No. 801,283.

PATENTED OCT. 10, 1905.

A. L. WEISSENTHANNER.

SHEET METAL STOPPER.

APPLICATION FILED NOV. 18, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

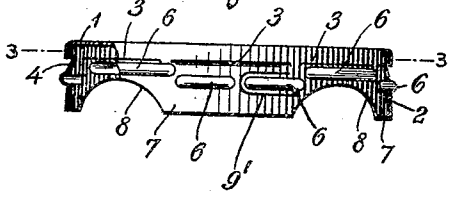


Fig. 3.

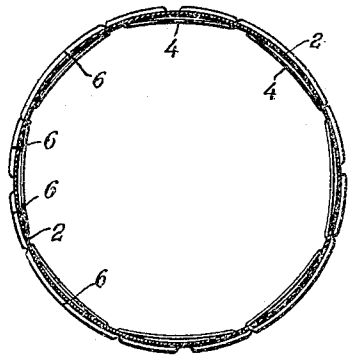


Fig. 2.

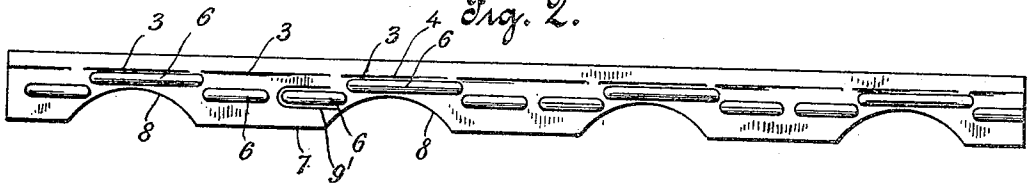


Fig. 4.

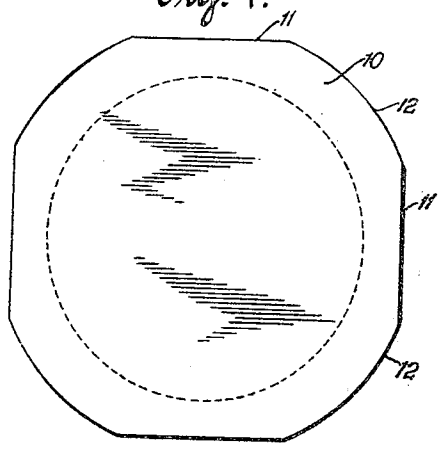
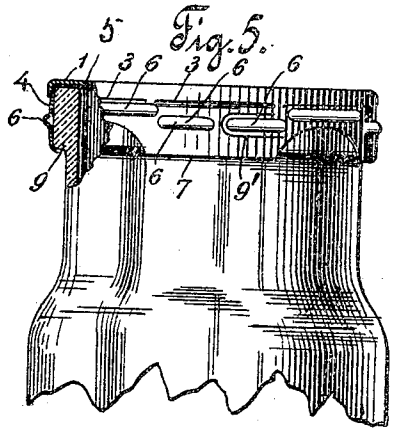


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

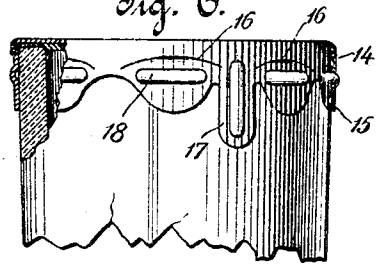


Fig. 9.

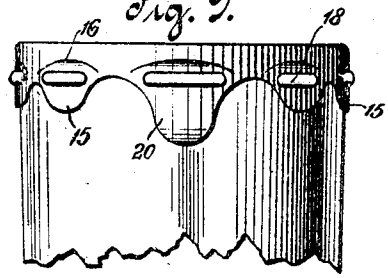


Fig. 7.

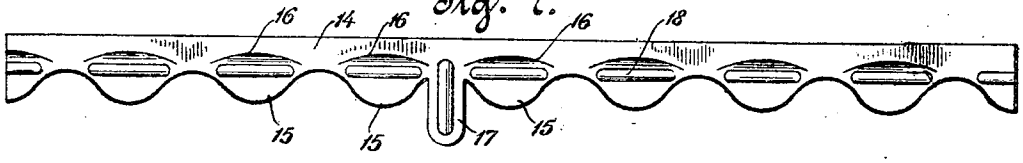


Fig. 8.

