July 7, 1942. J. F. HINES 2,289,269

FLASK CLOSURE

Filed Oct. 16, 1941 2 Sheets-Sheet 1

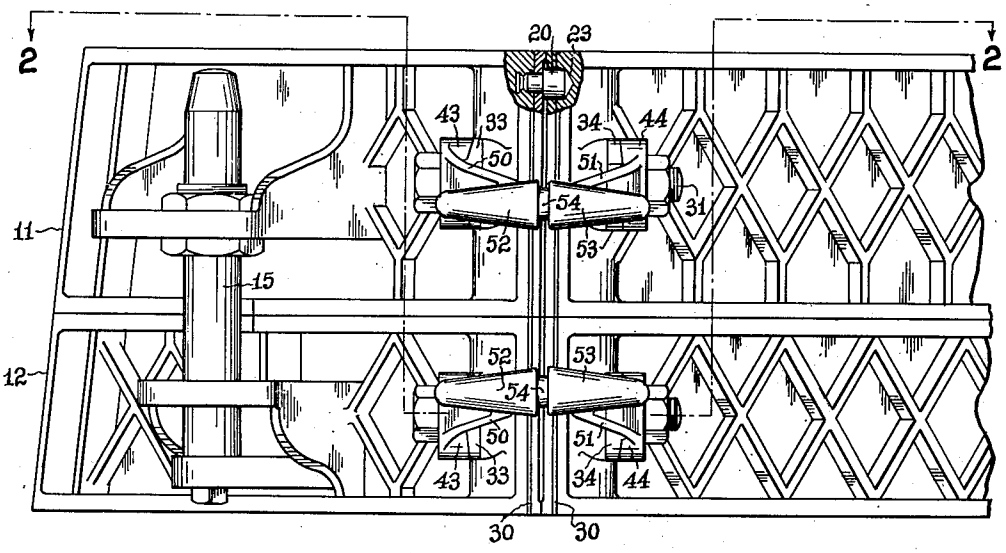



FIG. 1

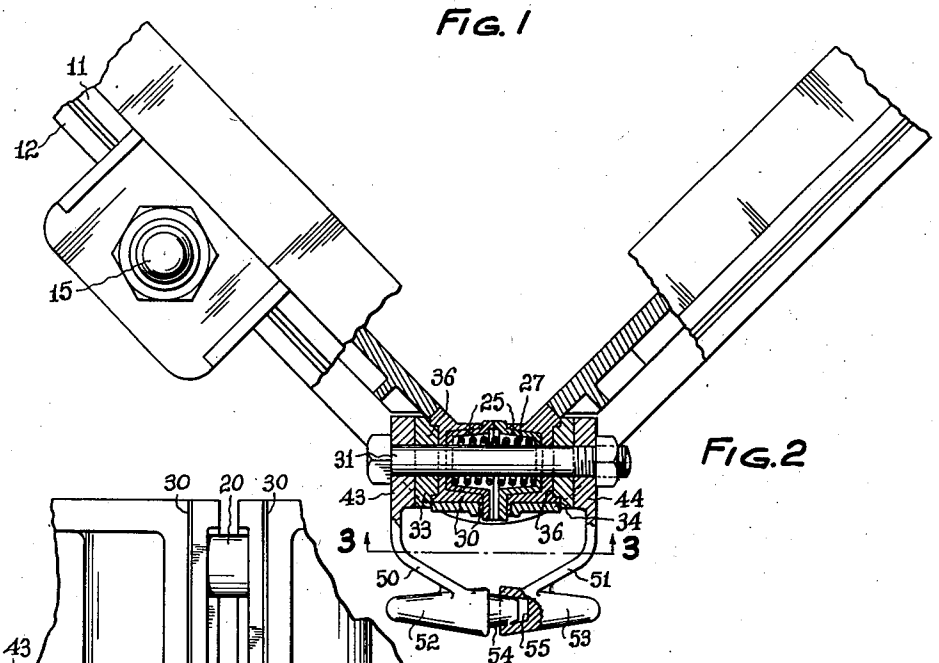



FIG. 2

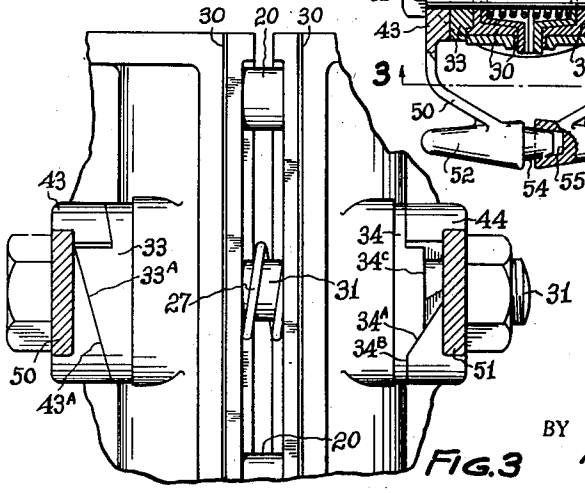



FIG. 3

INVENTOR.
JAMES F. HINES
BY Robert W. Wilson
ATTORNEY.

