June 8, 1948. J. N. TUTTLE 2,442,883

COATING RACK AND HOLDER

Filed June 20, 1944

2 Sheets-Sheet 1

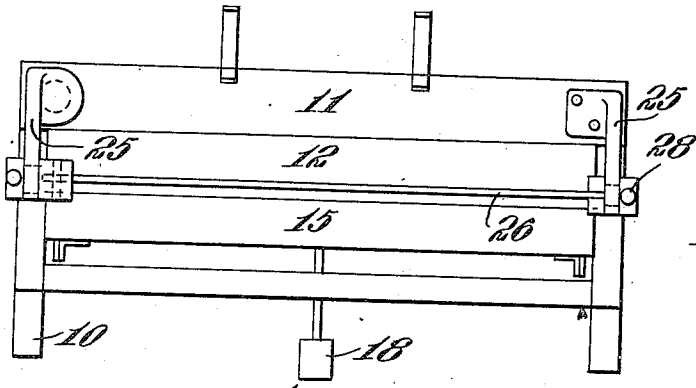


Fig. 6

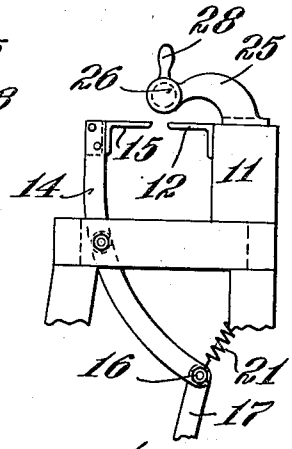


Fig. 7

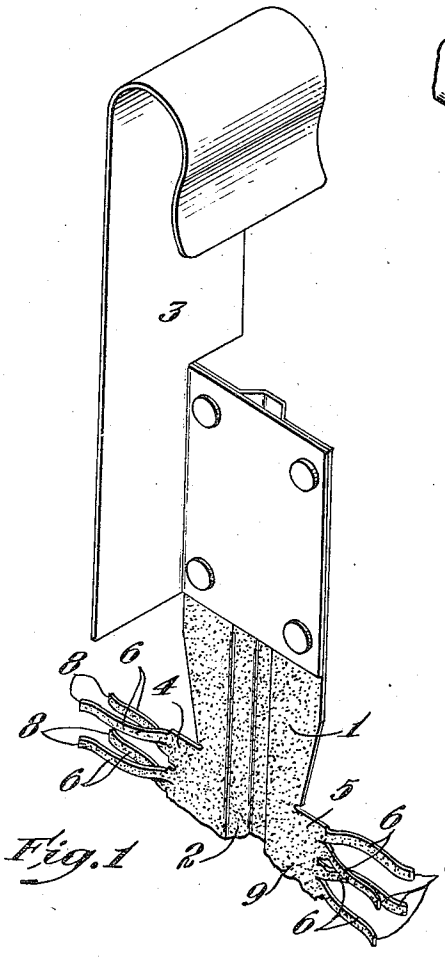


Fig. 1

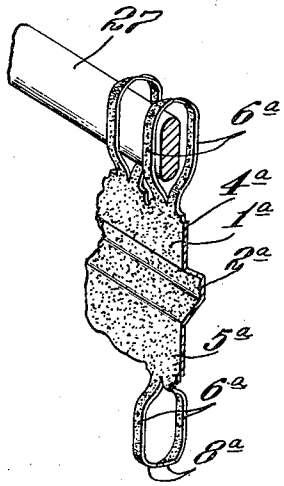


Fig. 3

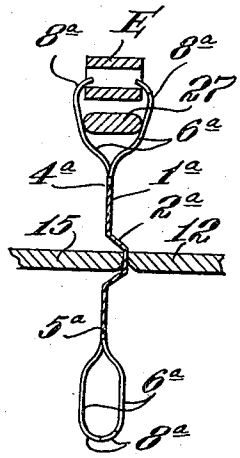


Fig. 4

Inventor
James N. Tuttle
by Pobst, Cushman & Glover
attys.