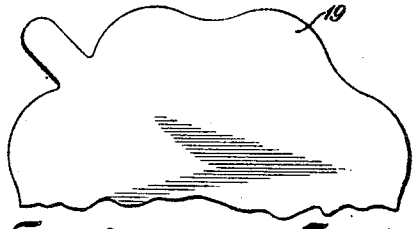


Fig. 10.

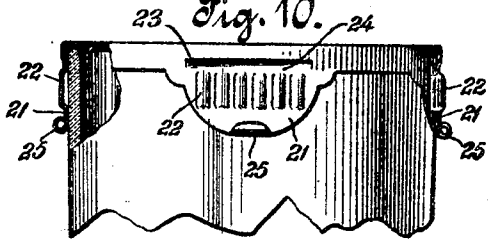


Fig. 13.

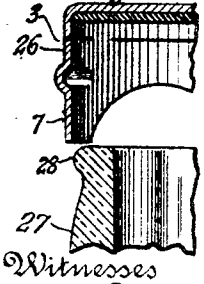


Fig. 14.

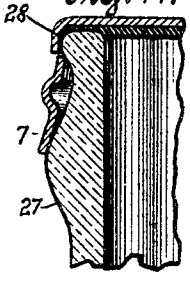


Fig. 11.

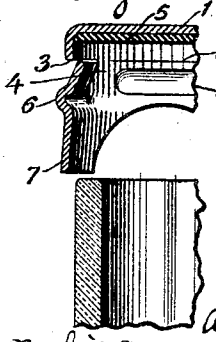
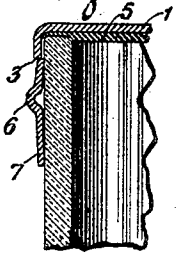


Fig. 12.



Witnesses

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UNITED STATES PATENT OFFICE.

ALFRED L. WEISSENTHANNER, OF NEW YORK, N. Y.

SHEET-METAL STOPPER.

No. 801,283 Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed November 18, 1904. Serial No. 233,352.

To all whom it may concern:

Be it known that I, ALFRED L. WEISSENTHANNER, a citizen of the Republic of France, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Sheet-Metal Stoppers, of which the following is a specification.

My invention relates to sheet-metal stoppers, and more particularly to stoppers having a securing means adapted to grip the surface of a bottle, jar, can, or other receptacle near its mouth and close the same either with or without the intervention of a suitable packing.

My invention has for an object to provide a stopper of the character referred to which may be readily applied to a receptacle and readily removed therefrom without the exercise of special care or skill.

More particularly the objects of the invention are to provide in a stopper of the class referred to a construction whereby the stopper may be applied to a receptacle by hand, or at least without the use of a machine specially constructed to bend or crimp portions of the stopper into locking engagement with the receptacle, although some of the advantages of my invention may be realized where such machines are used for applying the stopper; also, to provide a construction whereby the stopper although applied without the use of a crimping-machine will, nevertheless, be firmly held in place on receptacles which vary somewhat in shape or dimensions, so as to form an effective seal and yet be readily released by the application of comparatively slight force.

It is also an object of my invention to provide a stopper of the character referred to which is simple and cheap in construction.

These and other objects of my invention will more fully appear from the following description.

In accordance with one feature of the invention the stopper is provided with a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange in such manner as to provide a circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth. In accordance with one embodiment of this feature of the invention a plurality of substantially circumferential cuts are provided, a portion of the flange below each of said cuts being disposed within the flange in the manner and for the purpose specified, and according to the preferred construction the flange is stiffened below said inwardly-bent portions, and it is preferably also provided with a circumferentially continuous portion below said inwardly-disposed portions and with a member extending below said circumferentially continuous portion in the vicinity of one or more of said cuts. Preferably, also, said lower circumferentially continuous portion is stiffened and said inwardly-disposed portions and said downwardly-extending members are stiffened in a direction transverse to the circumference of the stopper.

In accordance with another feature of the invention the stopper is provided with means whereby the flange may be readily released from the receptacle, said means preferably being constructed to render the flange circumferentially discontinuous. In accordance with one embodiment of this feature of the invention the means whereby the stopper is released includes a stiffened lever-like tongue or member arranged to multiply the force applied thereto and acting to render the flange of the stopper circumferentially discontinuous.

