R. P. HERON & E. SABO.

CASTER.

APPLICATION FILED FEB. 3, 1910.

1,099,045.

Patented June 2, 1914.

3 SHEETS—SHEET 1.

Fig. 1.

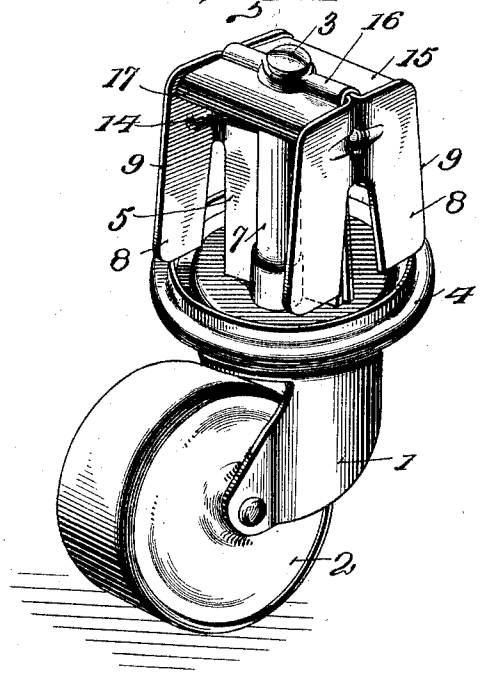


Fig. 2.

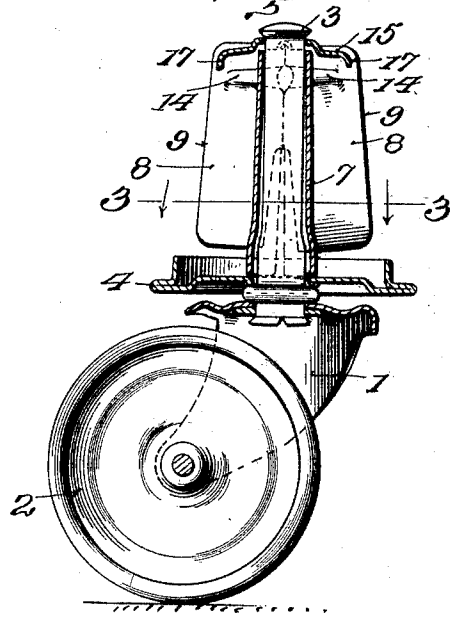


Fig. 3.

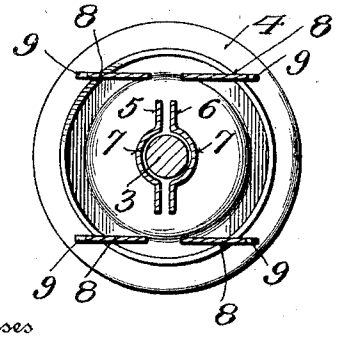
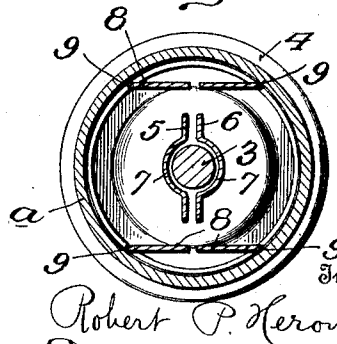


Fig. 4.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 5.

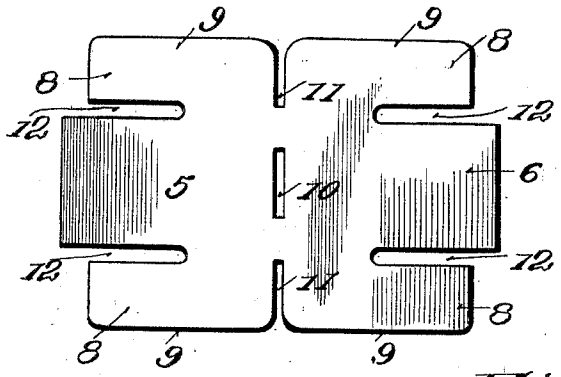


Fig. 7.