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2 Sheets-Sheet 2

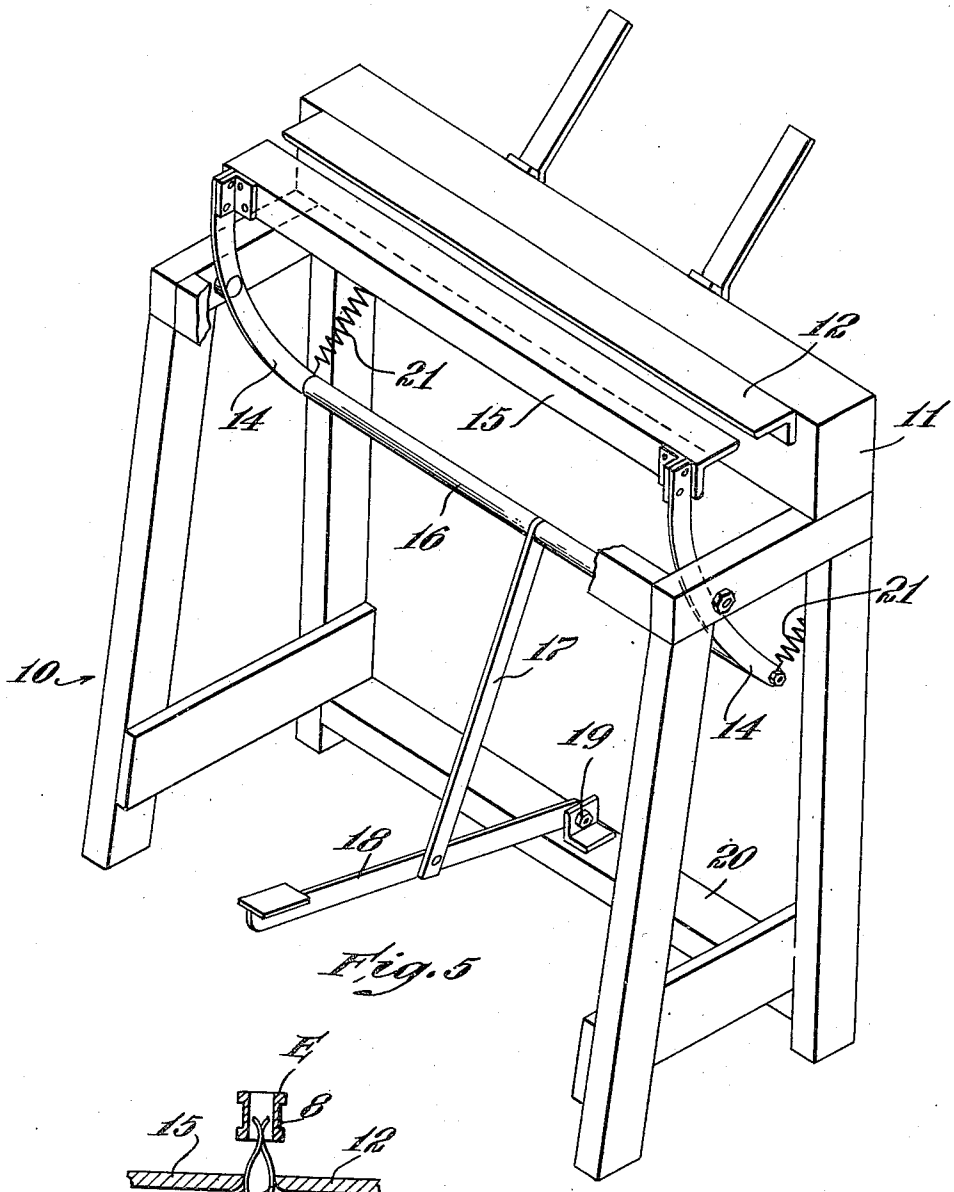


Fig. 5

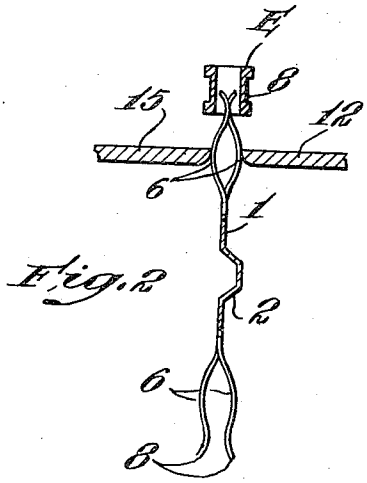


Fig. 2

Inventor
James N. Tuttle
by Pobert, Cushman & Groves
Att'ys.

