

March 22, 1960

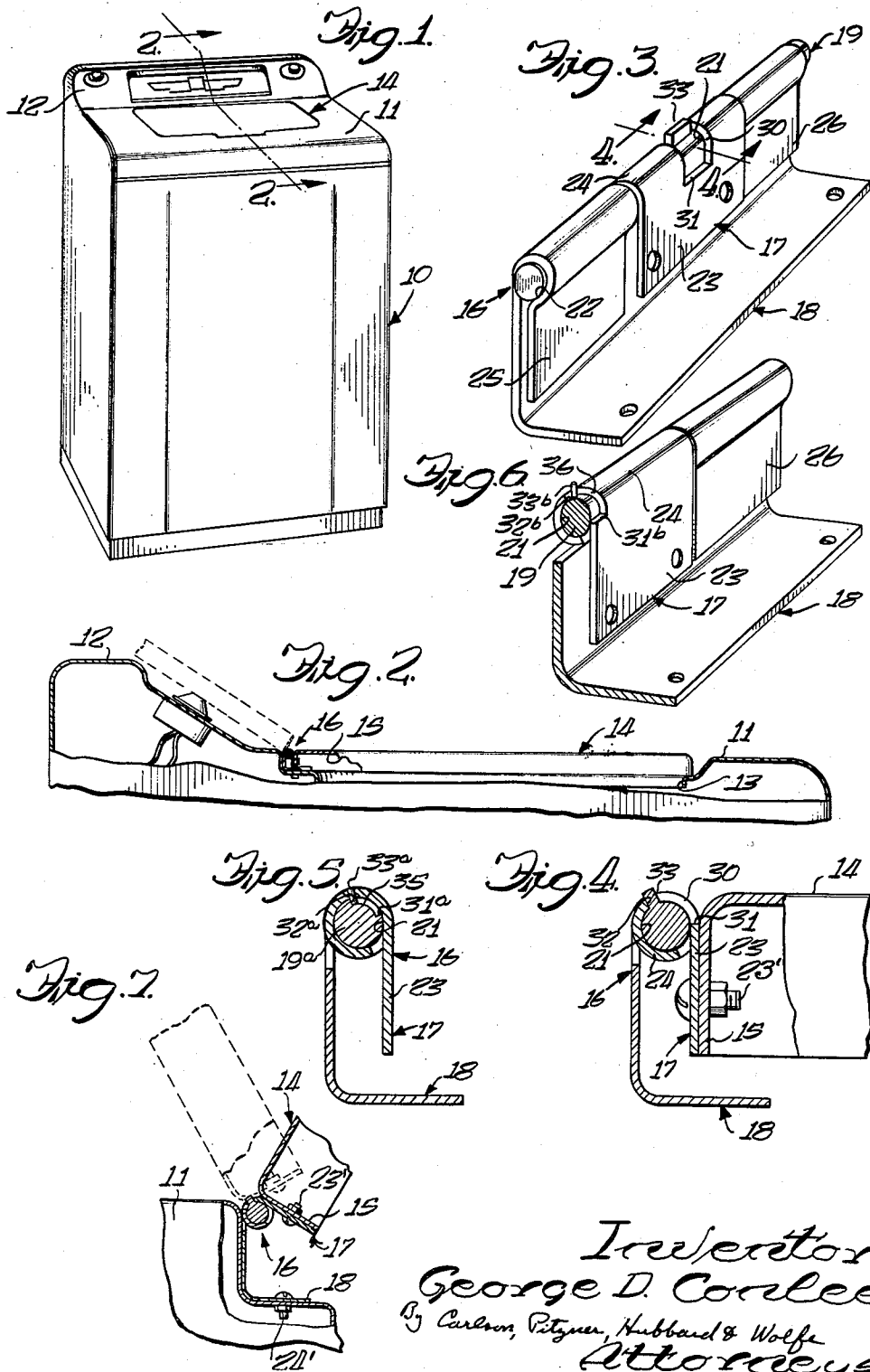
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CABINET HINGE