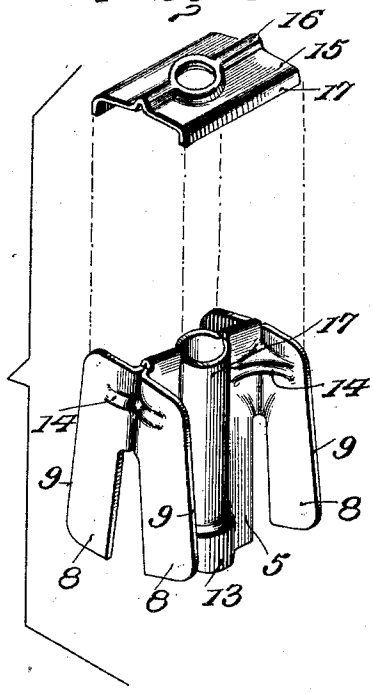
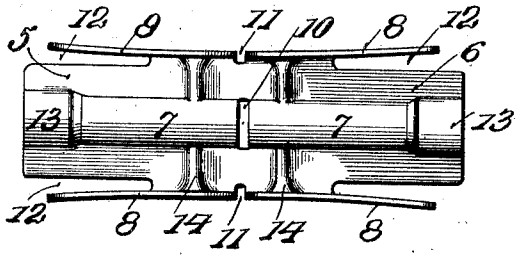


Fig. 6.



Witnesses

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3 SHEETS—SHEET 3.

FIG. 8.

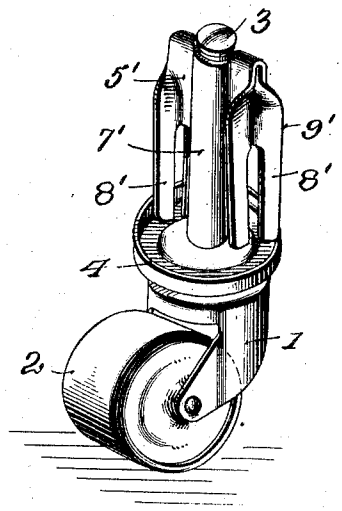


FIG. 9.

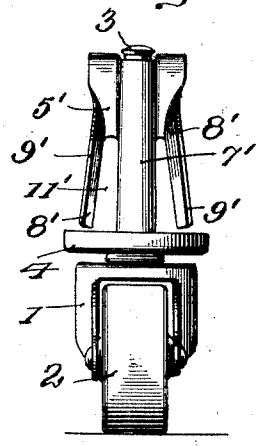


FIG. 10.

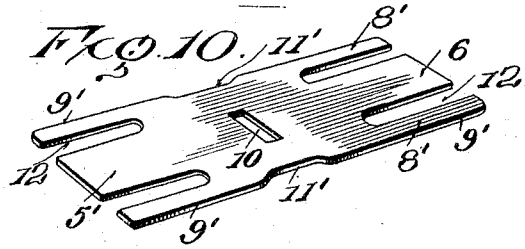


FIG. 11.

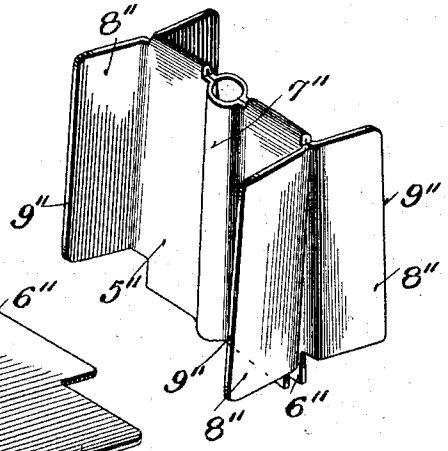
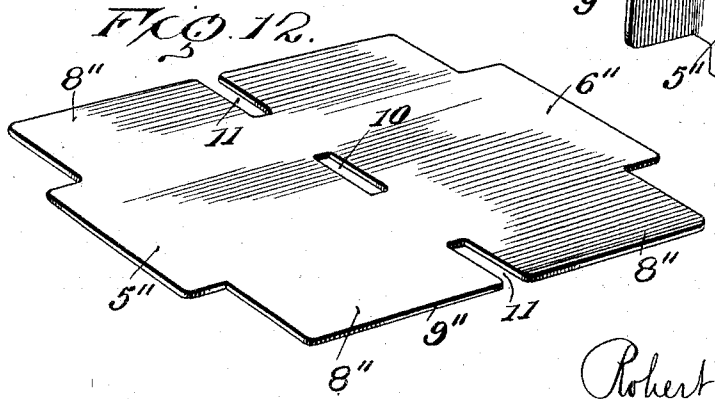


FIG. 12.