In accordance with another feature of the invention the stopper is provided with a securing means, including a part constructed to engage the receptacle during the operation of applying the stopper and by reason of such engagement to force another part of the stopper into gripping relation with the receptacle. In accordance with one embodiment of this feature of the invention the securing means comprises a flange having a circumferentially continuous portion arranged between said parts, and preferably said receptacle-engaging parts are stiffened and said intermediate circumferentially continuous portion is stiffened, and means, such as a stiffened tongue or member, is provided for releasing the stopper from a receptacle, as by rendering the flange circumferentially discontinuous.

The invention further consists in the novel parts, improvements, and features of construction herein shown and described.

In order that my invention may be more readily understood, I have in the accompanying drawings, which are referred to herein and form a part hereof, illustrated by way of example several forms of stoppers constructed in accordance with my invention and serving in connection with the descrip-

tion herein to explain the principles of the invention.

Of the drawings, Figure 1 is a side elevation, partly in section, of a stopper constructed in accordance with my invention. Fig. 2 is a diagrammatic view representing the flange of the stopper developed or extended so as to illustrate its full length in a single plane. Fig. 3 is a sectional plan view taken on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the blank from which the stopper of Fig. 1 is formed. Fig. 5 is a side elevation of the stopper of Fig. 1 applied to a receptacle, one side of the stopper and the receptacle being shown in section to illustrate more clearly the construction. Fig. 6 is a similar view of a modified form of stopper applied to a different form of receptacle. Fig. 7 is a view similar to that of Fig. 2, illustrating the flange of the stopper shown in Fig. 6. Fig. 8 is a broken plan view of the blank from which the stopper of Fig. 6 is formed. Fig. 9 is a side elevation of a modification of the stopper shown in Fig. 6. Fig. 10 is a broken side elevation of another form of stopper, embodying some of the features of my invention applied to a receptacle; and Figs. 11, 12, 13, and 14 are sectional fragmentary views drawn to a larger scale and illustrating the action of stoppers embodying certain features of the invention during the operation of applying the same to suitable receptacles.

Referring to the drawings in detail, and more particularly at first to the form of stopper illustrated in Figs. 1 to 5, inclusive, the stopper comprises a top or crown portion 1, having an integral depending securing-flange 2, adapted to pass down over and grip the outer surface of the receptacle adjacent to its mouth. In order that the flange of the stopper may grip any one of the series of receptacles with a suitable degree of force notwithstanding such slight variations in the dimensions or form of the flange-engaging surface of a receptacle as are liable to occur in practice, the flange of the stopper is provided with a circumferentially continuous yielding portion, said portion being necessarily also more or less circumferentially elastic, so that it will permanently grip a receptacle of such size and form as will necessitate a yielding of said portion when the stopper is applied to the receptacle.

In the particular embodiment of the invention illustrated in Figs. 1 to 5, inclusive, the circumferentially-yielding feature of the flange is produced by providing the flange with a plurality of circumferentially-extending cuts 3 and bending a portion 4 of the flange below each of the cuts inwardly, so as to dispose each of said portions 4 within the outer circumferential line of the flange, as indicated at the left in Fig. 1 and in the plan view of Fig. 3 and by the shaded lines in Figs. 1, 2, and 5. The cuts 3 are preferably arranged near the upper edge of the flange, sufficient space, preferably, being provided above the cuts for the reception of a suitable packing material, (indicated at 5 in Fig. 5,) where such packing is employed, and the inwardly-disposed portions 4 are so formed and connected at their opposite ends with the flange as to provide a substantially circumferentially continuous flange portion, which is adapted to yield outwardly in a circumferential direction when the stopper is forcibly applied to a suitable receptacle, so as to cause the flange to grip the exterior surface of the receptacle near its mouth and firmly retain the stopper in place.