Filed Nov. 15, 1956

2 Sheets-Sheet 1



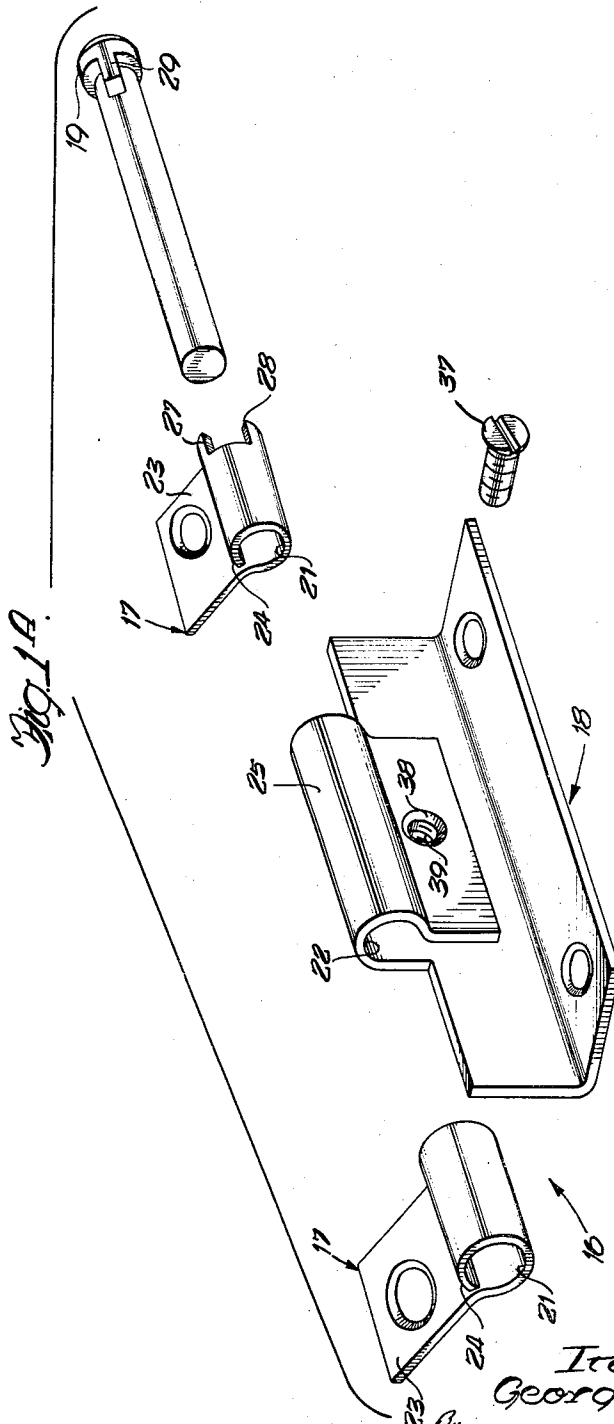
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CABINET HINGE

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7 Claims. (Cl. 16—140)

The invention relates to hinges for use with the swinging lids or doors of cabinets and the like, and it is more particularly concerned with hinges for lids or doors designed to swing about a horizontal axis. The present application is a continuation-in-part of my copending application, Serial No. 562,419, filed January 31, 1956, now abandoned.

One object of the invention is to provide a cabinet door hinge of the above general character which permits the door to swing freely through a major portion of its range of travel and which automatically exerts a restraining action at each end of the swing to prevent the door from slamming against the cabinet in either fully open or closed positions.

Another object is to provide a hinge operative to apply a frictional snubbing or braking force to the door as it swings in either direction beyond predetermined limit positions while leaving the door to swing freely between such limit positions.

Still another object is to provide a hinge in which the snubbing or braking force can be adjusted.

A further object is to provide a simple sturdy hinge for cabinet doors which effectively prevents the door from slamming as it is opened or closed.

Other objects of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of a washing machine cabinet equipped with a lid or door mounted by a hinge embodying the features of the invention.

Fig. 1A is an exploded perspective view of a preferred form of the hinge.

Fig. 2 is a fragmentary sectional view through the top of the cabinet taken in a vertical plane substantially on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of another form of the hinge.

Fig. 4 is a sectional view taken in a plane substantially on the line 4—4 of Fig. 3.

Fig. 5 is a transverse sectional view of a modified form of the hinge.

Fig. 6 is a fragmentary perspective view of still another modified form of the hinge.

Fig. 7 is a fragmentary sectional view of the cabinet taken in the same plane as Fig. 2 but on a somewhat larger scale and showing the limit positions between which the cabinet door swings freely.

