

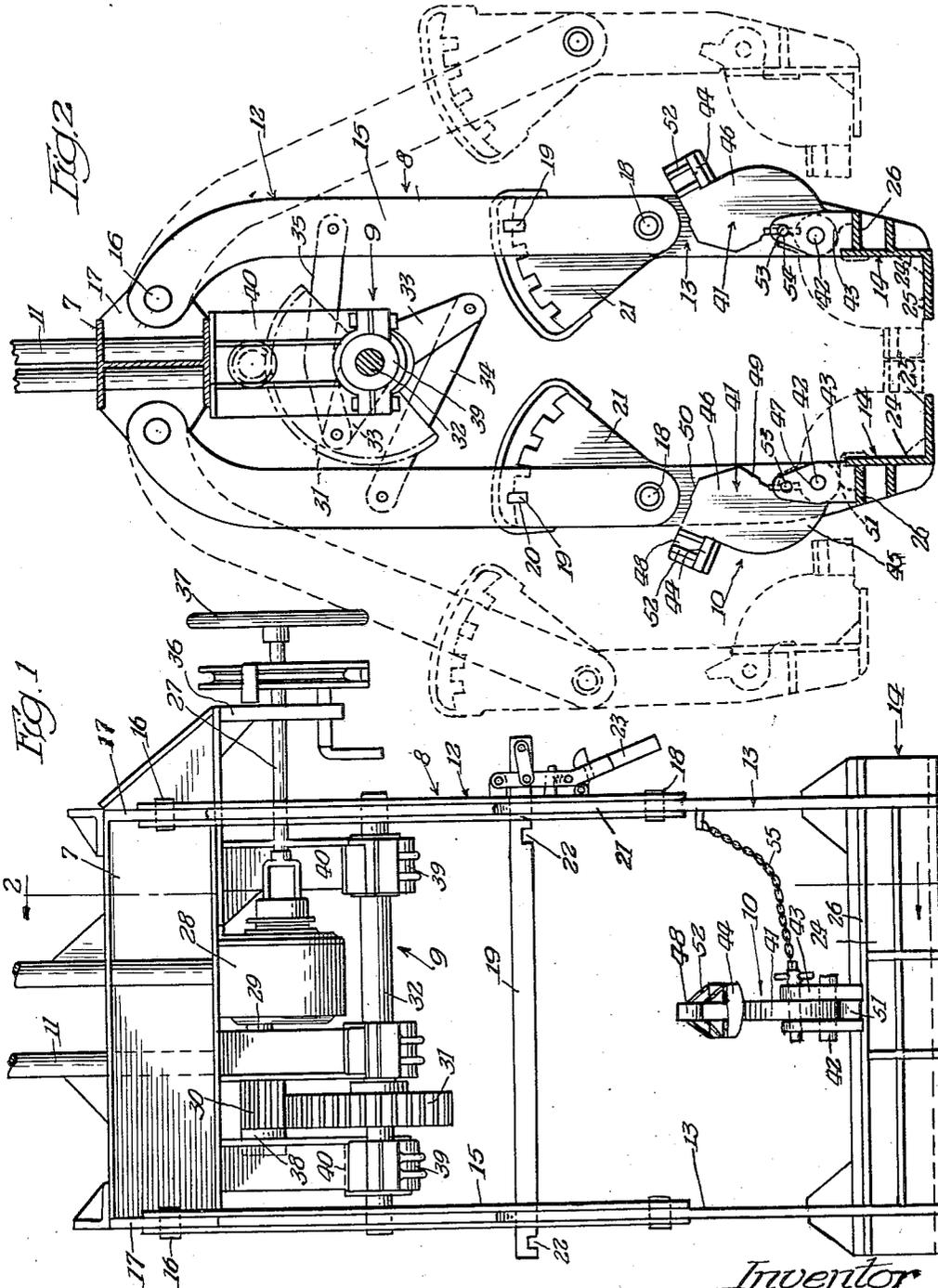
July 1, 1958

H. HOOKER ET AL  
AUXILIARY COIL LIFTING DEVICES FOR THE JAWS  
OF A SHEET LIFTER

2,841,434

Filed Aug. 23, 1954

2 Sheets-Sheet 1



