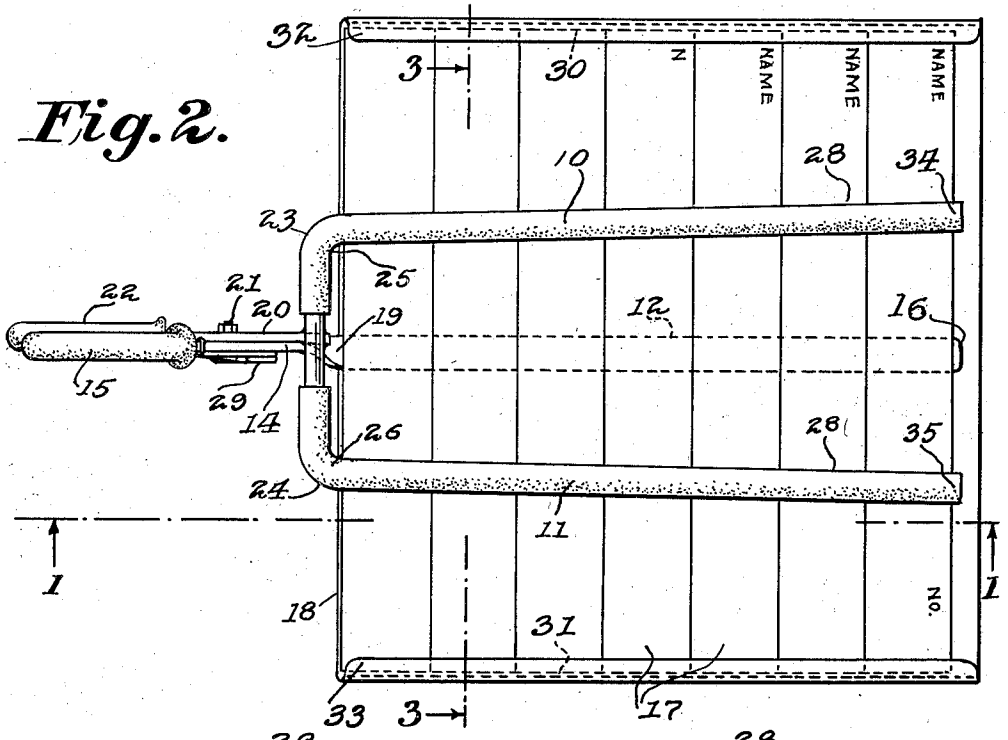
Feb. 24, 1942. W. E. DOUGHERTY 2,273,843

STRIP SHIFTING TONGS

Filed Oct. 1, 1941

Fig. 2.



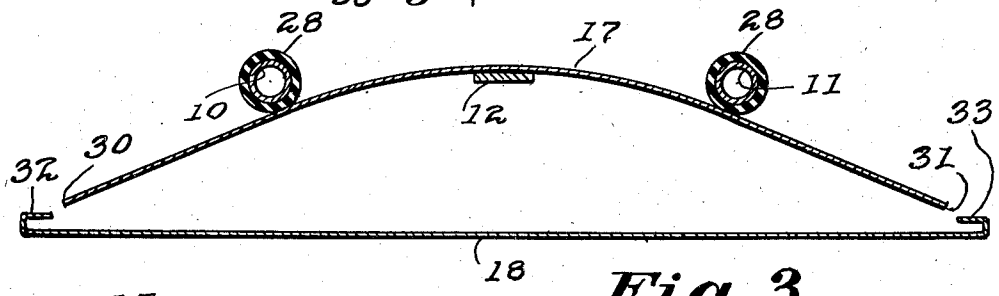


Fig. 3.

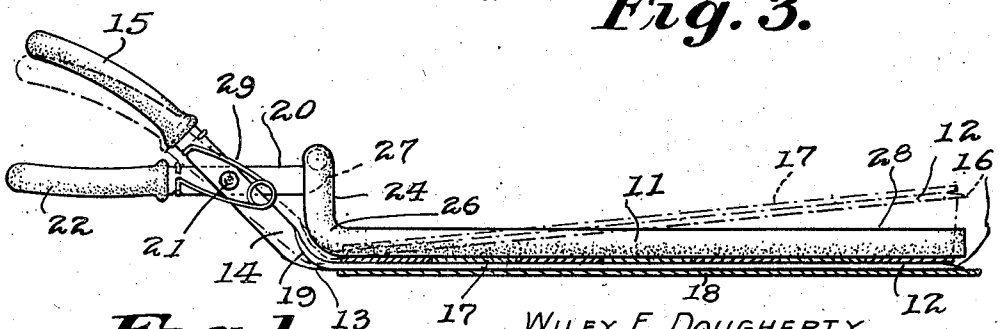


Fig. 1.