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COATING RACK AND HOLDER

James N. Tuttle, Newton, Mass., assignor to James N. Tuttle, Inc., Newton, Mass., a corporation of Massachusetts

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4 Claims. (Cl. 204—297)

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This invention relates to a device for holding a plurality of small parts such, for example, as bonnets and union nuts, bushings, nipples, ferrules, and the like small elements so that a group of such parts may be dipped into a treating solution to receive a protective or finishing coating.

In applying protective coatings to elements of the above type it is necessary to provide means for firmly holding the elements in spaced relation so that the treating solution will contact the surfaces to be protected and when the protective coating is to be provided by use of an electric current, it is further necessary to maintain a good electrical contact between the elements to be treated and the holding means which also serves as an electrical conductor. The task of properly positioning such elements on conventional racks or holders is tedious and time-consuming, and not only greatly increases the cost of applying the protective coating, but also constitutes a serious limitation to production.

The principal objects of the present invention are to provide a rack and apparatus for use therewith by means of which elements of the aforementioned type may be readily applied to and quickly removed from the rack, thereby reducing the time and expense required to perform this task to a small fraction of that ordinarily required, and to provide a rack which is of simple construction, inexpensive to manufacture, reliable in operation and capable of holding a maximum number of elements in properly spaced relation and at the same time provide a good electric contact therewith.

Further objects will be apparent from a consideration of the following description and the accompanying drawings wherein:

Fig. 1 is a fragmentary isometric view of a rack constructed in accordance with the present invention;

Fig. 2 is a transverse section through the rack shown in Fig. 1 and the jaws of the rack holder, illustrating the manner in which a tubular element may be applied to or released from the resilient fingers of the rack;

Fig. 3 is a fragmentary isometric view of another form of the rack constructed in accordance with the present invention;

Fig. 4 is a view similar to Fig. 2, showing the manner in which a tubular element may be applied to and released from the resilient fingers of the rack shown in Fig. 3;

Fig. 5 is an isometric view of the rack holder with certain parts omitted;

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Fig. 6 is a top plan view of the complete rack holder; and

Fig. 7 is a fragmentary end elevation of the rack holder shown in Fig. 6.

Referring to Figs. 1 and 2 the rack shown therein comprises an elongate strip of sheet metal 1 formed with a longitudinally extending reinforcing rib portion 2, the upper end of the rack being riveted or otherwise secured to a hooked member 3 by means of which the rack may be suspended on a bar or rod. Each of the longitudinal edges 4 and 5 of the rack is cut or slit transversely to provide a plurality of laterally extending resilient fingers 6 arranged in pairs, the fingers of each pair being bent or bowed outwardly in opposite directions so that their end portions 8 are normally spaced apart, as shown in Fig. 1. In forming the fingers 6 the bowed portions are longitudinally aligned so that when inserted between the jaws of an elongate clamping member, the fingers may be collectively flexed to bring their free end portions together, as illustrated in Fig. 2. Substantially the entire surface of the rack, except for the end portions 8 of the fingers, is preferably provided with a coating 9 of electrically non-conducting material such as a varnish, lacquer, or the like, so that when the rack is used in a treating process involving the use of an electric current, there will be no appreciable loss of current; in other words, the electric current will pass through the body portion of the rack, the fingers, and the elements carried by the latter.