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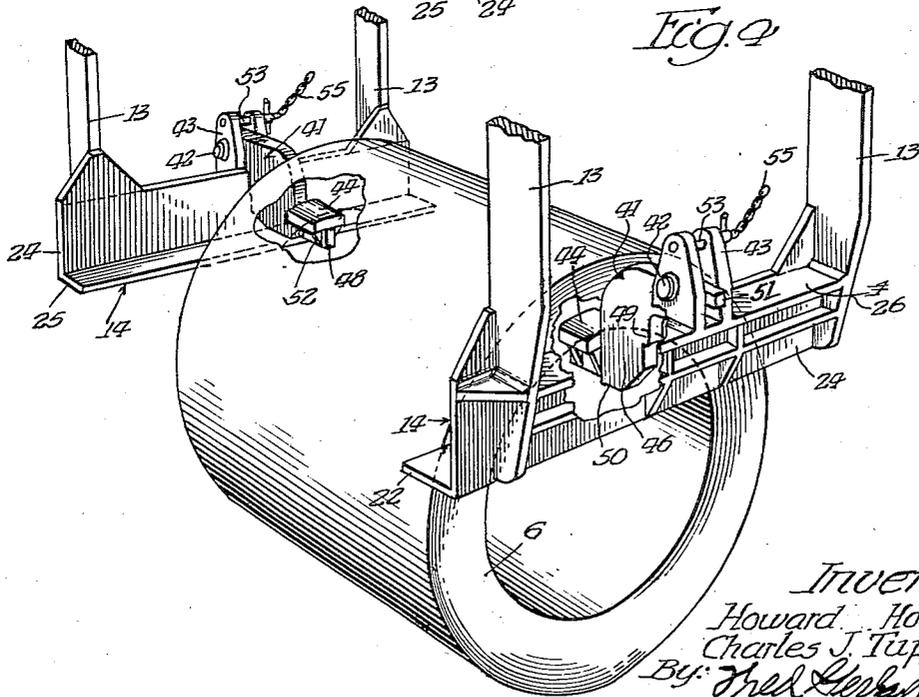
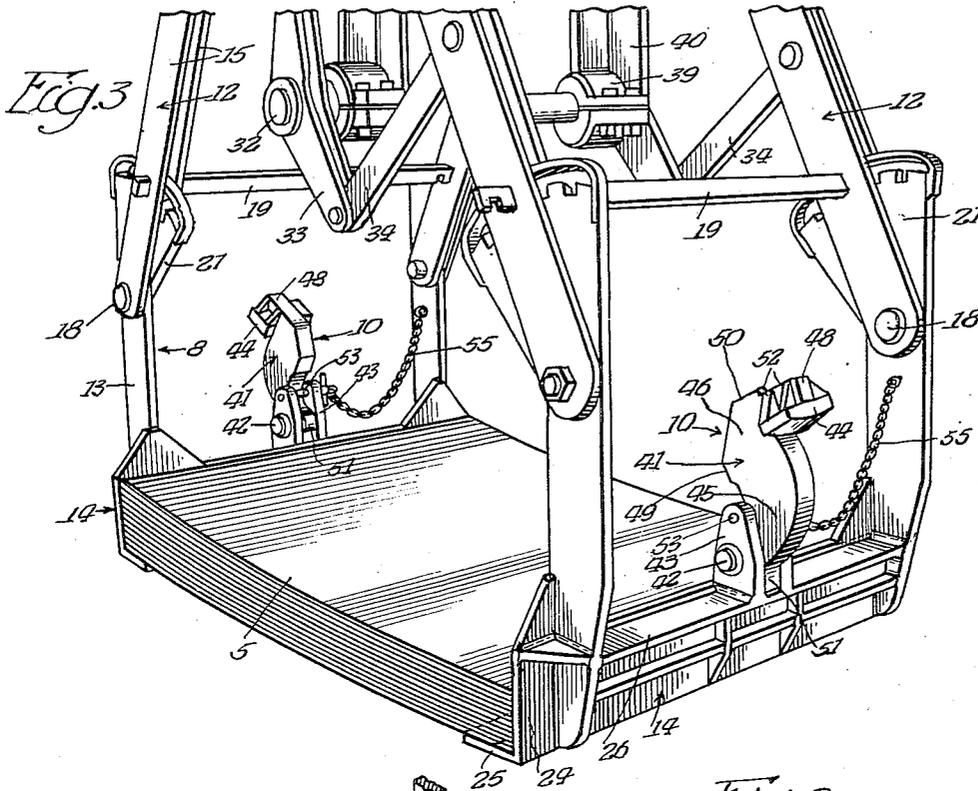
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**AUXILIARY COIL LIFTING DEVICES FOR THE JAWS OF A SHEET LIFTER**

