Sept. 15, 1942. S. MANDL 2,296,173

SPREADING TOOL

Filed Jan. 18, 1940

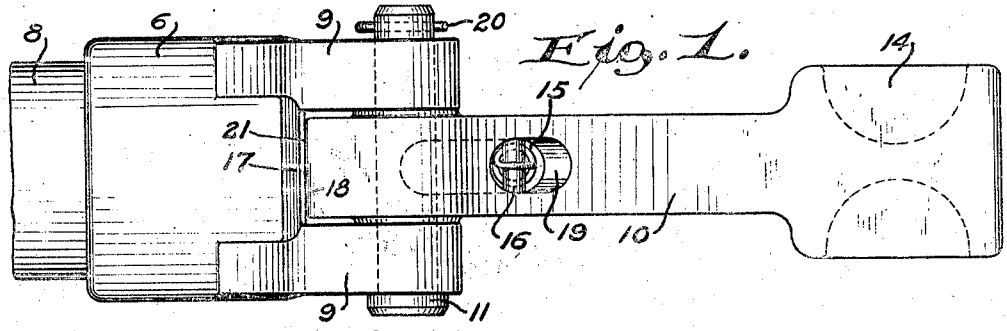


Fig. 1.

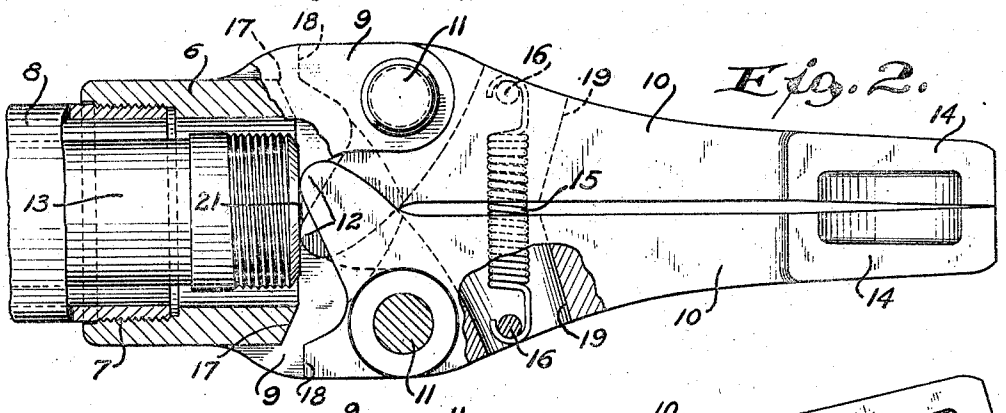


Fig. 2.

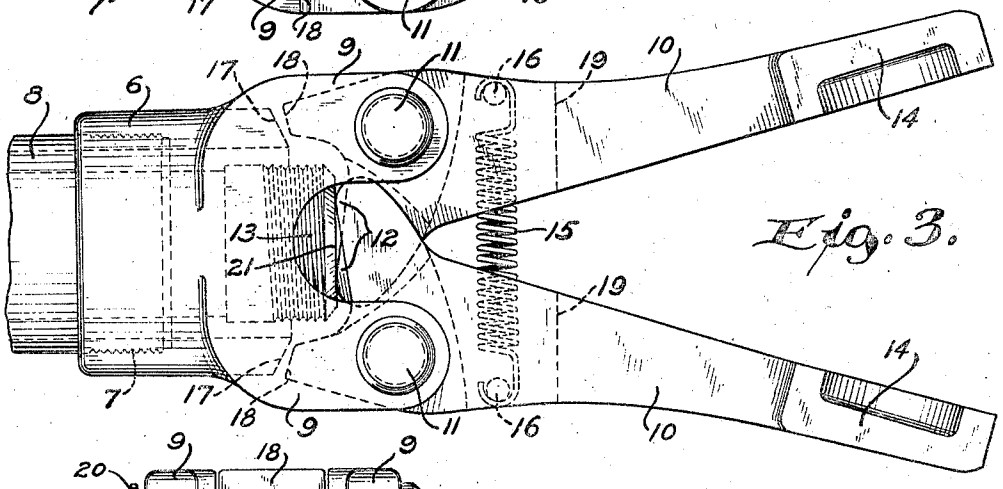


Fig. 3.

