig. 2 is a front elevation thereof;

Fig. 3 is a side elevation of the frame itself;

Fig. 4 is a detail showing the mode of attachment of the front plate to the side plates of the frame;

Fig. 5 is a section through a side plate, taken in the plane of the line 5—5 of Fig. 3; and

Fig. 6 is a perspective view of the frame.

Registers are employed in meters of greatly differing types, and the register here disclosed is particularly applied to liquid meters used for the measurement of water, oil, gasoline, and the like. The register mechanism as conventionally constructed employs a worm 12 driven through appropriate reduction gearing or "intermediate" by the piston or other measuring mechanism of the meter. This worm meshes with and rotates a worm wheel 14 attached to and driving a first register wheel 16. This register wheel together with succeeding register wheels 18, 20, 22, and 24 are all mounted on a register wheel shaft 26. The register wheels are interconnected by the conventional Geneva gear mechanism, a plurality of register lock pinions 28, 30, 32, and 34 being provided for this purpose. The pinions 28, 30, 32, and 34 are all mounted on a register lock shaft 36. The register wheels 16, 18, 20, and 22 are provided with actuating lugs 38 for operating the pinions, and the register wheels 18, 20, 22, and 24 are each provided with gears 40 meshing with the pinions. The upper or forward end of shaft 42, carrying the worm 12, is provided with an appropriate indicator 44. This indicator cooperates with a dial 46 formed on a register face 50, this being a sheet metal plate coated with vitreous enamel or any suitable porcelain finish. The register face 50 is provided with a window 52 exposing the series of register wheels, as is best shown in Fig. 2.

As so far described, the register mechanism is of the conventional "straight reading" type, and the present invention does not concern this mechanism per se, but rather the frame in which the mechanism is mounted. Ordinarily the frame consists of a casting having a back plate and a pair of forwardly extending side arms which carry the register wheel and locking pinion shafts 26 and 36. At the forward end of the side arms the register face 50 is mounted by screws passing through the register face.

In accordance with the present invention the frame is assembled out of a plurality of pressed sheet metal plates, producing a lighter and stronger frame and avoiding the cost of the cast frame and the necessary machining and grinding, jigging, and drilling operations for finishing the same. The present frame comprises a back plate 60, a front plate 62, and side plates 64 and 66, these members being pressed out of sheet metal by regular press operations. The back plate 60 is stamped to configuration and provided with mounting holes 68 and apertures 70. Side plates 64 and 66 are stamped to proper configuration and provided with bearing holes 72, for lock pinion shaft 36, and bearing holes 74 for register wheel shaft 26. The side plates are at the same time pressed inwardly at bearing holes 74 to form shoulders 76, best shown in Figs. 1 and 5,

for bearing against the worm wheel 14 and the end register wheel 24. It may be pointed out that the ease of formation of these bearing shoulders is one of the advantages of the present invention, for with the cast frame the metal around the bearing holes 74 is staked or forced upwardly in an endeavor to supply such bearings or shoulders.

The side plate 66 is provided with upstanding arms 78 having ears 80 bent inwardly and pierced to form bearings 82 for the worm wheel shaft 42. The front plate 62 is formed with tabs 84 and 86 for receiving the register face 50, and is apertured at 88 for the worm wheel shaft 42, as well as cut away at 90 to form a window mating with the window 52 of register face 50. All of the foregoing operations are performed as a part of the press or stamping operation producing the parts, so that the parts of the frame may be manufactured rapidly and inexpensively.

The side plates 64 and 66 are permanently secured to the back plate 60. For this purpose I provide the side plates 64 and 66 with tenons 92 adapted to pass through the mating openings 70 formed in the back plate 60. The openings 70 may be flared outwardly, if desired, as is best shown in Figs. 1 and 3. With this arrangement the tenons 92 may be swaged or riveted in place, causing the same to expand and fill the openings 70 and to thereby lock the parts rigidly in assembled relation without requiring any rivet head or projection at the back of plate 60. This assembly of the side and back plates may be accomplished by machine operation in a regular jig or fixture.