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1 Claim. (Cl. 294—67)

The present invention relates generally to lifters for use in moving or transporting from place to place metallic articles. More particularly, the invention relates to that type of lifter which is adapted to be hoisted and lowered and also moved from place to place by a crane or overhead hoist and as its principal components or parts comprises: an elongated supporting element which is adapted normally to extend horizontally and has on its central portion an upstanding bail whereby it may be attached to a hook or other connecting device on the operating end of the crane or hoist with which the lifter is used; a pair of oppositely disposed, horizontally elongated complementary jaws which are carried by the supporting element so that they depend therefrom and are also shiftable to and from one another into and out of engagement with the articles to be handled; and gearing which is associated with and carried by the supporting element and operates when driven in one direction to shift the jaws apart and when driven in the opposite or reverse direction to shift the jaws towards one another into gripping relation with the articles to be carried by the lifter.

As evidenced by United States Patent No. 2,256,896, dated September 23, 1941, and entitled "Lifter," it has heretofore been proposed in connection with a lifter of the aforementioned type to provide the lower portion of each of the jaws with a horizontally extending angle bar, one leg of which extends substantially vertically and the other leg of which extends inwards from, and at right angles to, the one leg. A lifter wherein the lower portions of the jaws are provided with horizontally extending angle bars has only limited capabilities of use because its use is restricted to handling metallic sheets and like or similar articles. In many instances it is necessary to lift metallic coils as well as sheets. If metallic coils are to be handled it has heretofore been necessary to employ a special lifter.

The main object of this invention is to provide a lifter which embodies at the lower portions of its jaws, horizontally extending angle bars for use in lifting metallic sheets and also embodies auxiliary devices which are associated with the angle bars and are adapted when brought into play to permit the lifter to handle metallic coils. By employing the auxiliary devices, the one lifter may be used to handle not only sheets but also coils and hence, it is unnecessary for the user of the lifter to have a special lifter for coil handling purposes. Generally speaking, each auxiliary device comprises an arm which has one end thereof pivotally mounted on the associated angle bar so that it is capable of being swung back and forth between an inoperative position wherein it extends upwards and an operative position wherein it extends inwards and downwards and is supported on the inwardly extending leg of the associated angle bar, and embodies at its other end a saddle-like member which when the arms is in its operative position is arranged and adapted to receive the upper portion of one end of a horizontally disposed metallic coil.

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Another object of the invention is to provide a dual purpose lifter of the type and character under consideration in which the arms of the auxiliary devices for permitting the lifter to handle coils as well as sheets are so shaped and designed that when they are in their operative position, portions thereof bear against the horizontally and vertically extending legs of the angle bars to the end that the arms are effectively and efficiently supported by the angle bars.

A further object of the invention is to provide a lifter of the aforementioned character in which the auxiliary devices are provided with simple means for releasably retaining or locking the arms thereof in their inoperative position.

A still further object of the invention is to provide a lifter which is generally of new and improved construction, may be operated with facility, and has greater capabilities of use than previously designed lifters of the same general type.

Other objects of the invention and the various advantages and characteristics of the present lifter will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the claim at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a side view of a lifter embodying the invention;

Figure 2 is a vertical transverse section taken on the line 2—2 of Figure 1, showing the jaws in full lines and with the auxiliary devices in their inoperative position, and also showing the jaws in dotted lines and with the auxiliary devices in their operative position;

Figure 3 is a fragmentary perspective of the lifter, showing the auxiliary devices in their inoperative position wherein they permit the lifter to be used to handle a stack of metallic sheets; and

Figure 4 is a fragmentary perspective of the lifter, illustrating the auxiliary devices in their operative position and showing the manner in which they permit the lifter to be used in connection with the handling of a metallic coil.