Witnesses

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ROBERT P. HERON AND EDMUND SABO, OF SYRACUSE, NEW YORK.

CASTER.

1,099,045. Specification of Letters Patent. Patented June 2, 1914.

Application filed February 3, 1910. Serial No. 541,736.

To all whom it may concern:

Be it known that we, ROBERT P. HERON and EDMUND SABO, citizens of the United States, and residents of Syracuse, in the county of Onondaga, State of New York, have invented certain new and useful Improvements in Casters, of which the following is a specification.

Our invention relates to casters and has reference more particularly to casters designed for use in tubular legs and to novel retaining frames therefor.

In some respects our construction is similar to that covered by the patent to Clark, 656,628, August 28, 1900, but, while for this reason it may, from one point of view, be regarded as an improvement on Clark, it differs radically not only from Clark but also from all other prior art of which we have knowledge and so far as this difference is concerned is broadly new. The respect in which our construction is similar to that of Clark is in the formation of the retaining frame and socket tube out of a sheet of metal having two corresponding portions each of which is similarly dished longitudinally and is provided with corresponding wings, the frame being formed by bending the two portions together. Our construction differs from the entire prior art, however, in having retaining wings presenting an edge to the interior of the tubular leg and yieldable substantially edgewise. The wings lie in substantially the plane in which they are impelled to move by the compressive force, so that the said force does not, to a material extent, tend to bend them around a fold, and there is substantially no such tendency even where the wings have a considerable forward set so that the free lower ends of the wings have some inward movement with respect to their upper part. The engaging edge and the fold of a given wing are in substantially the same plane. The importance of this distinctive arrangement will be more apparent, when it is recalled that in most prior constructions the reaction of the spring was secured by so applying the compressive force thereto that it tended to bend the spring about a fold, so that undue compression or expansion destroyed the resilience of the spring. It should be noted also that, where springs have been provided with edges for contact with the interior of tubular legs, the construction has been such that the action of the compressive force was not in substantially the plane of the spring but tended generally to turn the spring around the fold as a center. In other words, the force was applied in such a manner that the resistance of the spring to it was weak, the force acting in general transversely rather than edgewise or in the plane of the spring. To avoid the danger of spoiling the spring by careless handling stops were provided to limit the movement of the free portions of the frame, but the danger though lessened still remained. Our invention, on the contrary, meets the difficulty in a radical manner by removing the cause, the wings of the retaining frame in our construction not being subject to strains which tend to destroy their resilience, this quality not being secured by movement of the wing back and forth around a fold. Our construction is proof against careless handling without the necessity of the use of stops and to an extent not possible, even where stops are employed. The great stiffness of this construction and its power to resist edgewise pressure will be apparent. The manner in which the wings move depends largely on the amount of sidewise set or flare and the amount of forward set (see Figs. 6 and 7) the former tending to produce strictly edgewise movement and the latter inward movement, but neither having any material tendency to turn the wing about its fold. In some cases the movement may be solely edgewise; in others it may be also inward. The phrase "substantially edgewise" used in some of the claims is therefore not to be construed with mathematical exactness. Moreover other claims state the structure without reference to the mode of operation and applicants wish it to be clearly understood that they claim such structure whatever its mode of operation.

Our invention may be embodied variously and we have illustrated in the drawings three of its embodiments, it being understood that no attempt has been made to exhaust the forms which it might take. In the preferred forms the wings are made resilient by cutting away the metal between the wing and the body of the frame leaving only a short fold to connect them. Where this is done, the two portions of the frame may be folded into contact throughout their entire length, the wings being relied on to furnish all the resilience. On the other hand the portions of

the retaining frame may be connected only at the top fold and may be left permanently open to the bottom thus securing the desired resilience, the construction being such that the two halves are never closed. We prefer, however, except in the small sizes, to pinch the two portions of the frame firmly together to the bottom of the wing folds and let them flare outward below that point.

