April 7, 1953 M. A. MILLIGAN 2,634,153

LADLE CONSTRUCTION

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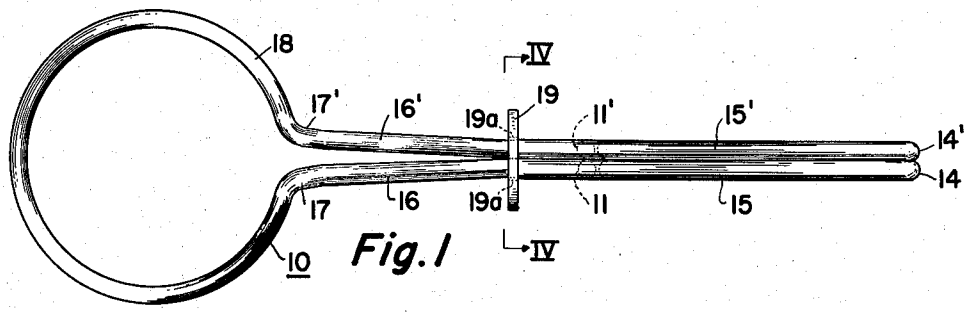


Fig. 1

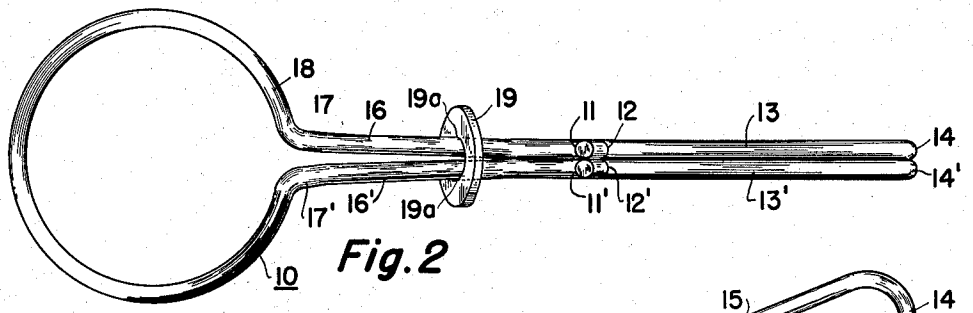


Fig. 2

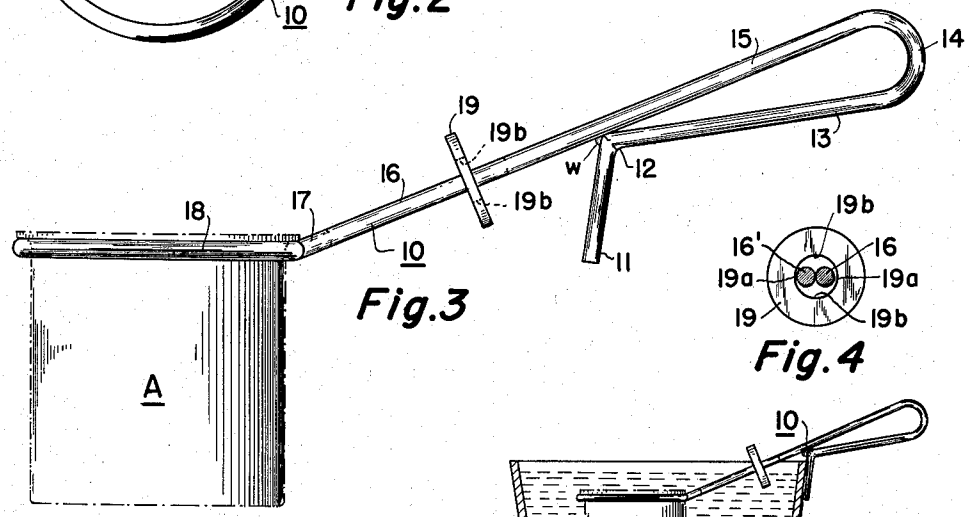


Fig. 3

Fig. 4

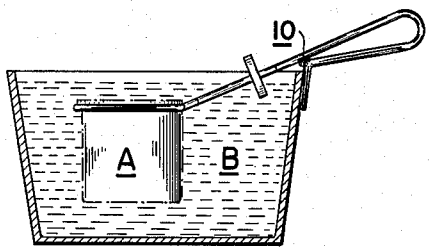


Fig. 5

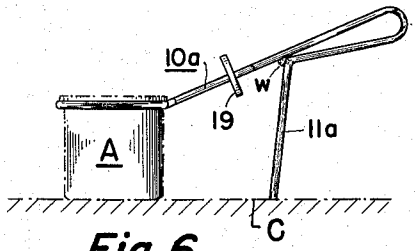


Fig. 6

INVENTOR.
Martin A. Milligan
BY Green, McCallister & Miller
HIS ATTORNEYS

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LADLE CONSTRUCTION

Martin A. Milligan, Washington County, Pa.