The lifter which is shown in the drawings constitutes the preferred form or embodiment of the invention. It is adapted to be attached to, and used in connection with, a crane or overhead hoist (not shown) and constitutes a medium or instrumentality for handling a stack 5 of metallic sheets or a metallic coil 6. As its principal parts or components, the lifter comprises an elongated supporting element 7, a pair of oppositely disposed horizontally elongated jaws 8, gearing 9 for conjointly shifting the jaws to and from one another, and a pair of auxiliary devices 10 for enabling the lifter to be used in connection with handling of the coil 6. Except for the auxiliary devices 10, the lifter is conventional and follows the design, construction and mode of operation of the lifter forming the subject matter of the aforementioned United States Patent No. 2,256,896.

The supporting element 7 is adapted normally to extend horizontally. It carries the jaws 8 and the gearing 9 and is in the form of an eyebeam. As shown in Figures 1 and 2, the supporting element 7 carries the jaws in a depending manner and embodies midway between its ends an upstanding bail 11 whereby the lifter as a whole may be attached to the hook at the operating end of the crane or hoist.

The oppositely disposed complementary jaws 8 extend lengthwise of the supporting element 7 and comprise

upper members 12, lower members 13 and angle bars 14. The upper members of the jaws have turned or inwardly extending upper ends (see Figure 2) and each comprises a pair of laterally spaced plate metal pieces 15. The upper ends of the upper members 12 are pivotally connected by way of horizontal pivot pins 16 to laterally extending pivot lugs 17 on the elongated supporting element 7. The pivot lugs 17 fit between the top and bottom flanges of the supporting element 7 and are welded in place. The pivot pins 16 extend through aligned holes in the upper ends of the plate metal pieces 15 and the outer central portions of the pivot lugs 17 and together with the lugs so pivotally support the jaws 8 that the latter are permitted to swing to and from one another. The lower members 13 of the jaws 8 extending substantially vertically and carry at their lower ends the angle bars 14. The upper ends of the members 13 project into the spaces between the lower ends of the pairs of plate metal pieces 15 and are pivotally supported by horizontal pins 18 in such manner that the lower members 13 may be swung into different angular positions with respect to the upper members 12 in order to adapt the lifter for use in handling large sized stacks of sheets and coils as well as small sized stacks of sheets and coils. A pair of horizontally extending lock bars 19 serves to hold or lock the lower members 13 of the jaws in their various adjusted positions with respect to the upper members 12. Such bars extend through, and are horizontally slidable in, slots 20 in the lower ends of the plate metal pieces 15 and are adapted to coact with teeth-equipped sector shaped elements 21 at the upper ends of the lower members 13. The elements 21 are disposed above the pivot pins 18 and fit between the lower ends of the plate metal pieces 15 constituting the upper members 12 of the jaws 8. The lock bars 19 are provided with notches 22 adjacent the teeth-equipped sector shaped elements 21 and are adapted when slid longitudinally in one direction to have the notches brought in alignment with the elements so that the latter together with the lower jaw members are free to be swung laterally into any desired adjusted position with respect to the upper jaw members. When the lock bars are shifted in the opposite direction, the portions of the lock bars that are at one side of the notches 22 are adapted to interlock with the elements 21 and lock the lower members 13 against swinging movement relatively to the upper members 12. Longitudinal shift of lock bars 19 is effected by means of handle-equipped levers 23 which are carried by certain of the upper members of the jaws. The lock bars 19, the sector shaped elements 21 and the levers 23 constitute means for releasably locking the lower jaw members in their various adjusted positions with respect to the upper jaw members. Such means form the subject matter of United States Patent No. 2,213,055 to which reference may be had for a more detailed disclosure thereof. The angle bars 14 of the jaws 8 are two in number and extend horizontally. They extend across the lower ends of the lower jaw members 13 and comprise vertically extending legs 24 and horizontally extending legs 25. The ends of the vertically extending legs 24 are welded to the inner surfaces of the lower ends of the lower jaw members 13 and are adapted when the jaws are shifted towards one another into hoisting relation with the stack 5 of sheets to abut against the side edges of the sheets. The horizontally extending legs 25 of the angle bars 14 are formed integrally with, and project inwards from, the bottom margins of the vertical legs 24 and are adapted when the lifter is utilized to handle the stack 5 to underlie the side margins of the sheets. The angle bars 14 are brought into play when the lifter is used to handle the stack 5. The vertical legs 24 of the angle bars are reinforced by a pair of horizontal metallic plates 26. The latter are welded to, and project outwards from, the upper margins of the vertical legs 24 and are disposed a small distance beneath the upper edges of said vertical legs. The ends of the plates