Our invention therefore consists of the caster, certain embodiments of which are shown in the drawings, and in the structure hereinafter described and more particularly pointed out in the appended claims.

Referring to the drawings: Figure 1 is a perspective view of the preferred form of our caster. Fig. 2 is a central elevation mainly in section. Fig. 3 is a horizontal section on line 3—3, Fig. 2 showing the wings in the position they occupy before insertion into the tubular leg. Fig. 4 is a view similar to Fig. 3 except that the retaining frame is shown in position in the tubular leg, the wings being compressed. Fig. 5 is a plan view of the blank for the retaining frame. Fig. 6 is a plan of the formed blank. Fig. 7 is a perspective view of the completed retaining frame, the brace being shown out of its regular position for clearness. Fig. 8 is a perspective view of another embodiment of our invention applied to a small caster. Fig. 9 is a side elevation of the retaining frame thereof. Fig. 10 is a perspective view of the blank for the retaining frame of the caster shown in Figs. 8 and 9. Fig. 11 is a perspective view showing another embodiment of our invention. Fig. 12 is a perspective view of the blank therefor.

Referring to Figs. 1–7, which illustrate the preferred form of the invention and the way in which it is made—The horn 1 carries the caster wheel 2, rotatably mounted therein in the usual manner and the pintle 3 on which is loosely mounted the leg supporting disk or plate 4. Above the disk is located the retaining frame which receives the pintle and in the embodiments illustrated forms a socket tube therefor. This frame has two corresponding portions 5 and 6 each of which is similarly dished longitudinally at 7 to form a partial tube and is provided with wings 8 each portion having two corresponding wings folded at an angle thereto. The frame has sufficient play so that the pintle may rotate freely with reference to it. We prefer to provide a hole in the said frame for the pintle and to head the pintle above it. The frame is formed by folding together the two corresponding portions. When in position the frame is symmetrical with respect to a diametrical plane through the leg supporting disk and pintle. It will be noted that, when the two parts of the frame are folded into position, the wings are arranged in corresponding pairs, back to back at each side of the pintle, each pair consisting of two angular wings arranged fold to fold and extending in opposite directions from the folds. These wings present edges 9 to the interior of the tubular leg (Fig. 4) to engage the same frictionally and lie in substantially the plane in which the compressive force acts, the line of fold and the edge being in substantially the same plane, and the wings presenting themselves edgewise, or substantially so, to the compressive force. The angle of the wings need not, however, be precisely 90°, but the arrangement is such that there is no material tendency for the wing to bend around its fold. What has been said thus far is applicable to all the embodiments of the invention illustrated.

The manner of making the retaining frame, and the features of construction peculiar to the preferred form of our invention will be better understood on reference particularly to Figs. 5, 6 and 7 which show the retaining frame in the various stages of its manufacture. Between the portions 5, 6 of the blank is the slot 10 to receive the end of the pintle, and between the ends of the wings 8 the metal is cut away at 11. The wings are, moreover, separated for a considerable part of their length from the body of the blank, the metal being cut away as shown at 12. The first step in the manufacture of the retaining frame is cutting out the blank, the second is forming the blank, and the third is folding it together. After the first blank has been cut out and fed forward, a new blank is cut out at the same time that the blank cut out on the previous stroke is formed. The formed blank is shown in Fig. 6 and has in each portion 5, 6 the dished part 7 extending lengthwise from the slot 10 to the opposite edge. To give plenty of room for the lower part of the pintle, the dished portions 7 may be embossed or enlarged somewhat at 13. It will be noted that, at the same time that each portion of the body is dished, the wings are bent at an angle to the body of the blank and are flared slightly as shown in Fig. 6. At this time also the lines on which the wings are folded are strengthened by the formation of transverse creases and corresponding ribs 14 extending from the metal of the body into that of the wings. The final step is the bending together of the two portions 5, 6 of the blank which results in the formation of the retaining frame as shown in Fig. 7. To secure the greatest strength and rigidity, we prefer to pinch the two portions of the retaining frame into firm and permanent contact as far down as the wing folds extend. As already stated, the wings of each pair are flared slightly so that the edges 9 are oblique.