It has been found in practice that the effectiveness of the inwardly-disposed portions is materially increased by stiffening the flange of the stopper below said inwardly-disposed portions, and preferably on the substantially circumferentially continuous portion of the flange. This stiffening may be effected in any suitable way. In accordance with the construction illustrated in Figs. 1 to 5, inclusive, this portion of the flange is stiffened by means of a plurality of circumferentially-extending bends or ribs 6. The efficiency of the stopper is also materially increased by providing the flange with a downwardly-extending member, and preferably a plurality of members extending downwardly from the circumferentially continuous portion thereof, said downwardly-extending member or each of them being located in the vicinity of one or more of said circumferential cuts. As shown, the stopper is provided with a series of downwardly-extending members 7, the same being formed by and between a series of recesses 8. During the operation of applying the stopper to a receptacle the outwardly-yielding movement of the inwardly-disposed portions 4 will act through the intermediate circumferentially continuous and preferably stiffened portion of the flange like a lever upon its fulcrum to force the downwardly-extending members 7 inwardly and cause them to grip the surface of the receptacle, and thereby increase the holding power of the stopper.

If desired, the lower ends of the members 7 may be wholly or partly bent inwardly or crimped under a suitable locking-shoulder on a receptacle, as indicated at 9 in Fig. 5, or the flange may be otherwise bent into locking contact with the receptacle by suitable crimping mechanism where greater sealing force is required.

So far as some of the features of my invention are concerned any suitable means may be provided for releasing the flange of the stopper from the receptacle. In accordance with one embodiment of the invention provision is made for readily rendering the flange circumferentially discontinuous along the line or lines of gripping contact. Pref-

erably the flange is weakened at one or more points in a vertical direction, so that it may be easily ruptured, and preferably means are provided for facilitating the rupturing operation. In the particular construction illustrated in Figs. 1 to 5, inclusive, the flange is weakened in a vertical direction partly by means of one of the recesses 8 and partly by a cut 9′, which is extended from a point near the recesses 8 around one of the stiffening-ribs 6 to a point near one end of one of the horizontal cuts 4. By reason of this construction a stiffened tongue or member is provided which is adapted to act lever-like to multiply the force applied to its free end and apply it in such manner as to rupture the slight portions of metal between the opposite ends of the cut 9′ and the adjacent recess 8 and cut 4, so as to render the stopper circumferentially discontinuous at the circumferentially-yielding portion. In some cases it may be desirable to further release the stopper from the receptacle by severing the gripping portion of the flange from the upper portion thereof more or less in a circumferential direction. This is especially desirable where portions of the flange are bent or crimped into locking relation with a shoulder on the receptacle. With this object in view the circumferential cuts 4 are preferably separated at their adjacent ends by slight portions of metal adapted to be easily ruptured, and to facilitate the rupture of these slight portions one of the ribs is preferably extended across and terminated near one side of the slight portion at the end of the corresponding cut 4, so as to form a lever-like member having a fulcrum-point adjacent to the part to be ruptured.

For the sake of economy in construction the flange of the stopper is preferably provided with four recesses and four downwardly-extending portions 7, so that the stopper may be formed of a blank, (shown at 10 in Fig. 4,) having straight sides 11 with rounded portions 12 between them, the straight sides 11 forming the curved recesses 8 and the curved portions 12 forming the downwardly-extending portion 7 when the blank is passed through the dies. It will be seen that this blank may be formed of a minimum amount of metal and may be cut from the sheet with a minimum of waste.

In accordance with the modified construction illustrated in Figs. 6, 7, and 8 the flange 14 of the stopper is provided with a greater number of downwardly-extending portions 15 and the circumferentially-extending cuts are slightly curved. As shown, one circumferential cut 16 is provided for each downwardly-extending portion 15, and the opposite ends of the cut are extended so close to the walls of the recesses between the downwardly-extending portions that the metal between the ends of the cut and the recesses may be easily ruptured by forcing the lower end of the downwardly-extending portion outwardly, thereby rendering the stopper circumferentially discontinuous and releasing it from the receptacle. In accordance with the preferred construction, however, a special downwardly-extending stiffened member or tongue 17 is arranged at one or more points in such manner that the metal at the adjacent ends of the adjacent cuts 16 may be ruptured, so as to release the stopper. In this construction, as in the previous ones, the portion of the flange below each of the cuts 16 is disposed within the flange to form a substantially circumferentially continuous yielding portion adapted to grip the exterior surface of the receptacle. A substantially circumferentially continuous portion of the stopper below said yielding portion is preferably stiffened also by circumferential ribs 18, one rib being arranged between each of the circumferential cuts and the corresponding downwardly-extending portion 15. Blank 19, from which this stopper is made, is illustrated in Fig. 8. It will be seen that this blank also may be readily cut from a sheet of metal without great waste, the curved projections of one blank extending within the recesses of the adjacent blank.