WILEY E. DOUGHERTY
INVENTOR

BY J. F. Mothershead
ATTORNEY

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STRIP SHIFTING TONGS

Wiley E. Dougherty, Skiatook, Okla.

Application October 1, 1941, Serial No. 413,229

5 Claims. (Cl. 294—118)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon in accordance with the provisions of the act of March 3, 1883, as amended April 30, 1928 (ch. 460, 45 Stat. L. 467).

This invention relates to strip shifting tongs and has for its object to provide an implement for the handling of flexible reference strips or sheets such as are known in commerce as "flexoline" strips which are ordinarily intended to be carried in edge to edge relation by a frame or panel of the character known as a "flexoline" frame.

More specifically the invention is of the character of article ordinarily handled by stationers and dealers in office furniture and equipment and aims to provide an implement for expediting the insertion, removal and transfer of reference strips or sheets into, from and to retaining frames.

Ordinarily reference strips or sheets of the character are, or are intended to be, carried in edge to edge relationship by a frame having retaining guides under which end portions of the strips extend and are retained. Heretofore the insertion and removal of such strips into and from the retaining guides of the frame has been customarily accomplished by separately handling each strip, i. e., manually flexing each strip to allow its ends to pass beneath and from the guides.

Objects of the present invention are to provide manually operable mechanical means for flexing a single strip of the character and more particularly a plurality thereof in edge to edge relationship sufficiently to permit its or their ends to pass into and from the guides of a retaining frame of the character referred to and simultaneously holding the strips, in case of a plurality thereof, in prearranged order or sequence during the inserting, removing or transferring operation without crimping, buckling or permanently bending the strips, without actually gripping or clamping the strips impingingly between two or more members and without otherwise marring or distorting the strips or destroying their flexibility or tendency to resume their original plane when released.

The tongs function to hold the strips primarily by reason of the resistance to bending by the strips themselves.

With these and other objects in view the invention resides in the combination of parts and details of construction described hereinafter and finally pointed out in the appended claims. Certain embodiments having the characteristics of the invention and by which the same may be practiced are illustrated in the accompanying drawing, in which:

Figure 1 is a view of the implement in side elevation illustrating in full lines the relationship of the respective tines thereof at the strip contacting point in the closure operation; a view as at line 1—1 of Figure 2 to illustrate the positions of the reference strips as contacted by the tines of the implement; and illustrating in dotted lines the relationship of the tines at the strip flexing point in the closure operation of the implement;

Figure 2, a plan view of the tongs illustrating its position at a step in a simulated operation; and

Figure 3, a cross sectional view as along line 3—3 of Figure 2, to illustrate the relationship of the tines in closed position and an edge view of the reference strips as flexed thereby.

A practical embodiment of the invention is illustrated in the drawing, and by reference thereto it will be seen as comprising a pair of tongs including spaced tines 10 and 11, centrally of which a tine 12 is adapted to be moved.

In the particular embodiment illustrated one portion of the tongs to which the other is pivoted is formed of (though not necessarily) an elongated piece of material, preferably metal. This piece of material is bent at an intermediate point 13 to form the tine 12 by one end portion of the piece of material, and to form a shank or throw-arm 14 which continues into a handle 15. The piece of material may be preferably strap-like to provide a more or less flat tine 12 which may even be sharpened at its end 16 to facilitate its insertion beneath reference strips 17 when held by or lying flat upon a retaining panel 18 or other surface. If it is preferred to utilize a strap-like piece of material, as shown in the drawing, the same may be twisted at the point 13 where it is bent so that the plane of the shank or throw-arm 14 will lie at right angles to the plane of the tine 12. By such a twist the shank or throw-arm 14 is provided with a vertically disposed flat surface to which the other portion of the tongs may be pivoted or fulcrumed. Also, by such a twist a more or less flat abutment or stop 19 is formed at the base end of the tine 12 for limiting the distance to which the tine may be inserted beneath reference strips to be engaged by the tongs. The end

portion of the elongated piece of material which extends from the throw-arm 14 and terminates in a handle 15 may, if desired, be curved and even covered with suitable material to facilitate a convenient grasp thereof and to afford protection to the hands of the user.