As illustrated in Fig. 2, the fingers 6 may be flexed inwardly so as to bring their free end portions 8 together, in which position a tubular element E may be dropped or otherwise positioned about the ends 8, so that when the fingers 6 are permitted to spring back the element E is releasably held thereby and in spaced relation to other elements similarly positioned on and held by the other pairs of fingers. In order to release the elements from the grip of the fingers 6, it is merely necessary to flex the fingers inwardly, preferably while holding the rack with the fingers pointing downwardly so that the elements may drop off.

The rack shown in Figs. 3 and 4 is similar in all material particulars to that shown in Figs. 1 and 2, and similar reference characters are applied to corresponding parts. In this embodiment the fingers 6^a are bowed outwardly and then inwardly so that their end portions 8^a are normally contiguous, as shown in Fig. 3, and their bowed portions are longitudinally aligned so as to define a series of aligned openings or loops adapted

to receive an elongate cam-like member, as illustrated in Fig. 4. In this embodiment the fingers 6a are flexed outwardly in any suitable manner so that either a solid or a tubular element may be positioned between their end portions 8a, and when the fingers are permitted to spring back, the elements are held in spaced relation to each other. In like manner the elements may be released and quickly removed or stripped preparatory to reloading.

The aforementioned flexing of the fingers 6 and 6a is efficiently performed by the use of the rack holder shown in Figs. 5 to 7, comprising a frame-like stand 10 which supports an elongate block 11 to which is rigidly secured a length of angle iron 12 constituting a fixed jaw. A pair of arcuate arms 14, pivotally mounted on the top of the frame, support a length of angle iron 15 which constitutes a movable jaw arranged to cooperate with the fixed jaw 12, either for flexing the fingers 6, as illustrated in Fig. 2, or clamping the rack 1a in position, as illustrated in Fig. 4. The lower ends of the arms 14 are connected by a rod 16 which in turn is connected by a link 17 to a treadle 18 pivotally mounted at 19 to a longitudinal frame member 20. Springs 21 normally hold the jaw 15 open and by depressing the treadle 18 the jaw 15 may be moved toward and against the fixed jaw 12.

Mounted at the opposite ends of the block 11 are gooseneck brackets or arms 25 (Figs. 6 and 7) which receive and rotatably support the ends of a rod or cam shaft 26, the intermediate portion of which is of oval cross section (Figs. 3 and 4) to provide a cam-like member 27 so dimensioned that it may loosely pass through the openings or loops of the racks 6a. The cam shaft 26 is so supported by the arms 25 that it may be slid lengthwise for removal and one end of the cam shaft is provided with an operating lever 28 by means of which the cam surfaces 27 may be rotated through an angle of 90° as shown in Fig. 4.

The parts are so constructed and arranged that when the rack 6a is inserted between the jaws 12, 15, with the clamping surfaces of the latter engaging the recessed portion 2a, as shown in Fig. 4, the openings or loops of the rack are aligned with the bearings or openings in the arms 25 and hence the cam shaft 26 may be slid into operative position, as shown in Fig. 3. By rotating the shaft 26 the cam surfaces 27 operate to flex the fingers 6a outwardly and hold them in position to receive the elements E.

In using this apparatus with the rack shown in Figs. 1 and 2, the latter is manually held so that the jaws 12, 15 engage one series of fingers 6 and the treadle 18 is depressed sufficiently to flex the fingers so as to bring their end portions 8 together, in which position the tubular elements E may be dropped about the closed end portions. Upon release of the treadle the fingers 6 spring back and thus releasably hold the elements E in proper spaced relation. In like manner the series of fingers on the opposite longitudinal edge of the rack may be loaded and the loaded rack may then be dipped into the treating solution. After the desired coating has been applied to the elements E, the rack is again inserted between the jaws 12, 15, but with the fingers pointing downwardly, so that upon depression of the treadle 18 the fingers are collectively flexed inwardly, whereupon the coated elements E are released and drop off into a pan or other suitable receptacle which may be held beneath the jaws. If desired, the rack may be positioned as previously described, in which case the elements E may be stripped from the fingers by hand. Thereafter the rack may be reloaded with other elements to be treated.