While a preferred embodiment of the invention and certain modifications thereof have been shown in the drawings and will be described herein in detail, it is not intended to limit the invention to the specific forms disclosed. On the contrary, the intention is to cover all modifications and adaptations falling within the spirit and scope of the invention as expressed in the appended claims.

By way of illustration, the invention has been shown as installed in a sheet metal cabinet 10 which, in this

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stance, serves as the casing of a washing machine. The cabinet 10 is generally rectangular and has a flat top panel 11 formed with a raised ledge 12 along its rear edge for convenience in mounting certain control elements. An opening 13 (Fig. 2) in the top panel 11 affording access to the interior of the cabinet is fitted with a closure in the form of a lid or door 14 pivoted to swing about an axis adjacent and parallel to the rear edge of the door. The full range of movement of the door is preferably between the closed position shown in full lines in Fig. 2 and the fully open position shown in broken lines in the same figure. The particular door shown is generally rectangular and comprises a sheet metal panel formed with a depending flange 15 around its marginal edge.

To provide for its pivoting or swinging between the closed and open positions, the door 14 is mounted on the cabinet by means of a hinge 16. This hinge comprises two members 17 and 18 adapted to be attached respectively to the cabinet and to the door and connected to each other for relative pivoting movement by a hinge pin or pintle 19 extending through axially aligned sockets 21 and 22 provided on the members. In the particular embodiments illustrated, the member 17 is attached to the cover 14 as by bolts 23' while the member 18 is attached to the cabinet top panel 11 by bolts 24'.

In accordance with the invention the parts constituting the improved hinge are constructed and arranged in a novel manner to permit the members 17 and 18 to swing freely between predetermined limit positions and to exert a restraining force on movement of the members beyond either limit position. Such limit positions, of course, are determined in accordance with the particular range of movement required of the lid or door with which the hinge is to be used and the limits are set so that the free swinging range is somewhat less than the full range of movement between fully open and closed positions.

In carrying out the invention, the hinge pin socket or sockets of one of the members is dimensioned for a relatively loose fit with the pintle so that that member may swing freely thereon. Through the medium of spaced abutments and a cooperating stop provided on those relative swinging parts, such free swinging is restricted within the predetermined limits. Movement beyond either limit position results in the pintle being carried along with the hinge member in a rotating movement.

The pintle socket of the other member is constructed and arranged to apply a frictional resistance to such rotation of the pintle and thus restrict free movement of the hinge member and the door to which it is attached as the door approaches either end of its range of movement. Preferably the arrangement is such that the resistance opposed to rotation of the pintle is sufficient to prevent the door or lid from falling freely of its own weight, yet permitting it to be pushed into open or closed position with relatively little effort.

The hinge members 17 and 18 may be made of any suitable material as, for example, steel or brass, and may be made in various shapes or styles. In the preferred form shown in Fig. 1A of the drawings, the member 17 is made in two parts, each shaped to provide a single socket 21 adapted to be positioned at opposite ends of a socket 22 provided on the member 18. It will be understood that the number and arrangement of the pintle sockets may vary in accordance with the particular use for which the hinge is intended.

Referring in more detail to the hinge construction shown, each part of the member 17 comprises a flat metal plate 23 with one edge portion 24 curled into cylindrical configuration to define the socket 21. It will be understood that the hinge member 17 may be made, if desired, with the two plates 23 constituting a single elongated strip with the sockets 21 suitably spaced apart. In this

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exemplary hinge, the member 18 comprises a flat metal plate bent longitudinally into angular form. One web of this angle is extended in the form of a strap 25 which is curled over to define the socket 22. Alternately, the extended web of the angle member may be centrally slotted to form a second strap 26 spaced from the strap 25 and similarly curled over to define a socket 22 as shown in Fig. 3. For cooperation with that form of hinge member 18, the member 17 is formed with a single socket 24 dimensioned to fit between the spaced sockets 22.

The cooperating stops and abutments which define the free swinging limits of the two hinge members may take various forms and may be variously placed for the performance of their limiting functions. Thus, in the hinge form shown in Fig. 1A, the curled edge portion of one part of the member 17 is notched to define opposed abutments 27 and 28 spaced apart circumferentially of the socket 21 formed by the curled portion 24 of the member. In this case a radially projecting stop 29 is provided on the pintle 19 and located so that it extends into the notch between the abutments when the hinge elements are assembled. As shown, the stop comprises a lug formed integrally with the head of the pintle.