The spaced tines 10 and 11 are carried by a centrally disposed shank 20 which is pivoted at 21 to the shank 14 of tine 12 and extends into a handle 22 which may, if preferred, be curved and covered, as stated in connection with handle 15. In the embodiment shown the shank 20 consists of a single member and has a surface corresponding with that of the shank 14 for pivotal cooperation, but may suitably consist of spaced members or a bifurcated member, not shown, astraddle the shank 14. Intermediate the shank 20 and the tines 10 and 11 a throwarm is provided which may be formed by an angularly disposed portion of the shank 20, or, as shown, by portions 23 and 24 of tines 10 and 11 between the bends 25 and 26 and point 27 at which the tines are secured to the shank 20.

The tines 10 and 11 of the one portion of the tongs are spaced to such an extent that when tine 12 is moved into an intermediate position with respect thereto the spaces between tines 10—12 and 12—11, as shown in Figure 1, greatly exceed that of the ordinary thickness of the reference strips 17 intended to be handled by the tongs to insure against a gripping of the reference strips between either tines 10—12 or 12—11. The sole holding effect of the tongs upon the reference strips consists of a frictional engagement and the resistance to bending of the flexible strips which are to be engaged. To aid in such engagement the tines may, if desired, be provided with gripping surfaces such as serrations or the application of suitable material to the faces of the tines. In the strip flexing operation a slight sliding action necessarily occurs between the faces of the reference strips 17 and tines 10 and 11, and to prevent defacing the strips by such action, tines 10 and 11 may be covered, as shown in Figure 3, by such as rubber hosing 28.

To normally hold the tongs open in ready position for use and for reopening the tongs when compressional force on the handles is released, a suitable spring 29 may be applied between the members to the tongs.

The advantages of the throw of the arm or shank 14 and arms 23—24 of the shank 20, the inclinations of the tines, their divergence and their thickness will be more specifically described in connection with the operation and function of the tongs for their intended use.

In Figure 3 an illustrative reference strip 17 is shown flexed sufficiently by the tongs to remove or free its ends 30 and 31 from beneath the guides or lips 32 and 33 of an illustrative strip-retaining panel 18. The resistance to bending of the strips, when flexed sufficiently for such removal by a closing of the tongs, as shown in Figure 3, is such as to bring about a frictional engagement sufficient to transfer the strips, without disturbance to their original relationship, to another panel where the strip ends will slide beneath the guides of a new panel upon the release of the tongs and the resumption of the strips to their normal flat plane.

The thickness of the tine 12, which is intended to be inserted beneath the strips to be engaged in a manner such as shown, is preferably such as will not bow or flex the strips sufficiently to free their ends 30 and 31 from the guides 32 and 33 of a retaining panel. By this arrangement the strips may be at least partially retained by the guides, as shown in Figure 2, until the tine 12 has been inserted to the point desired and until tines 10 and 11 are brought into engagement with the strips; otherwise the strips are likely to be disarranged by freeing them from their guides before being engaged by the tongs.

By reference to Figure 1 it will be seen that the throw of the shank 14 of tine 12 and the throw of portions 23 and 24 of tines 10 and 11, and that the pitch of tine 12 with respect to tines 10 and 11 when in a partially closed position are such that all strips of a plurality in edge-to-edge relationship will be engaged substantially at the same time to prevent disarray. In other words, when the upper surface of tine 12 reaches the point at which it begins to pass through the plane of the under surface of tines 10 and 11, during the closing operation of the tongs, tine 12 will be substantially parallel with tines 10 and 11, in side elevation, and thereby engage the successive strips simultaneously. The further movement of tine 12 through the under plane of tines 10 and 11 is necessary, however, to flex the strips sufficiently to remove their ends from the guides of the panel. Due to the pivoting of the elements of the tongs, tine 12 will gradually assume angular relationship with respect to tines 10 and 11, in side elevation, as it is moved through between the latter. This angular relationship will result in a gradual increasing flexure in the successive strips if tines 10 and 11 are parallel with respect to one another. Since uniform flexure of each strip of a successive edge-to-edge plurality thereof may be preferable, in addition to the simultaneous engagement thereof, the tines 10 and 11 are made slightly divergent from their base ends to their outer extremities 34 and 35. By this divergence the angular relationship of tine 12 with respect to tines 10 and 11 when in closed position, as shown in dotted lines in Figure 1, will produce a flexure in the outermost strip substantially equivalent to that to which the innermost strip is subjected.