In using the apparatus with the rack 6a, the procedure is somewhat similar except that the cam shaft is used both in loading and releasing the elements E. However, it will be observed that in either case the rack may be quickly loaded, stripped and reloaded, and that there is no necessity for painstakingly positioning the individual elements to be treated, as is necessary in the procedures heretofore used.

While I have shown and described different desirable embodiments of the invention, it is to be understood that this disclosure is for the purpose of illustration and that various changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described, may be made without departing from the spirit and scope of the invention, as set forth in the appended claims.

I claim:

1. A rack for holding elements of the class described in spaced relation and adapted to be used in conjunction with a rack holder embodying an elongate member having active parts movable laterally relative to its longitudinal extent, said rack consisting of an elongated strip of sheet material having at least one longitudinal edge slit transversely to provide a plurality of laterally extending resilient fingers arranged in pairs, the fingers of each pair being bowed outwardly in opposite directions to provide a series of longitudinally aligned loops and the bowed portions of said fingers being aligned so that they may be collectively flexed inwardly and outwardly when said rack is inserted in the rack holder so that its active parts are engageable with said fingers, thereby to bring the free end portion of each pair toward and away from each other, whereby to cause said free end portions simultaneously yieldingly to grip elements applied thereto or release elements carried thereby, and means connected to one end of said strip for supporting it when immersed in a treating fluid.

2. A rack for holding elements of the class described in spaced relation and adapted to be used in conjunction with a rack holder embodying an elongate member having active parts movable laterally relative to its longitudinal extent, said rack consisting of an elongated strip of sheet metal having its longitudinal edges slit transversely to provide a plurality of laterally extending resilient fingers arranged in pairs, the fingers of each pair being bowed outwardly in opposite directions to provide a series of longitudinally aligned loops and the bowed portions of said fingers being aligned so that they may be collectively flexed inwardly and outwardly when said rack is inserted in the rack holder so that its active parts are engageable with said fingers, thereby to bring the free end portion of each pair toward and away from each other, whereby to cause said free end portions simultaneously yieldingly to grip elements applied thereto or release elements carried thereby, substantially the entire strip being coated, except at the free end portions of said fingers, with an electrically non-conducting material, and means connected to one end of said strip for supporting it when immersed in a treating fluid.

3. A rack for holding recessed or tubular ele-

ments of the class described in spaced relation and adapted to be used in conjunction with a rack holder having elongated relatively movable clamping jaws, said rack consisting of an elongated strip of sheet material having its longitudinal edges slit transversely to provide a plurality of laterally extending resilient fingers arranged in pairs, the fingers of each pair being bowed outwardly in opposite directions to provide a series of longitudinally aligned loops, the free end portions of the fingers of each pair being normally spaced from each other and being bent outwardly in opposite directions so as yieldingly to engage opposite interior peripheral wall portions of a recessed or tubular element, the bowed portions of said fingers being aligned so that when said rack is inserted in the rack holder with said bowed portions between its jaws, said fingers may be collectively flexed inwardly to bring the free end portions of each pair toward each other, whereby to cause said free end portions simultaneously to release the elements carried thereby and permit other recessed or tubular elements to be positioned about said end portions, and means connected to one end of said strip for supporting it when immersed in a treating fluid.

4. A rack for holding elements of the class described in spaced relation and adapted to be used in conjunction with a rack holder having a removable elongated rotatable cam-like member, said rack consisting of an elongated strip of sheet material having its longitudinal edges slit transversely to provide a plurality of laterally extending resilient fingers arranged in pairs, the fingers of each pair being bowed outwardly in opposite directions to provide a series of longitudinally aligned loops the free end portions of the fingers of each pair being bent toward each other so as yieldingly to engage the opposite exterior wall portions of an element or the like part, the bowed portions of said fingers being aligned so that when said rack is inserted in the rack holder with its cam-like member extending through said aligned loops, said fingers may be collectively flexed outwardly in response to rotation of the cam-like member to separate the free end portions of each pair whereby to effect the simultaneous release of elements carried thereby and permit other elements to be positioned between said free end portions, and means connected to one end of said strip for supporting it when immersed in a treating fluid.

JAMES N. TUTTLE.

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