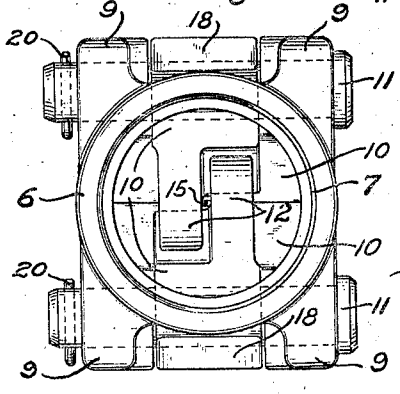


Fig. 4.

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SPREADING TOOL

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6 Claims. (Cl. 81—15)

This invention relates generally to improvements in mechanisms for moving two bodies or parts of a body away from each other, and relates more specifically to improvements in the construction and operation of tools especially adapted to spread distorted sheet metal elements such as damaged automobile fenders and bodies.

Generally defined, an object of my invention is to provide an improved spreader assembly which is simple in construction and efficient in operation.

In the art of repairing damaged automobiles and the like, it frequently becomes desirable to quickly separate or spread parts which have become jammed against or distorted toward each other. While prying bars may in simple cases be used to advantage for such purposes, the use of these bars often causes greater damage to the parts due to breakage of parts resulting from improper application of the spreading force; and I have found that such further damage can in most cases be avoided or at least materially reduced, by proper application of the spreading force to both of the jammed parts. Then too, the force applied with a prying bar is necessarily limited and relatively irregular, thus making it impossible to secure the best results. Due to the fact that considerable space is required to manipulate a crow bar or the like, it is in many instances impossible to properly approach the work in order to most effectively apply the spreading force. The present spreading methods and implements are therefore relatively unsatisfactory for the performance of various kinds of jobs, and are moveover injurious to the work.

It is therefore a more specific object of the present invention to provide a new and useful spreading tool which is operable with great power and within extremely limited space to quickly separate even the most stubborn parts with minimum danger of damaging the same.

Another specific object of this invention is to provide an improved spreading implement which is readily attachable to and operable with the aid of a fluid pressure actuated jack such as a hydraulic ram, from a remote place if so desired.

A further specific object of my invention is to provide an improved spreader assembly which is durable in construction, and conveniently manipulable to exert uniform and exceedingly high pressure against the work, with minimum effort on the part of the operator.

Still another specific object of my present invention is to provide an improved spreader attachment for jacks or the like, which is flexible and safe in use, sturdy in structure, and which can be manufactured and sold at moderate cost.

These and other specific objects and advantages will be apparent from the following detailed description.

A clear conception of one embodiment of my invention, and of the mode of constructing and of manipulating a spreading tool built in accordance with the improvement, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a top view of one of my improved spreading tools, showing the same applied to a fragment of a hydraulic ram;

Fig. 2 is a side elevation of the spreading tool assembly of Fig. 1, showing the spreader jaws in closed or inactive position and also showing portions thereof in section;

Fig. 3 is another side elevation of the improved spreading assemblage, showing the jaws partially separated or spread; and

Fig. 4 is an end view of the improved spreading tool, looking toward the attaching or supporting socket thereof.

While the invention has been shown and described herein as being especially adapted for embodiment in a hydraulic jack actuated spreading implement for sheet metal parts, it is not the intent to thereby unnecessarily restrict the scope or utility of the improvement.

Referring to the drawing, the improved spreading tool shown therein by way of illustration, comprises in general, a tubular member or hub 6 having internal screw threads 7 formed for attachment to the cylinder 8 of a hydraulic ram, and being provided with four spaced ears 9; a pair of similar spreader elements or jaws 10 swingably suspended from the ears 9 of the hub 6 by means of pivot pins 11, and each having at one end an actuating projection or arm 12 cooperable with the adjacent end of a ram plunger 13, and also having a work engaging portion or head 14 at its opposite swinging end; and a tension spring 15 which connects cross bars or pins 16 preferably formed integral with the medial portions of the jaws 10.