It will therefore be seen that by my invention tongs are provided which will engage a plurality of strips in edge-to-edge relationship substantially simultaneously, before they are wholly freed from panel retainers, and which will subject the strips to substantially uniform flexure without disturbance to their original relationship and wholly without injury thereto.

Having described my invention and illustrated an embodiment by which the same may be practiced, what I claim is:

1. A pair of tongs for flexing and engaging relatively thin flexible pieces of material in adjacent substantially planar relationship and of the character generally employed for reference slips, said tongs comprising a pair of pivotally connected members each including a manipulating handle at one side of the pivotal connection and a throw arm at the other side thereof, one of said members having a tine extending from and at an angle to the throw arm thereof and the other of said members having a pair of tines extending from and at an angle to the throw arm thereof and between which the tine of the former member is movable by the reverse rotation of said members about said pivotal connection, said pair of tines being spaced to provide a clearance between each thereof and the tine movable therebetween which is sufficiently greater than the

normal thickness of the material to be engaged thereby as will prevent an impingement of said material between the tines of said members, the throw of said arms being such as will bring a surface of the tine of the one member on a plane substantially with that of a plane across surfaces of said pair of tines and thence angularly thereto by the continued closing operation of the tongs, whereby to contact an aforesaid arrangement of pieces of material substantially at the same time and at an intermediate closure point of said tongs, and said pair of tines diverging outwardly to their outer ends to unify the flexure of said pieces of material when the tines are moved to the aforesaid angular relationship.

2. In office equipage, a pair of tongs for removing and replacing reference slips from their holder, said tongs including at least one tine pivotally movable into and from a position intersecting a plane between at least a pair of tines spaced to provide a clearance to the sides of said tine which is considerably greater than the thickness of the reference slips intended to be engaged by the tongs, and means causing the respective tines to assume substantially parallel planes at an intermediate point in the capable pivotal movement of said tine at a position immediately in advance of the movement of said tine into said intersecting position whereby a plurality slips may be engaged substantially at the same time at different points along said tines.

3. In office equipage, a pair of tongs for removing and replacing reference slips from their holder, said tongs including at least one tine pivotally movable into and from a position angularly intersecting a plane between at least a pair of tines, and means causing the respective tines to assume substantially parallel planes at an intermediate point in the capable pivotal movement of said tine at a position immediately in advance of the movement of said tine into said intersecting position whereby a plurality of slips may be engaged substantially at the same time at different points along said tines and thence flexed by the continued pivotal movement of said tine to said angularly intersecting position, said pair of tines being spaced at least sufficient to prevent an impingement of such reference slips between the respective tines, and said pair of tines diverging outwardly toward their free ends sufficient to unify the curvature of slips engaged at various points along the tines when said angularly intersecting position of the tines is assumed.

4. A pair of tongs for removing and replacing reference slips from their holder, said tongs comprising a pair of members having angularly intermeshing tines with clearances therebetween considerably greater than the thickness of the slips intended to be engaged thereby, said members being pivotally connected on a plane removed from the planes of said tines, said plane of pivotal connection being such with respect to the planes of said tines as will cause the respective tines to assume a spaced parallel relationship immediately prior to angular intermeshing relationships to afford contact with a plurality of slips at substantially the same time whereby to prevent their disarray as by successive engagement.

5. A pair of tongs for removing and replacing reference slips from their holder, said tongs comprising a pair of members having angularly intermeshing tines with clearances therebetween considerably greater than the thickness of the slips intended to be engaged thereby, said members being pivotally connected on a plane removed from the planes of said tines, said plane of pivotal connection being such with respect to the planes of said tines as will cause the respective tines to assume a spaced parallel relationship immediately prior to angular intermeshing relationships to afford contact with a plurality of slips at substantially the same time whereby to prevent their disarray as by successive engagement, the clearance between each pair of adjacent tines in angularly intermeshing relationship being progressively greater toward the free ends of the tines to unify flexure of slips engaged at various points along the tines when said tines are in said angular intermeshing relationship.

WILEY E. DOUGHERTY.