The construction illustrated in Fig. 9 is similar to that illustrated in Fig. 6 with the exception that instead of a special depending releasing member or tongue 17, stiffened by a rib, the stopper in Fig. 9 is provided with a depending member 20, which is somewhat longer and is of somewhat greater circumferential extent than the other depending members 15, said member 20 preferably being bent somewhat outwardly at its lower end, so as to form a more convenient releasing device than the smaller depending members 15.

In accordance with the form of stopper illustrated in Fig. 10 a series of short vertically-arranged ribs 22 are provided between each of the horizontal cuts 23 and the corresponding downwardly-projecting portion 21, said ribs preferably extending from a point substantially within the circumferentially continuous portion of the stopper below the horizontal cuts downwardly and serving in part to force the portion 24 of the flange below the cuts 23 inwardly to provide a substantially circumferentially continuous yielding portion adapted to grip the exterior surface of the receptacle near its mouth, partly to stiffen the flange of the stopper along its substantially circumferentially continuous line below said yielding portion and partly to stiffen the downwardly-projecting members 21 in the direction of their length. In accordance with this construction also the metal between the opposite sides of each of the downwardly-extending portions 21 and the opposite ends of the corresponding cut 23 is so slight that it may be readily ruptured by forcing the lower end of the downwardly-extending portion 21

outward. To facilitate this operation, the lower ends of the downwardly-extending portions 21 are preferably provided with beads 25, presenting rounded surfaces adapted to be grasped by the fingers.

An important feature of my invention consists in the provision in a sheet-metal stopper of securing means, including a part constructed to engage the receptacle during the operation of applying the stopper, and by reason of such engagement to force another part of the stopper into gripping relation with the receptacle. In accordance with each of the forms of the invention illustrated the inwardly-disposed portion or portions of the flange forming a part of the circumferentially continuous yielding portion of the stopper constitutes a part constructed to engage the receptacle during the operation of applying the stopper, and by reason of such engagement to force another part—to wit, the downwardly-extending portions of each of the stoppers illustrated—into gripping relation with the receptacle. This operation is rendered apparent by the diagrammatic views of Figs. 11 and 12, in which is illustrated the operation of applying the form of stopper shown in Figs. 1 to 5, inclusive, to a receptacle. In Fig. 11 the stopper is shown in position to be applied to the receptacle, the parts being shown on an enlarged scale and their relative positions somewhat exaggerated to illustrate more clearly the operation. It will be seen that while the downwardly-extending part 7 is in position to slide easily from the outer surface of the receptacle, the inwardly-disposed part 4 will strike the upper edge of the receptacle and will be forced outwardly when the stopper is pressed home to the position shown in Fig. 12. As the inwardly-extending part 4 is pressed outwardly, however, it will act to force the downwardly-extending part 7 inwardly, the portion of the flange formed by said inwardly and downwardly extending parts being deflected or twisted slightly along its intermediate line like a lever on a fulcrum until the lower end or some other portion of the downwardly-extending part 7 comes in contact with the surface of the receptacle. The portion of the flange between the parts 4 and 7 being on a substantially circumferentially continuous line of the stopper and preferably being stiffened by one or more of the ribs 6, and thus prevented from yielding outwardly, will form a rigid fulcrum-like portion, so that the portion of the flange, including the parts 4 and 7, will be more or less straightened out in its vertical direction to conform more or less to the size and contour of the exterior surface of the receptacle and add by the pressure developed to the securing or gripping action of the circumferentially yielding portion of the stopper. It is to be observed that this feature, as well as other features of my invention, may be carried out by constructions other than those herein shown and described and independently of other features of the invention. For instance, the lever-like gripping action resulting from the engagement of one part of the securing means of the stopper with the surface of the receptacle may be embodied in a construction not having a circumferentially continuous yielding portion formed partly by said receptacle-engaging part. In Figs. 13 and 14 a construction of this character is diagrammatically illustrated. The stopper shown in these figures is substantially the same construction as that illustrated in Figs. 11 and 12, except that the portion 26 of the flange beneath the cut 3 is not bent inwardly, so as to be disposed within the flange. This stopper is adapted to carry out the present feature of the invention when applied to a receptacle having an outwardly-extending surface 27 formed at such a point as to engage the downwardly-extending member 7 of the stopper when the latter is applied to the receptacle. It follows from this construction that when the stopper is forced onto the receptacle the downwardly-depending member or members 7 will be forced outwardly, and the portion of the stopper, including the member 7 and the part 26, will be deflected or twisted at the intermediate circumferentially continuous and substantially unyielding portion of the flange in such manner as to force the part 26 into gripping relation with the receptacle. Where it is desired to retain the stopper on the receptacle with considerable force, a lip 28 may be provided on the receptacle at such point as to be engaged by the upper edge of the part 26.