The construction described is sufficiently resilient, while being exceedingly rigid. It may, however, be made even stronger and more rigid by the employment of a brace 15 in the shape of a plate grooved at 16 to fit the fold at the top of the retaining frame, surrounding the pintle and extending edgewise between the two pairs of wings, thus bracing both. The strength of the brace is increased and its appearance improved by turning down the free edges to form depending flanges 17. It may, if desired, be imperforate covering the top of the pintle and being held in place frictionally. A complete retaining frame with brace is illustrated in Fig. 7.

Referring to Figs. 8, 9 and 10, which show an effective form of our invention applied to a small caster, and the blank therefor—The blank is cut away at 11′ between adjacent wings 8′, the cut being shallower but longer than in the blank of Fig. 5 and curving outward more gradually. The metal of the two portions 5′, 6′ is cut away from the inner edge of each wing to the edge of what is to be the dished portion 7′. The retaining frame is formed as before by folding together the two formed portions each having the dished part 7′ extending from fold to edge. As shown we pinch the upper part of the frame at least to the bottom of the wing folds firmly and permanently together, leaving the ends of the wings 8′ free and flaring them outward from the pintle as indicated. In this form the wing fold is substantially vertical but is curved at the top out to the edge and the metal is flared so that a very strong and rigid construction is secured. The resilience of the frame thus resides solely in the wings whose ends are free to move toward each other, their upper parts being however rigid. These wings have edges 9′ to engage the interior of the tubular leg.

Referring now more particularly to the embodiments shown in Figs. 11 and 12:—the retaining frame has corresponding portions 5″, 6″, similarly dished at 7″ and each of which has angular wings 8″ having edges 9″ to engage the interior of the tubular leg. The frame in this form of the invention is folded together, but is never completely closed except at its top fold, thus securing resilience. Owing to the construction, however, there is no need for the provision of any stops to limit the movement of the frame. It will be apparent that the frictional edges are oblique when the caster is not in place in the leg. The retaining frame in this form of the invention may be described as a double channel iron, the members of which are arranged back to back, and it possesses the well known strength of a beam of that character. The manner in which the frame is formed has been described in connection with another embodiment and will be clear from an examination of Figs. 11 and 12. The wings may, if desired, be provided with transverse strengthening ribs extending nearly but not quite to the frictionally engaging edge.

It will be apparent that in all the embodiments shown the wings are yieldable substantially edgewise and that the application to them of compressive force does not tend to destroy their resilience.

It is to be noted further, as to the forms shown in the first ten figures, that the lower ends of the wings are free and that, where the two parts of the frame are pinched together to the bottom of the wing folds, there is no tendency of the wings to move around the top fold. While we regard this particular construction as highly desirable, we do not wish to be understood as limiting ourselves to wings arranged at precisely a right angle to the body of the frame or located mathematically in the plane in which the compressive force acts, the claims being designed to be of such breadth as to cover not only the constructions shown but all other embodiments of the invention.

What we claim is:

1. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having a body and wings folded at an angle thereto, each wing presenting an edge to the interior of the tubular leg to engage the same frictionally, the engaging edge and the wing fold lying in substantially the plane in which the compressive force impels the wing to move.

2. A sheet metal retaining frame for casters for tubular legs having wings folded at an angle thereto, extending lengthwise of the leg, presenting an edge to the interior of the tubular leg to engage the same frictionally and yieldable individually each in substantially its own plane.

3. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, a retaining frame having wings folded to an angle therewith, each yieldable individually and presenting an edge to the interior of the tubular leg to engage the same frictionally, and means for preventing movement of the wings around their folds.

4. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame receiving said pintle, having its body arranged symmetrically with respect to a diametrical plane through the leg supporting plate and pintle, and having wings located at an angle to said plane and yieldable substantially edgewise toward said plane.

5. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having two corresponding portions similarly dished lengthwise and folded to form a socket tube for the pintle, each of said portions having angular wings extending lengthwise of the leg from a point well up on said pintle to a point well down toward said plate and presenting an edge to the interior of the tubular leg lengthwise thereof to engage the same yieldably and frictionally.

6. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame provided with pairs of individually yieldable angular wings extending lengthwise of the leg from a point well up on said pintle to a point well down toward said plate, said pairs being located back to back on opposite sides of the pintle, each wing being folded at an angle to the frame and presenting an edge to the interior of the tubular leg to engage the same frictionally, the members of each pair being arranged fold to fold, and extending in opposite directions therefrom.

7. A sheet metal retaining frame for casters for tubular legs having two corresponding portions each similarly dished, the said portions being folded to form a socket tube for the pintle, said frame having corresponding pairs of angular wings arranged fold to fold, the members of each pair extending in opposite directions from the lines of fold, and being yieldable toward each other.

8. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having two corresponding portions similarly dished and folded at the top of the frame to form a socket tube for the pintle, each of said portions having wings folded at an angle thereto adjacent the line on which the portions are folded and extending downward lengthwise of the tubular leg, wings of one portion being arranged fold to fold with wings of the other portion and the wings of the pairs thus formed extending from said folds in opposite directions and presenting edges to the interior of the tubular leg to engage the same frictionally.

9. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having two corresponding portions similarly dished and folded to form a socket tube for the pintle, and having oppositely disposed angular wings folded on substantially vertical lines and each presenting an edge to the interior of the tubular leg to engage the same frictionally, the said folds extending along only a portion of the wings and the other ends thereof being free and separate from the body of the frame.

10. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having two corresponding portions similarly dished and folded together to form a socket tube for the pintle, each portion having a pair of angular wings oppositely disposed to the wings of the other portion, the said wings being attached to the body of the frame only near their upper part and having their lower part separate from the body of the frame and free to yield.

11. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, a retaining frame having two corresponding portions similarly dished and folded together to form a socket tube for the pintle, each portion having a pair of angular wings oppositely disposed to the wings of the other portion, the said wings being attached to the body of the frame only near their upper part and having their lower part separate from the body of the frame and free to yield, and a brace for the upper ends of said wings.

12. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, a retaining frame having two corresponding portions similarly dished and folded together to form a socket tube for the pintle, each portion having a pair of angular wings oppositely disposed to the wings of the other portion, the said wings being attached to the body of the frame only near their upper part, having their lower part separate from the body of the frame and yieldable toward each other, and a brace plate extending edgewise near the tops of the wings and abutting on the inner faces of the wings.

13. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having a body and wings folded therefrom and presenting each an edge to the interior of the tubular leg to engage the same frictionally, said wings having one end immovable and the other free and yieldable edgewise each in substantially its own plane.

14. A retaining frame for casters for tubular legs comprising a piece of sheet metal having corresponding portions similarly dished and folded together, each portion having wings bent at an angle thereto along lines forming wing folds, said wings extending lengthwise of the tubular leg and connected with said portions through only a

part of the length of the wings leaving the other end of each wing free, strengthening ribs being provided transverse of said wing folds.

15. A retaining frame for casters for tubular legs formed by folding together a sheet of metal having corresponding portions similarly dished, the portions extending downward from said fold, and having wings attached to each portion near the top thereof and folded at an angle thereto, extending downwardly and having their lower ends free, the upper part of the frame being pinched firmly together to bring the corresponding lines of fold into juxtaposition, and the wings extending edgewise in opposite directions therefrom and presenting edges to the interior of the tubular leg to engage the same frictionally.

16. A caster for tubular legs having in combination with a caster wheel, horn and pintle, a leg supporting plate surrounding the pintle, and a retaining frame having two corresponding portions similarly dished lengthwise and folded to form a socket tube for the pintle, said portions having substantially radial extensions, said extensions having wings extending lengthwise of the tubular leg and presenting an edge to the interior of the tubular leg lengthwise thereof to engage the same yieldably and frictionally.

Signed by us at Syracuse, Onondaga Co., N. Y., this 29th day of January, 1910.

ROBERT P. HERON.
EDMUND SABO.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."