July 7, 1942. J. F. HINES 2,289,269

FLASK CLOSURE

Filed Oct. 16, 1941 2 Sheets-Sheet 2

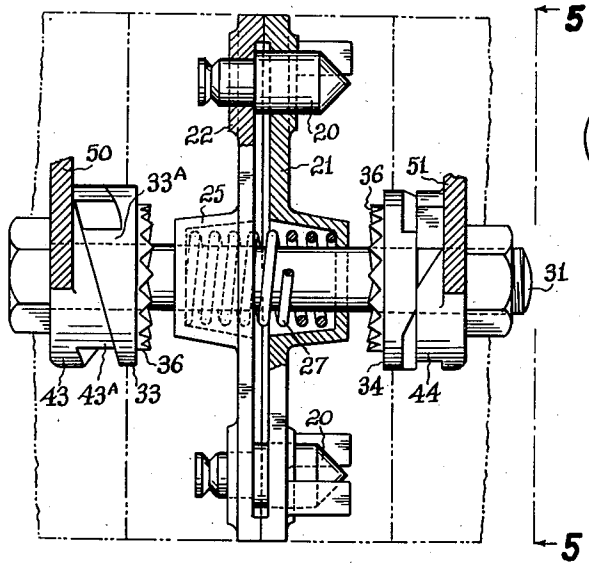



FIG. 4

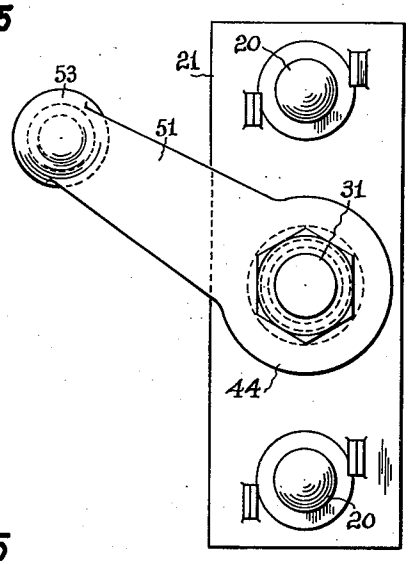



FIG. 5

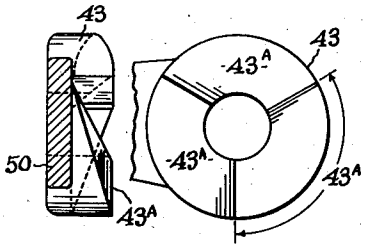



FIG. 6 FIG. 7

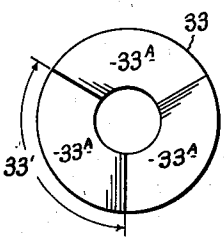



FIG. 8

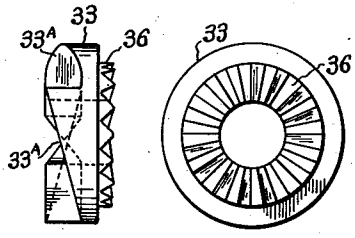



FIG. 9 FIG. 10

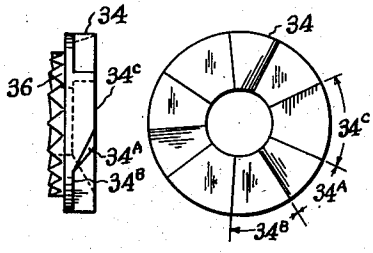



FIG. 11 FIG. 12

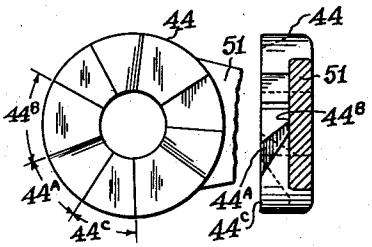



FIG. 13 FIG. 14

INVENTOR.
JAMES F. HINES
BY Robert W. Wilson
ATTORNEY.