Other arrangements of the stop and abutments are shown in the modified hinge forms illustrated in Figs. 3-7 of the drawings. In the hinge form shown in Figs. 3 and 4, for example, the curled edge portion 24 of the hinge member 17 is formed with a generally centrally located slot 30 defining abutments 31 and 32 spaced apart circumferentially of the socket 21 formed by the curl 24. A stop 33 is provided on the pintle 19 and located so that it projects into or through the slot 30 for cooperation with the abutments alternately as the members 17 and 18 pivot relative to each other about the pintle. The stop shown comprises a lug of rectangular cross-section welded or otherwise rigidly secured to the pintle and projecting radially therefrom. It will be appreciated that a simple pin 33b such as that shown in Fig. 6 may be employed as a stop if desired.

When the abutments 27-28 or 31-32 are provided on the hinge member 17, the socket or sockets 21 for that member are dimensioned to receive the pintle 19 with a relatively loose fit so that the member 17 can swing freely on the pintle until the stop 29 or 33 engages one or the other of the abutments. Further movement of the hinge member 17 carries the pintle along with it, rotating the pintle about its axis in the sockets 22 of the companion hinge member.

In the manufacture of the hinge, the strap 25 forming the socket 22 is bent over far enough to dimension the socket for receiving the pintle 19 with a relatively tight fit. Where a second socket is provided, as in the hinge shown in Fig. 2, the strap 26 is bent over similarly to the strap 25. Preferably the end of the strap or straps are extended along the body of the member and generally parallel thereto. The end of the strap may be left free, as shown in Fig. 3, and the stiffness of the metal relied on to establish and maintain the desired frictional engagement. Preferably, however, means is provided for adjusting the frictional grip of the socket on the pintle to simplify initial assembly of the hinge and provide for compensating for wear in use. While the grip or friction adjusting means may be of any suitable construction, a simple and satisfactory adjusting means for that purpose comprises a screw 37 inserted through a clearance hole 38 in the extended portion of the strap 25 and threaded into a tapped hole 39 in the body or angle web of the member 18. Accordingly, the socket can be contracted to increase the grip on the pintle by simply turning in the screw or the grip can be eased by backing off the screw. The restraining action or frictional drag on the hinged lid may thus be established quickly and easily in the initial assembly of the apparatus and readjustment can be made with a simple screw driver if necessary because of wear in use.

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The dimensioning or adjustment of the socket forming strap or straps is such that the frictional engagement of the socket forming parts and the pintle opposes a substantial resistance to the rotation of the pintle and thus applies a snubbing or braking force to the movement of the hinge member 17 beyond either of the limit positions defined by the two abutments. It will be appreciated, of course, that the abutments can be provided on the socket 22 if desired for cooperation with a stop suitably positioned on the pintle 19. In such cases, the socket or sockets 22 are designed to receive the pintle with a loose fit while the socket 21 is shaped and dimensioned to frictionally resist rotation of the pintle.

The hinge form shown in Fig. 5 differs from that above discussed in that abutments 31a and 32a are provided on the pintle 19a while a stop 33a is provided on the hinge member 17. The abutments, in this instance, are defined by the ends of a suitable groove 35 in the pintle 19a. The stop 33a may constitute a pin or the like driven through an aperture in the curl 24. Alternatively, a stop pin can be provided in either or both of the straps 25, 26 for cooperation with suitably located stops on the pintle. In either case, the hinge members 17 and 18 are freely swingable between predetermined limits and, when swung beyond such limits, the pintle is carried along with the stop-equipped hinge member. The socket or sockets of the other member are dimensioned to frictionally grip the pintle and oppose a substantial resistance to its rotation.

Fig. 6 shows a hinge structure generally similar to that shown in Figs. 3-5. In this instance, however, the stop 33b comprises a pin driven into a suitable hole drilled in the pintle. Abutments 31b and 32b, in this instance, are formed by a notch 36 in one edge of the curl 24. As in the previously discussed hinge forms the abutments may be provided in association with the sockets 22 if desired. In any case, the socket or sockets with which the abutments are associated are dimensioned for a loose fit with the pintle while the other socket or sockets are dimensioned for frictionally gripping the pintle to resist its rotation.