Another important feature of the invention consists in the provision in a sheet-metal stopper of securing means, including a part constructed to engage the receptacle during the operation of applying the stopper, and by reason of such engagement to force another part of the stopper into gripping relation with the receptacle, said parts of the stopper being stiffened in such manner as to cause them to grip firmly the surface of the receptacle. In each of the stoppers illustrated in Figs. 1 to 9, inclusive, the parts constituting this lever-like gripping feature of the stopper are stiffened in the direction of their length or transversely to the fulcrum-line. In each case the inwardly-disposed portion of the flange adapted to engage the receptacle, and also the downwardly-extending member which is forced into gripping relation with the receptacle through the action of the inwardly-disposed portion, are of such circumferential extent as to be materially stiffened in a direction transverse to the circumferential line of the stopper by reason of their curvature. Each of said parts, moreover, but particularly the inwardly-disposed part, is materially stiffened also by the circumferential ribs, which are formed in the circumferentially continuous in-

termediate portion of the flange between said parts. In the form of the device illustrated in Fig. 10 the inwardly-disposed portion 24 of the flange, as well as the downwardly-extending portion 21, is stiffened partly by reason of its great circumferential extent or curvature and partly by the presence of the vertical ribs 22.

It is to be understood that my invention in its broader aspects is not limited to the particular construction shown and described herein nor to the particular construction or constructions by which the invention has been or may be carried into effect, as many changes may be made in the details of the construction without departing from the main principles of the invention and without sacrificing its chief advantages.

Having thus described my invention, what I claim as novel, and desire to secure by Letters Patent, is—

1. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, and a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted without crimping to grip the exterior surface of a receptacle near its mouth.

2. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, and a portion of the metal below said cuts being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted without crimping to grip the exterior surface of a receptacle near its mouth.

3. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and said flange being stiffened below said inwardly-disposed portion.

4. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and said flange being stiffened in a circumferential direction below said inwardly-disposed portion.

5. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and said flange being stiffened by a circumferential rib below said inwardly-disposed portion.

6. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a portion of the metal below said cuts being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and said flange being stiffened below said inwardly-disposed portions.

7. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a portion of the metal below said cuts being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and said flange being stiffened by circumferential ribs below said inwardly-disposed portions.

8. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, and a member extending below said circumferentially continuous portion in the vicinity of said cut, said member being adapted to grip the receptacle without crimping.

9. A sheet-metal stopper having a securing-flange, said flange having a plurality of substantially circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, said members being adapted to grip the receptacle without crimping.

10. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, and a gripping member extending below said circumferentially continuous portion in the vicinity of said cut, said gripping member being stiffened in a direction transverse to said cut.

11. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, and a gripping member extending below said circumferentially continuous portion in the vicinity of said cut, said gripping member being of such circumferential extent as to be stiffened by its curvature in a direction transverse to said cut.

12. A sheet-metal stopper having a securing-flange, said flange having a plurality of substantially circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of gripping members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, said gripping members being stiffened in a direction transverse to said cuts.

13. A sheet-metal stopper having a securing-flange, said flange having a plurality of substantially circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth.

14. A sheet-metal stopper having a securing-flange, said flange having a plurality of substantially circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, said downwardly-extending members being stiffened in the direction of their length, and a portion of the flange below each of said cuts being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth.

15. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, and a member extending below said circumferentially continuous portion in the vicinity of said cut, said flange being stiffened along said circumferentially continuous portion between said cut and said downwardly-extending member.

16. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, and a member extending below said circumferentially continuous portion in the vicinity of said cut, said flange being stiffened by a circumferential rib or ribs along said circumferentially continuous portion between said cut and said downwardly-extending member.

17. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, and a member extending below said circumferentially continuous portion in the vicinity of said cut, said flange being stiffened along said circumferentially continuous portion between said cut and said downwardly-extending member, and said downwardly-extending member being stiffened in the direction of its length.

18. A sheet-metal stopper having a securing-flange, said flange having a plurality of substantially circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, said flange being stiffened along said circumferentially continuous portion and said downwardly-extending members being stiffened in the direction of their length, and a portion of the flange below said cuts being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth.

19. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and means whereby said flange may be readily released from the receptacle.

20. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and means whereby said flange may be readily rendered circumferentially discontinuous to release the stopper from the receptacle.

21. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, and a portion of the flange below said cut being disposed within the flange providing a substantially circumferentially continuous yielding flange portion adapted to grip the exterior surface of a receptacle near its mouth, and a stiffened tongue whereby said flange may be readily rendered circumferentially discontinuous to release the stopper from the receptacle.

22. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a circumferentially continuous portion below said cut, a member extending below said circumferentially continuous portion in the vicinity of said cut, said flange being stiffened along said circumferentially continuous portion between said cut and said downwardly-extending member, and a stiffened tongue whereby said flange may be rendered circumferentially discontinuous to release the stopper from the receptacle.

23. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange, said inwardly-disposed portion being stiffened in a direction transverse to said cut.

24. A sheet-metal stopper having a securing-flange, said flange having a substantially circumferential cut, a portion of the flange below said cut being disposed within the flange, and said inwardly-disposed portion being of such circumferential extent as to be stiffened in a direction transverse to said cut by reason of its curvature.

25. A sheet-metal stopper having a secur-

ing-flange, said flange having a plurality of substantially circumferential cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said inwardly-disposed portions being stiffened in a direction transverse to the corresponding cut.

26. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said downwardly-extending members and each of said inwardly-disposed portions being stiffened in a direction transverse to the corresponding cut.

27. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said downwardly-extending members and each of said inwardly-disposed portions being of such circumferential extent as to be stiffened in a direction transverse to the corresponding cut by its curvature.

28. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said downwardly-extending members and each of said inwardly-disposed portions being stiffened in a direction transverse to the corresponding cut, and said flange being stiffened along said circumferentially continuous portion.

29. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said downwardly-extending members and each of said inwardly-disposed portions being of such circumferential extent as to be stiffened in a direction transverse to the corresponding cut by its curvature, and said flange being stiffened by circumferential ribs along said circumferentially continuous portion.

30. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a circumferentially continuous portion below said cuts, and a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said downwardly-extending members and each of said inwardly-disposed portions being stiffened in a direction transverse to the corresponding cut, and means whereby the flange may be rendered circumferentially discontinuous to release the stopper from a receptacle.

31. A sheet-metal stopper having a securing-flange, said flange having a plurality of circumferential cuts, a circumferentially continuous portion below said cuts, a plurality of members extending below said circumferentially continuous portion, each in the vicinity of one of said cuts, a portion of the flange below each of said cuts being disposed within the flange, each of said downwardly-extending members and each of said inwardly-disposed portions being of such circumferential extent as to be stiffened in a direction transverse to the corresponding cut by its curvature, and said flange being stiffened by circumferential ribs along said circumferentially continuous portion, and a stiffened tongue whereby the flange may be rendered circumferentially discontinuous to release the stopper from the receptacle.

32. A sheet-metal stopper having a securing means including a gripping part and a part constructed to engage the receptacle during the operation of applying the stopper and by reason of such engagement to force said gripping part into operative position.

33. A sheet-metal stopper having a depending securing-flange, said flange including a gripping part and a part constructed to engage the exterior surface of the receptacle near its mouth during the operation of applying the stopper and by reason of such engagement to force said gripping part into operative position.

34. A sheet-metal stopper having a securing-flange, said flange including a stiffened gripping part and a stiffened part constructed to engage the exterior surface of the receptacle near its mouth during the operation of applying the stopper and by reason of such engagement to force said gripping part into gripping relation with the exterior surface of the receptacle.