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5 Claims. (Cl. 294—31.2)

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This invention relates to ladles for handling materials such as liquids. More particularly, the invention relates to a detachable handle device or construction adapted to form a ladle with a suitable container.

Previous to the present invention, in laying furnace fire brick, it has been customary to employ a group or a series of different size sheet metal ladles for pouring the so-called "soup" which is made up of fire clay in liquid form. This soup is employed to secure or seal up the joints between fire brick, such as employed in metal and glass melting and annealing furnaces. The soup has to be poured accurately to avoid an excess and must be poured promptly where emergency repairs are being made on a furnace during its operation. For example, a hole may develop in an open hearth furnace and must be repaired immediately if damage to the melt is to be avoided. If the bricks are not sealed accurately and promptly the high temperature and the air causes them to disintegrate. Thus, suitable ladles are needed which can be conveniently handled by the operator in effecting the pouring of the soup from the outside of a hot furnace when it is in operation and for pouring it accurately, regardless of whether it is or is not in operation. Such ladles are employed both for new work in making blast, annealing and melting furnaces and for repairing such furnaces.

The sheet metal type of ladle, as now used, is relatively expensive and bulky and presents a problem in its utilization. In the first place, its container and handle parts are integral and when one part wears out, the whole must be discarded. In the second place, the handle part has to be of different lengths for different furnace building and repair jobs even where the required capacity of the container part is the same. Also, different capacities of ladles are required for different jobs and there is no definite relation between container part capacity requirements and handle length requirements. As a result, a large selection of ladles having different handle and container sizes has to be kept on hand. By way of example, one job may require a half gallon container (pour) capacity and another may require a tea cup container capacity; also, there is no definite relationship between a required handle length for a given job and the pour capacity required for the job. Such ladles create a storage and handling problem, due to the large number required and their bulky construction.

My present invention was devised to provide a new and improved ladle construction which would

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be relatively inexpensive, will meet the requirements of the art, and be capable of more effective and simplified utilization.

It has thus been an object of my invention to provide a new and improved form of ladle construction and particularly, a detachable handle therefor;

Another object has been to provide a solution to the problem heretofore presented in the utilization of old type ladles of various sizes;

These and many other objects of my invention will appear to those skilled in the art from the description of my illustrated embodiments and from the appended claims.

In the drawings,

Figure 1 is a top plan view of a device constructed in accordance with my invention;

Figure 2 is a bottom plan view of the device of Figure 1 showing its tension part slightly compressed;

Figure 3 is a side view in elevation of the device of Figures 1 and 2 as employed with a container to provide a ladle;

Figure 4 is an end section taken along the line IV—IV of Figure 1;

Figure 5 is a reduced view in elevation through a material container and illustrating a principle of operation of my ladle device;

And Figure 6 is a reduced view in elevation showing the employment of a slightly modified form of my invention.

In carrying out my invention, I employ a carrying device 10 formed from a relatively heavy wire or rod-like metal piece having flexibility when employed singularly, but having rigidity when doubled with its doubled portions in an abutting relationship. The piece is shaped upon itself in such a manner as to provide a double thickness limit flange part, a double thickness loop handle part, a flexible spread or tension part, and a ring-like container-supporting or gripping part. It will be noted that the flexible spread or tension part has double portions extending from an abutting relationship adjacent the handle part and diverging outwardly in a spaced-apart relationship towards the gripping part in such a manner that the flexibility of single length wires is obtained and enhanced in the tension part.

A tension adjustment means or element is slidably mounted on the tension part over its opposed length portions adjacent the handle part and is adapted to be advanced along the diverged length portions towards the ring part to securely position, grip, or mount a container A within the ring part.