The supporting hub 6 and the ears 9 are preferably formed of a single durable piece of metal, and the end of the hub 6 remote from the socket threads 7, is provided with abutment surfaces 17, with which lugs 18 formed on the jaws 10 are cooperable to limit the spreading movement

of the jaws. The jaws 10 are of interchangeably similar construction, and each of these jaws is likewise preferably formed of a single durable piece of metal and is provided with a lateral opening 19 within which the spring 15 is confined. The pivot pins 11 may be held in place by cotter pins 20 or the like; and upon removal of the retaining pins 20 and withdrawal of the pivot pins 11, the entire assemblage may be quickly dismantled.

The fluid pressure actuated jack or ram comprising the cylinder 8 and plunger 13 movable within and relative to the cylinder 8, may be hydraulically actuated, in any suitable manner and from a remote station if so desired. The ram plunger 13 has a flat end face 21 which coacts directly with the jaw arms 12 and the tension spring 15 constantly maintains the arms 12 in contact with the surface 20 and closes the jaws 10 whenever the pressure on the plunger 13 is released.

During normal operation of the improved spreading tool, either a hydraulic or any other suitable type of jack may be applied to the internal screw thread 7 of the hub 6, the movable plunger 13 of the jack being adapted to engage the arms 12 of the jaws 10 in the manner illustrated in Figs. 2 and 3. Before insertion of the jaws 10 between the parts which are to be spread apart, the jack plunger 13 should be retracted sufficiently to permit the tension spring 15 to close the jaws 10, that is to bring these jaws into snug engagement with each other adjacent the heads 14 thereon. The arm heads 14 should then be inserted between the parts of the work which are to be separated, whereupon the jack or ram plunger 13 may be brought forwardly to separate the jaws 10 by virtue of the application of pressure against the jaw arms 12. This movement of the ram plunger 13 may be continued until the lugs 18 of the jaws 10 engage the abutments 17 on the hub 6, whereby the swinging movement of the jaws 10 will be positively stopped. In order to remove the tool from the work, it is only necessary to retract the plunger 13, whereupon the spring 15 will again return the jaws 10 to inactive position, as in Fig. 2. It will thus be noted that the jaws 10 may be separated at a uniform rate of speed by merely moving the plunger 13 forwardly, and that these jaws will be returned to inactive position upon release of the plunger actuating pressure.

As previously indicated, any suitable type of jack may be utilized to actuate the improved tool, and while a hydraulic ram such as shown in the drawing is preferable, it is not a necessary part of the assemblage. The screw threaded socket in which the threads 7 are formed, provides simple means for detachably attaching the tool to a jack, and the tension spring 15 serves to quickly return the jaws 10 to inactive position. The heads 14 at the swinging ends of the jaws 10 may be of diverse shapes, but since these heads are subjected to considerable pressure, they should be sturdily constructed. The assemblage may obviously be readily assembled and dismantled by inserting or removing the pivot pins 11, and the abutments 17 provide simple and effective means for preventing separation of the jaws 10 beyond a predetermined limiting position. The entire assemblage is obviously extremely simple, compact, and durable in construction, and the spring 15 is at all times effectively concealed and protected against damage. The invention has proven highly successful in actual commercial use, and the improved assemblage can obviously be manufactured and sold at moderate cost and may be manipulated by a novice without danger of injury.

It should be understood that it is not desired to limit this invention to the exact details of construction or the precise mode of use, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. A spreading tool comprising, a hub having one end associated directly with the cylinder of a single acting hydraulic ram and being provided at its opposite end with integral ears disposed laterally of and extending along its axis, parallel pins mounted in said ears on opposite sides of said axis, a wedge shaped jaw directly pivotally suspended from each of said pins, each of said jaws having an integral actuating arm directly slidably engageable with the end of the ram plunger and extending inwardly from its suspension pin past the arm of the other jaw a considerable distance across said axis, and the extreme outer ends of said jaws being directly abuttable to prevent swinging of either jaw across said axis, and resilient means connecting said jaws and cooperating therewith to constantly urge said outer jaw ends toward each other and said arms toward said ram plunger end.