It will be apparent from the foregoing that a hinge constructed in accordance with the invention in any of the forms above described effectively prevents the lid or door with which it is associated from slamming when either opened or closed. The door is left free to swing freely through the major portion of its range of travel and at both ends of that range it is snubbed or braked to prevent the door from falling of its own weight, yet permitting it to be pushed easily into fully open or closed positions. In the case of cabinets of the type shown where the full range of movement of the door is in the neighborhood of 150°, the stops 27-28 or 31-32 are preferably spaced apart to allow a free swing of approximately 110°. Accordingly, the door 14 can be swung freely from the fully open position in which it is resting on the ledging 12 to the partially closed position shown in full lines in Fig. 7. Even though released at that position the door will not fall and slam against the cabinet due to the resistance opposed to the rotation of the hinge pintle. However, a light push easily swings the door the rest of the way to closed position.

From the closed position, the novel hinge permits the door to swing freely to the position shown in broken lines in Fig. 7. Further movement of the door to fully open position requires a light push to overcome the frictional resistance exerted on the pintle. Slamming of the door against the ledge 12 or the controls mounted thereon is thus effectively prevented.

With the hinge shown in Fig. 1A, adjustment of the frictional drag or braking action can be adjusted very quickly and easily with a simple screwdriver. Thus, the drag can be set for proper action with lids of different size or weight without changing the size or construction

of the hinge. Compensation for wear is made in the same way when necessary after a long period of use.

It will be evident from the foregoing that the invention provides a hinge of novel and advantageous construction particularly suitable for doors or lids closing openings in the tops of cabinets. The novel hinge effectively prevents the door from slamming when it is opened and closed and yet offers a minimum of interference to the manual opening and closing of the door. The hinge is simple in construction and thus inexpensive to manufacture. It is rugged and durable and capable of giving troublefree service over long periods of use.

I claim as my invention:

1. A hinge comprising, in combination, a first member and a second member adapted to be secured respectively to two relatively movable structural parts, a pintle and cooperating means on said members connecting the members for relative pivoting movement, cooperating stop and spaced abutment means on the pintle and one of said members, said abutment means being spaced apart a distance considerably less than about 180°, the normal range of movement of one of the members relative to the other, so as to constrain the pintle to rotate with said one member only as the latter is swung beyond either of two limit positions defined by the engagement of the stop and abutment means, the connecting means on the other member coacting with the pintle to frictionally resist without preventing such rotation of the pintle and thereby require the application of additional forces for swinging of the member beyond either limit position.

2. A hinge comprising, in combination, a first member and a second member adapted to be secured respectively to two relatively movable structural parts, said members having adjacent edge portions curled to define axially aligned sockets, means including a pintle extending through said sockets connecting said members for relative pivoting movement, cooperating stop and spaced abutment means on the pintle and one of said members positively constraining the pintle to rotate with said one member only as the latter is swung beyond either of two limit positions defined by the engagement of the stop and abutment means, the socket forming portion of the other member coacting with said pintle to frictionally resist such rotation of the pintle and thereby require the application of additional force for swinging of said one member beyond either limit position and being deformable

for adjusting the frictional resistance opposing rotation of said pintle.

3. A hinge as defined in claim 1 in which the spaced abutment means are provided on the pintle and the cooperating stop means is carried by and movable with said one member.

4. A hinge comprising, in combination, a pair of flat metal members respectively having their edge portions curled to define axially aligned sockets for a hinge pintle, a pintle insertable through said sockets to connect said members for pivotal movement, the curled portion of one of said members being dimensioned for loose fit with said pintle to permit the member to swing freely thereon and having an outwardly opening notch in one end defining a pair of abutments spaced apart circumferentially of the socket, a stop element rigid with and projecting radially from said pintle adapted to enter said notch when the pintle is inserted in the sockets, said element engaging with said abutments alternately as said one member swings relative to said pintle between two limit positions, the socket of said other member being dimensioned to frictionally grip the pintle and oppose a predetermined resistance to its rotation by said one member when it swings beyond either of said limit positions.

5. A hinge as defined in claim 4 including means cooperating with the curled edge portion of the other member for adjusting the socket to vary the frictional grip on the pintle.

6. A hinge as defined in claim 5 in which the adjusting means comprises a screw threaded into the body of the other member and having a head engageable with an extension of the curled edge portion of that member.

7. A hinge as defined in claim 2 in which one of the relatively movable members has its curled edge portion notched to define two spaced sockets and the other movable member has its curled socket defining edge portion dimensioned to fit between the two sockets of said one member.

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