The construction is such that various depth capacities of containers A may be employed with the same device. If a larger diameter container is required, then I prefer to employ another device having a corresponding larger ring part. But in any event, the number of ladles required for a given operation is greatly reduced, and each device is of such a construction that a number of them can be quickly detached from their containers after a job has been completed and carried to a new location in an ordinary tool bag. The ring part of the device is constructed on a horizontal plane and the other parts thereof slope on a vertical plane upwardly therefrom in such a manner that, as shown in Figure 5, the container A may be dipped on a horizontal plane into a material container B and lifted thereout filled-up to its brim. Thus, an accurately measured quantity of soup is insured for the pouring operation. The construction also facilitates maintenance of a suitable level of the material in the container B and discourages any attempt to scrape undissolved precipitates from the bottom of the container B or to use a partially filled ladle or dipper in connection with the work. Since the size of the ladle is selected for the definite requirements of a job, difficulty will be encountered if it is not completely filled up.

In a modified construction of Figure 6, I extend the flange part so that the ladle when filled may be placed upon a table or floor level C along with other ladles of different sizes. In this manner, the workman can quickly pick up and utilize a ladle of the proper size requirement for a particular portion of the job.

Referring particularly to Figures 1, 2 and 3 of the drawings, the device 10 comprises a flange part which is made up of opposed and abutting end portions 11 and 11' of the rod-like piece that extend vertically downwardly at an angle such that the flange part lies substantially on the vertical plane of a side wall of the material container B, see Figure 5. The end portions 11 and 11' extend upwardly and are connected by bends 12 and 12' to bottom, somewhat horizontally and backwardly-projecting, abutting, under or bottom length portions 13 and 13' which form a lower portion of the handle part. The under portions 13 and 13' lie on a plane that slopes backwardly and upwardly from a horizontal plane and are connected by back loop portions 14 and 14' to top length portions 15 and 15'. The portions 13 and 13' and 14 and 14' are in an abutting relationship and with the portions 15 and 15', define the handle part. The upper length portions 15 and 15' slope downwardly on an inclined plane of a greater angularity than the bottom portions 13 and 13' and in the same plane as connected gripping-force-generating portions 16 and 16' of the tension part. The top and bottom portions of the handle part converge towards the outer angle formed by the bends 12 and 12' and are shown secured together by weld metal *w* to further insure a rigid handle construction.

As noted particularly in Figures 1 and 2, the length portions 16 and 16' of the tension part have an outwardly-diverging, spaced relationship with respect to each other that increases from the handle part. The portions 16 and 16' slidably receive a clamping-force-generating slide means or disc-like adjusting element 19.

The element 19, as shown in Figures 1, 2, 3 and 4, is of flat, washer-like construction to provide an abutment face and has a circular bore therethrough of two parts, one of which 19*a* (horizontal or transverse) provides a minimum slide clearance transversely of the length portions 16 and 16', and the other of which 19*b* (vertical) has a spaced relationship with such length portions. In this manner, the slide element 19 provides a tight gripping action between the opposed walls of the bore 19*a* and a pivot action between the opposed walls of the bore 19*b*, thus permitting the element 19 to exert a full holding action and at the same time pivot about its holding axis when it strikes any object such as the wall of the material container B.

The portions 16 and 16' terminate in connecting portions 17 and 17' which together define the spread or tension part of the device and which integrally connect such part to the grip annulus or ring part 18. The portions 17 and 17' have a greater spread angle with respect to each other than the portions 16 and 16' and serve to increase the gripping flexibility of the device in view of the rather strong construction of the rod-like metal from which they are formed. In addition, they define a limit stop for the maximum advance of the adjustable clamping element 19. As a result, the portions 17 and 17' represent a limiting factor in the diameter of the container A which can be utilized with a particular size of my device, although they place no limitation on the depth dimension of such container. The ring part 18 is adapted to extend around the upper flange of the container A and hold it without any pivot or tilting action securely in position within the device 10.

The portions 11 and 11' of the device representing the flange part provide a protective limit stop for the hands of an operator when the device is being used. They control the dipping action, as shown in Figure 5, to retain the container A in a horizontal position when soup is being removed from the container B. They also provide a limit stop for the maximum backward slide of the element 19 and with the bends 12 and 12', limit tension action to the tension part.

The backward upward slope of my device 10 from its carrying ring part 18 along with the flange part insures a horizontal dipping and pouring utilization of the ladle. Heavier portions of the material tend to settle to the bottom of the container B and are not of a requisite consistency for the pouring operation.

In the modified construction of Figure 6, the device 10*a* is of substantially the same construction and utilization as the device of Figures 1 to 5, except that the portions 11*a* and 11*a*' of the flange part are given an increased length such that the ladle can rest upon a table or the floor C without spilling any of its contents or, in other words, to retain the mouth of the container A in a substantially horizontal position.