Patented July 7, 1942 2,289,269

# UNITED STATES PATENT OFFICE

2,289,269

## FLASK CLOSURE

James F. Hines, Lakewood, Ohio, assignor to Hazel K. Hines, Lakewood, Ohio

Application October 16, 1941, Serial No. 415,321

2 Claims. (Cl. 22—107)

The present application is in part a continuation of my co-pending application Serial No. 346,626, for "Clamp."

This invention is in the field of foundry flasks and aims particularly to provide a clamp for a snap flask, which clamp will lend itself readily to a specific type of flask construction such as illustrated in my Patents 2,223,563 and 2,224,961, applications for which were co-pending with my said application Serial No. 346,626. In this respect the present clamp includes features particularly adapted for incorporation with a preformed wall member by casting and assembly therein and thereto.

The present invention aims to provide a clamp which is particularly adapted for easy assembly in a highly accurate snap flask corner, and in use is particularly intended to impart strong closing pressure at good mechanical advantage and to prevent accidental opening. Simplicity, ruggedness, protection of parts against injury, location of parts out of the way of being struck, ease of assembly, are all included among the purposes of my invention. Other advantages, purposes and results will appear from the description.

A preferred specific embodiment of my invention is shown by way of illustration in the accompanying drawings and is described in the following specification, it being understood that such drawings and description are by way of illustration and not limitation.

In the drawings:

Fig. 1 is an elevation of a flask corner to which my invention is applied, with the parts in closed position;

Fig. 2 is a view partly in plan and partly in horizontal section, taken as indicated by the lines 2—2 of Fig. 1;

Fig. 3 is an enlarged detail in elevation, taken as indicated by the line 3—3 of Fig. 2, but with the parts open;

Fig. 4 is a view also taken on the line 3—3 Fig. 2, but showing the parts closed, this view being partly in elevation and partly in vertical section, with parts broken away, with the clamp assembly shown solid and the flask elements which surround it indicated only by broken lines;

Fig. 5 is an elevation from the left of Fig. 4, as indicated by line 5—5, with parts broken away; and

Figs. 6 to 14 inclusive are details of the cam elements of the clamp, wherein Figs. 6 and 14 are side elevations, with parts in section, Figs. 7, 8, 12 and 13 are face views, Figs. 9 and 11 are side elevations and Fig. 10 is a back view.

For the general organization to which the present invention is applied reference is made to Fig. 1 of my Patent No. 2,223,563 or to Fig. 1 of my Patent No. 2,224,961. In the present drawings only one corner of a flask assembly is shown, it being understood that the diagonally opposite corner will be identical.

In Fig. 1 parts of a cope 11 and drag 12 of a flask are shown, the two parts being secured together by usual methods, such as the pin 15.

In the description for convenience, "wall" is used to mean either a side or an end of either a cope or a drag, "flask section" means two walls connected by an immovable corner, "flask half" means either an entire cope or an entire drag. In the claims "flask" means either a whole flask or a flask half.

The flask sections are herein shown as connected by a corner assembly which is substantially the same as illustrated in Figs. 10 and 11 of Patent No. 2,224,961, but the clamp per se is actuated by crown cams, being in that respect an improvement upon Patent No. 2,223,563. The present invention is directed to the clamp as applied to any suitable corner guiding construction although herein specifically combined with my own construction, which is characterized by dowels 20 associated with plates 21 and 22, such dowels seating in appropriate sockets 23, all as described in detail in Patent No. 2,224,961.

The plates 21 and 22 include oppositely directed hollow transverse bosses 25 which receive opposite ends of a separating spring 27. The entire assembly is set into the flask wall, at the corner, by casting metal therearound, such tie metal being indicated in Fig. 2, reference character 30. A horizontal bolt 31 goes through the bosses 25 and carries on each end a washer 33, 34 each having radial teeth 36 on its back or inwardly directed surface, and each having a crown cammed face outwardly directed, but the cam faces are not identical. As will be seen from Fig. 2, the teeth 36 are embedded in the tie metal 30, thus fixing the washers 33 and 34 against turning. Handle arms 50 and 51 embrace the washers 33 and 34 respectively, such arms terminating in crown cam enlargements 43 and 44 pivoted on bolt 31 and having inwardly directed faces to co-act with the outwardly directed faces of washers 33 and 34 respectively.

Referring now in detail to the cams, those on one end of the bolt, washers 33, 43 in the illustrative examples, have a plurality of teeth (three

as illustrated), which teeth are inclined throughout their entire opposing surfaces 33A, 43A, respectively.

The cams are relatively so set that the cope flask sections are closed by downward movement of their handles composed of handle halves 52 and 53, and the drag flask sections are closed by upward movement of their handles, when the two flask halves are assembled. Thus the gravitational tendency of the handles is toward closing during the mold-making operations of jolting and squeezing.