2. A spreading tool comprising, a hub having one end associated directly with the cylinder of a single acting hydraulic ram and being provided at its opposite end with integral ears extending away from the hub and along its axis, parallel fixed pins mounted in said ears on opposite sides of said axis and substantially within the hub width measured across the pins, a wedge shaped jaw directly pivotally suspended from each of said pins, each of said jaws having an integral actuating arm directly slidably engageable with the end of the ram plunger and extending inwardly from its suspension pin past the arm of the other jaw a considerable distance across said axis, and the extreme outer ends of said jaws being directly abuttable to prevent swinging of either jaw across said axis, resilient means connecting said jaws and cooperating therewith to constantly urge said outer jaw ends toward each other and said arms toward said ram plunger end, and cooperable abutments on said hub and the extreme inner ends of said jaws for positively stopping spreading motion of the jaws by said ram beyond predetermined limiting positions.

3. A spreading tool comprising, a hub having one end interally screw threaded for direct attachment to the cylinder of a single acting hydraulic ram and being provided at its opposite end with integral ears extending away from the hub and along its axis, parallel pins mounted in said ears on opposite sides of said axis and remote from said opposite hub end, a wedge shaped jaw directly pivotally suspended at its medial portion from each of said pins, each of said jaws having an integral actuating arm directly slidably engageable with the end of the ram plunger and extending inwardly from its suspension pin past the arm of the other jaw a considerable distance across said axis, and the extreme outer ends of said jaws being directly abuttable to prevent swinging of either jaw across said axis, and a tension spring housed within and connecting said jaws and cooperating therewith to constantly urge said outer jaw ends toward each

other and said arms toward said ram plunger end.

4. A spreading tool comprising, a hub having one end internally screw threaded for attachment to the cylinder of a single acting hydraulic ram and being provided at its opposite end with integral ears extending away from the hub and along its axis, parallel fixed pins mounted in said ears on opposite sides of said axis and remote from said opposite hub end, a wedge shaped jaw directly pivotally suspended at its medial portion from each of said pins, each of said jaws having an integral actuating arm directly slidably engageable with the end of the ram plunger and extending inwardly from its suspension pin past the arm of the other jaw a considerable distance across said axis, and the extreme outer ends of said jaws being directly abuttable to prevent swinging of either jaw across said axis, a tension spring housed within and connecting said jaws and cooperating therewith to constantly urge said outer jaw ends toward each other and said arms toward said ram plunger end, and cooperable abutments formed directly on said hub and on the extreme inner ends of said jaws for positively stopping spreading motion of the jaws by said ram beyond predetermined limiting positions.

5. A spreading tool comprising, a hub having one end formed for attachment to the cylinder of a single acting hydraulic ram and being provided at its opposite end with laterally spaced pairs of integral ears extending away from the hub and along its axis, parallel transverse pins fixedly mounted in each pair of said ears on opposite sides of said axis and remote from said opposite hub end, a wedge shaped jaw directly pivotally suspended at its thickened portion from each of said pins, each of said jaws having an integral actuating arm directly slidably engageable with the end of the ram plunger and extending inwardly from its thickened portion past the arm of the other jaw a considerable distance across said axis, and the extreme outer ends of said jaws being directly abuttable to prevent swinging thereof across said axis, and a tension spring connecting said jaws and cooperating therewith to constantly urge said outer jaw ends toward each other and said arms towards said ram plunger end, and cooperable abutments on said hub and on the extreme inner ends of said jaws for positively limiting the spreading motion of the jaws by said ram.

6. A spreading tool comprising, a hub having one end formed for attachment to the cylinder of a single acting hydraulic ram and being provided at its opposite end with laterally spaced pairs of integral ears extending away from the hub and along its axis, parallel transverse pins fixedly mounted in each pair of said ears on opposite sides of said axis and remote from said opposite hub end, a wedge shaped jaw directly pivotally suspended at its thickened portion from each of said pins, each of said jaws having an integral actuating arm directly slidably engageable with the end of the ram plunger and extending inwardly from its thickened portion past the arm of the other jaw a considerable distance across said axis, and the extreme outer ends of said jaws being directly abuttable to prevent swinging thereof across said axis, and a tension spring connecting said jaws and cooperating therewith to constantly urge said outer jaw ends toward each other and said arms towards said ram plunger end.

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