It will be apparent that the gripping or holding action of my device as effected by the element 19 and the spread or tension part, depends essentially on friction and by reason of the previously described construction, is entirely foolproof. The unitary enclosed construction of the ring part 18 further insures against loosening the container A while material is being poured. Also of particular importance, the handle part has no effect upon the gripping action, regardless of how tightly the operator grips it and there is no danger of a release of the holding action of the element 19 from this standpoint. The device 10 is so constructed that when assembled with a container A, its center of gravity (with and without the container being filled) tends to cause the

container to seek a horizontal plane. These features are all important in providing a successful device which will be fool-proof in its utilization of a separate container and will, at the same time, be capable of quick detachment from such container. It thus eliminates the necessity for especially constructed ladles which are of relatively heavy construction and for this reason, are difficult to manipulate by the operator, are expensive in initial cost, and are bulky from a transportation standpoint.

As will be noted in the embodiment of Figure 6, the portions 11*a* and 11*a'* of the limit flange part project downwardly in a vertical plane a distance which corresponds substantially to the height of the container A plus the vertical height of the upper end of the tension part or, in other words, the height of the point of connection *w* between the lower end portion of the handle part. As a result, the lower end of the limit flange part lies on substantially the same horizontal plane as the bottom portion of the container A.

It will be noted that I employ a gradual and smooth slope of divergence for the tension part such that the element 19 will slide easily therealong to produce a suitable gripping action on the container A. Also, the diameter of the ring part is such that the container A is loose or free within it when the element 19 is in the starting position of Figure 1. I have found that about three or four handles constructed in accordance with my invention will take the place of twenty-five or more old type ladles and will, with suitable container cans, provide a much greater selection of ladle sizes.

What I claim is as follows:

1. In a relatively rigid ladle construction to support a collecting container and dip out a requisite quality of soup-like work material from a batch container, and for pouring the material from the connecting container in repairing joints between brickwork, the combination of a ring-like supporting part in a substantially horizontal plane for the carrying container, an under-looped relatively rigid handle part, and a flexible tension part integrally connected between said first-mentioned parts; said tension part and a top portion of said handle part inclining in a vertical plane upwardly from said supporting part, said handle part having the under-looped portion that connects its said top portion to a bottom portion thereof, said bottom portion extending in a plane from said loop portion into abutment with an underside of said top portion at a point behind a point of termination of said tension part, said handle and tension parts being defined by dual portions of a relatively heavy integral wire length which are in an abutting relationship along said handle part and are in a spaced-apart relationship of smoothly-sloped increasing-divergence towards said supporting part along said tension part, an abutment-face-defining adjustment element having an open-end bore of a diameter substantially corresponding to a minimum transverse dimension of the dual portions of said tension part to slide along said tension part and flex such dual portions inwardly towards each other to increase the gripping action of said supporting part, a limit flange part to abut the batch container during the dipping-out of the work material, and said limit flange part being defined by dual-abutting portions of the wire length and being integrally connected by a joint to an inner end of said bottom portion of said handle part to project downwardly therefrom.

2. A construction as defined in claim 1 wherein, said bottom portion of said handle part is welded to the underside of said top portion at its point of abutment therewith.

3. A construction as defined in claim 1 wherein, said adjustment element is of flat washer-like construction and has a horizontal bore portion to closely abut the doubled portions of said tension part and a vertical bore portion that is of substantially greater depth than a vertical section across said tension part to permit said element to pivot vertically about said tension part without releasing the holding action effected by said first-defined horizontal bore portion, and said horizontal and vertical bore portions defining a central substantially circular opening through said adjustment element.

4. A construction as defined in claim 1 wherein, said upper portion of said handle part lies on the previously-defined vertical plane of said tension and handle parts, and said under portion lies on a sloping vertical plane of lesser inclination than said previously-defined vertical plane.

5. A construction as defined in claim 1 wherein, said limit flange part depends downwardly a distance substantially corresponding to the location of a bottom portion of the collecting container, so that it will support the collecting container on a substantially horizontal plane.

MARTIN A. MILLIGAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
689,778	Barnard	Dec. 24, 1901
1,071,457	Old	Aug. 26, 1913
1,389,102	Romo	Aug. 30, 1921
1,789,876	Molyneux	Jan. 20, 1931