35. A sheet-metal stopper having a securing-flange, said flange including a stiffened gripping part and a stiffened part constructed to engage the exterior surface of the receptacle near its mouth during the operation of applying the stopper and by reason of such engagement to force said gripping part into gripping relation with the exterior surface of the receptacle, and said flange having a circumferentially continuous portion between said parts.

36. A sheet-metal stopper having a securing-flange, said flange including a stiffened gripping part and a stiffened part constructed to engage the exterior surface of the receptacle near its mouth during the operation of applying the stopper and by reason of such engagement to force said gripping part into gripping relation with the exterior surface of the receptacle, and said flange having a stiffened circumferentially continuous portion between said parts.

37. A sheet-metal stopper having a securing-flange, said flange including a stiffened gripping part and a stiffened part constructed to engage the exterior surface of the receptacle near its mouth during the operation of applying the stopper and by reason of such engagement to force said gripping part into gripping relation with the exterior surface of the receptacle, said flange having a stiffened circumferentially continuous portion between said parts, and means whereby said flange may be rendered circumferentially discontinuous to release the stopper from the receptacle.

38. A sheet-metal stopper having a securing-flange, said flange including a stiffened gripping part and a stiffened part constructed to engage the exterior surface of the receptacle near its mouth during the operation of applying the stopper and by reason of such engagement to force said gripping part into gripping relation with the exterior surface of the receptacle, said flange having a stiffened circumferentially continuous portion between said parts, and a stiffened tongue whereby said flange may be rendered circumferentially discontinuous to release the stopper from the receptacle.

39. A sheet-metal stopper having a circumferentially-yielding securing-flange adapted without crimping to grip the exterior surface of a receptacle adjacent to its mouth, said flange having a circumferentially-weakened part and a vertically-weakened part whereby it may be readily released from the receptacle.

40. A sheet-metal stopper having a circumferentially-yielding securing-flange adapted without crimping to grip the exterior surface of a receptacle adjacent to its mouth, said flange having a plurality of circumferentially-extending cuts separated by portions adapted to be easily ruptured whereby it may be readily released from the receptacle.

41. A sheet-metal stopper having a circumferentially-yielding securing-flange adapted without crimping to grip the exterior surface of a receptacle adjacent to its mouth, said flange having a plurality of circumferentially-extending cuts separated by one or more portions adapted to be easily ruptured, and said flange being vertically weakened within the limits of one of said circumferentially-extending cuts whereby the stopper may be readily released from the receptacle.

42. A sheet-metal stopper having a circumferentially continuous yielding securing-flange adapted without crimping to grip the exterior surface of a receptacle adjacent to its mouth, said flange having a plurality of circumferential cuts, and means whereby said flange may be readily rendered circumferentially discontinuous to release the stopper from the receptacle.

43. A sheet-metal stopper having a circumferentially continuous yielding securing-flange adapted without crimping to grip the exterior surface of a receptacle adjacent to its mouth, and a stiffened member whereby the stopper may be readily released from the receptacle.

44. A sheet-metal stopper having a circumferentially-yielding securing-flange adapted to grip the exterior surface of a receptacle adjacent to its mouth and a stiffened member whereby the flange may be readily released from the receptacle.

45. A sheet-metal stopper having a circumferentially-yielding securing-flange adapted to grip the exterior surface of a receptacle adjacent to its mouth, said flange having circumferentially-extending weakened parts and a stiffened member whereby the stopper may be readily released from the receptacle.

46. A sheet-metal stopper having a circumferentially-yielding securing-flange adapted to grip the exterior surface of a receptacle adjacent to its mouth, said flange having circumferentially-extending cuts separated by one or more portions adapted to be easily ruptured, and a stiffened member to facilitate the rupture of said portions.

47. A sheet-metal stopper having a depending securing-flange, said flange having a circumferentially continuous yielding portion and a part extending below said yielding portion, and means whereby said downwardly-extending part is forced inwardly when the stopper is applied to the receptacle.

48. A sheet-metal stopper having a depending securing-flange, said flange having a circumferentially-yielding portion and a part extending below said circumferentially-yielding portion, means whereby said downwardly-extending part is forced inwardly when the stopper is applied to a receptacle, and means whereby the stopper may be readily released from the receptacle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED L. WEISSENTHANNER.

Witnesses:

EDWIN SEGER,

J. H. FREEMAN.