The front plate 62, is, however, detachably secured to the side plates, for the reason that the register wheels must be made freely accessible during assembly of the register or during repair of the same, in order to permit the wheels to be properly alined in the zero position while mutually interlocked by the locking pinions, before adding the front plate to complete the register assembly. To assemble the front plate on the side plates by screws requires drilling and tapping operations which are separate machine operations and which are costly because of the small size of the tap needed for screw holes. In accordance with by invention, the simplicity of the swaged joint used at the back plate is retained when mounting the front plate. For this purpose the side plates are provided with undercut or semi-dovetailed tenons 94 and 96, the latter being made of increased width and slit or incised to form a separate lug 98, as is best shown in Fig. 4. The front plate 62 is provided with slots 100 and 102 dimensioned to receive the tenons 94 and 96 when in the condition shown in Fig. 4. After the front plate has been laid in place, however, an appropriate punch may be inserted in the slot in tenon 96 and struck to bend the lug 98 outwardly or away from the body of tenon 96, as is shown in Fig. 3. As a result of this staking operation, lug 98 bears against the upper end of slot 102 and consequently displaces the front plate and side plates, thereby causing the undercuts of the tenons and slots to come into interlocked relation. The resulting connection is strong and semi-permanent. The connection may be freed and the front plate removed by simply inserting the tapered end of an appropriate punch between the lug 98 and the upper end of slot 102, for, upon striking the punch, the lug 98 will be bent toward tenon 96 and thus permit removal of front plate 62. This operation may be repeated a large number of times without fatiguing or breaking the metal of lug 98. Of course, in practice such removal for repair may seldom or never prove necessary.

The register face 50 is much like that conventionally employed, except that no small marginal holes are provided for screwing the same to the register frame. This in itself is an advantage, because these holes act as foci for cracking and chipping of the porcelain or enamel, particularly when the mounting screws are tightened. In the present case the register face 50 is instead held by the marginal fingers or tabs 84 which receive and hold the edges of the plate. One of these tabs, preferably the tab 86, is made yieldable by slitting or incising the metal of plate 62 along the line 104. With this arrangement the register face is readily pressed into place and may be removed by prying the same away from front plate 62 of the frame.

It is important to note that front plate 62 is substantially co-extensive in area with the register face 50, and acts as a backing plate for the register face which stiffens and reinforces the same. This prevents bending or distortion of the register face with consequent extensive cracking or breaking away of the vitreous enamel finish, as frequently takes place with the unsupported register face heretofore employed.

It is believed that the mode of constructing and using, as well as the many advantages of my new register frame, will be apparent from the foregoing detailed description thereof. The frame is light, strong, and economical to manufacture, it being made entirely of sheet metal parts struck to shape in finished form by press operations. The frame includes a front plate which stiffens and reinforces the register face. The register face is secured to the frame without holes or mounting screws, and is instead held by edge receiving tabs one or more of which may be partially severed from the front plate for yieldability. The front plate is detachably mounted on the side plates without the use of screws or like parts, and, in fact, the entire frame is assembled by simple slot and tenon relations, the parts being assembled or interlocked by connections formed directly on and integral with the frame plates.

It will be apparent that while I have shown and described my invention in preferred form, many changes and modifications may be made in the structure disclosed, without departing from the spirit of the invention, defined in the following claims.

I claim:

1. A register frame, said frame comprising front and back plates interconnected and spaced apart by side plates, all of said plates being pressed out of heavy gauge sheet metal, said front plate being readily removably secured to said side plates by undercut tenons formed on the side plates and passing through mating slots in the front plate, said tenons terminating flush with the outer face of the front plate, and one or more of said tenons being split to receive a staking tool, each split tenon being spread in order to lock it within its mating slot.

2. A register frame, said frame comprising front and back plates interconnected and spaced apart by side plates, all of said plates being pressed out of heavy gauge sheet metal, and said front plate being readily removably secured to said side plates by a plurality of undercut aligned tenons formed on each of the side plates and

passing through aligned mating slots in the front plate, one of said tenons being split to receive a staking tool, said split tenon being spread, the plates being so relatively located when the tenon is spread as to lock the several undercut tenons aligned with said split tenon.

3. A register frame, said frame including a rigid flat-surfaced front plate for supporting and reinforcing a register face, said front plate being provided with marginal holding tabs for receiving and gripping the edges of the register face, one of said tabs being formed on a part of the plate partially severed from the remainder of the plate to afford yieldable movement of the tab and thus facilitate insertion or removal of the register face from the plate.

4. A releasable joint between first and second metal plates, the end of the first plate abutting the side of the second, said first plate having a plurality of undercut aligned tenons formed at its end and passing through aligned mating slots in the second plate, one of said tenons being split to receive a staking tool, said split tenon being spread and said first and second plates being so relatively located when the tenon is spread as to simultaneously lock the several undercut tenons within the several mating aligned slots.

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