It is desirable when the clamp is closed that there be no tendency for the flask sections to separate by reason of the inclined surfaces sliding upon one another. Further it is desirable that such avoidance of sliding be obtained by the cam action, without detents, catches, or the like, and not dependent on any variable factors such as the relation between the angle of inclination and the coefficient of friction of the engaged opposed surfaces. To accomplish this purpose one set of cams, (those on 34, 44 in the illustrative embodiment) are faced with flats or dwells connected by inclines. On the washer 34 the low dwells are designated as 34B, the high dwells as 34C, and the inclines as 34A. On the enlargement 44 the low dwells are 44B, the high dwells are 44C, and the inclines connecting them are 44A. As a result of this arrangement, the closing movement of the handle brings the high dwells 34C and 44C into engagement so that the entire outward force due to sand pressure and to the spring 27 is exerted axially, with no circumferential component between 34 and 44. Consequently, it is not possible for the clamp to work itself loose unless the circumferential component of the pressure of 33 upon 43 becomes great enough not only to overcome the friction between inclines 33A and 43A but also to overcome the friction between the opposed dwells of 34C and 44C. Thus the dwells effectively act as a brake against self-opening action.

The handle is composed of two halves each including an arm 50 or 51. Said arms extend radially from the outside cam washers 43 and 44 respectively. These arms curve toward each other and each supports a hand piece 52 or 53. The handle halves are joined together at the hand pieces in a loosely fitting joint which permits some relative movement between the halves. Preferably such joint is composed of a male member 54 projecting from handpiece 52 and loosely fitting into a socket 55 in hand piece 53 as best shown in Fig. 2. Preferably the male member 54 is tapered, and said tapered portion may be slightly convex.

The arrangement of the handle in halves greatly facilitates the assembly of the flask corner. This improved corner is preferably assembled in the flask by fastening the plates 21 and 22 together temporarily without the spring 27 or bolt 31 (usually the friction fit of the dowels 20 is sufficient for this), and then operating as described in my Patent 2,224,961, on page 3 from line 73 of column 1 to line 42 of column 2. Thus accuracy of size of the finished flask is obtained without reliance upon precision of the individual parts. It will be observed that since the cams and the plate assembly are all cast in position with the corner closed, there is a precise relationship of all the parts, and the flask always can be closed to the exact size in use.

The four cam washers are easily assembled in their proper places along the bolt in proper sequence by reason of the handle being made in two parts. Among the advantages of this arrangement is the saving of time when the flask halves are separated for insertion of the spring after the casting operation, since each handle half can be put on as easily as though it were a mere washer, and the two halves easily join at the socket while the corner assembly is being tightened down on the spring.

Having described a preferred embodiment of my invention by way of illustration I do not limit myself thereto. Variations therefrom may be resorted to within the scope of the following claims.

I claim:

1. In a flask of the character having a corner opening and closing assembly comprising two separate plates each cast to one corner of the flask with inner faces toward one another, dowels connecting said plates, a hollow boss on each of said plates, said bosses extending oppositely from one another away from said inner faces and horizontally of the flask, a separating spring within said bosses bearing outwardly in each; the combination which comprises a bolt extending through both said bosses, a pair of opposing crown cams at each end of said bolt, said bolt passing through said cams, said cams being rotatable with respect to said bolt, the inner cams of said pairs being each secured against turning by the cast material which secures the adjacent plate to the flask corner, and a handle connection between the outer cams of said pairs, the cams of at least one pair having opposing inclines and opposing flat sections transverse to the axis of rotation at the tops of said inclines.

2. In a foundry flask of the type having separable corners, with walls adjacent said corners having grooves defined up and down in their ends and plates of the same general height as said walls covering the length of said grooves and held in place by metal cast in said grooves, said plates constituting a pair with opposed faces defining a vertical parting line on a diagonal plane of the flask and guide means associated with said plates to guide the opening and closing of the corners; the combination which comprises a bolt extending through both said plates in the direction of separation of the corner, a pair of co-acting crown cams on said bolt as an axis near each end of said bolt, the cams of at least one pair having opposing inclines with opposing flats at the tops of said inclines, the back of the inner cam of each pair being disposed in the corresponding one of said grooves outwardly with respect to the plate and so held by the metal cast in the groove, an arm fast to each said outer cam extending transversely to the axis of rotation thereof, and a handle connection between said arms divided into two parts by interengaging elements having limited movement relative to one another.

JAMES F. HINES.