26 abut against, and are welded to, the lower ends of the lower jaw members 13.

The gearing 9 for conjointly swinging or shifting the jaws 8 to and from one another is located beneath the elongated supporting element 7 and comprises a horizontal shaft 27, a gear-type speed reducing unit 28, a shaft 29, a pinion 30, a gear segment 31, a rock shaft 32, a pair of levers 33, a pair of links 34 and a pair of links 35. The shaft 27 is disposed beneath, and extends lengthwise of, the front end of the supporting element 7 and is journaled in a depending bearing 36. It is provided at its outer end with a hand wheel 37 for turning purposes and has its inner end connected to the drive shaft of the speed reducing unit 28. Such unit is suitably supported beneath the central portion of the supporting element 7 and has the driven shaft thereof suitably connected to one end of the shaft 29. The shaft 29 is located under, and extends lengthwise of, the rear end of the supporting element 7 and is journaled in a bearing 38. The pinion 30 is formed as an integral part of the shaft 29 and meshes with, and serves to drive, the gear segment 31. The rock shaft 33 has the gear segment 31 fixedly secured thereto and is journaled in bearings 39 on the lower ends of vertically extending brackets 40, the upper ends of which are connected to the supporting element 7. It extends horizontally and is disposed beneath and in parallel relation with the supporting element 7. The levers 33 have the central portions thereof fixedly connected to the ends of the rock shaft and are transversely aligned with the upper jaw members 12. The links 34 extend between, and are pivotally connected to, certain ends of the levers 33 and the central portions of the upper members of one of the jaws. The links 35 extend between, and are pivotally connected to, the other ends of the levers 33 and the central portions of the upper members of the other jaw. The gearing 9 is such that when the hand wheel 37 is turned in one direction, the jaws 8 are swung apart and when the hand wheel is turned in the opposite direction, the jaws are swung towards one another.

The auxiliary devices 10 are adapted to be brought into play when it is desired to use the lifter in connection with handling of the coil 6. They are associated with the angle bars 14, respectively, and each comprises an arm 41, a pivot pin 42, a pair of spaced apart pivot brackets 43 and a saddle-like coil engaging and supporting member 44. As shown in the drawings, the devices 10 are mounted on the central portions of the angle bars 14 and hence, are oppositely disposed or positioned. The arms 41 of the auxiliary devices extend vertically and are L-shaped. They consist of proximal parts 45 and distal parts 46 and are pivotally supported by the pivot pins 42 and the pivot brackets 43 so that they are free to swing back and forth between an inoperative position wherein they extend upwards as shown in Figures 1 and 3 and also in full lines in Figure 2 and an operative position wherein they extend downwards and inwards as shown in Figure 4 and also in dotted lines in Figure 2 of the drawings. The proximal parts 45 of the arms 41 extend at right angles to the distal parts 46 and have the outer extremities thereof disposed between the pivot brackets 43. The latter extend upwards from the central portions of the horizontal plates 26 and have the lower ends thereof welded to the subjacent portions of said plates. The pivot pins 42 are horizontally disposed and extend through aligned holes 47 in the central portions of the pivot brackets 43 and the outer extremities of the proximal parts of the arms 41. The outer extremities of the proximal parts of the arms are provided with integral outwardly extending lugs 51 which when the arms are in their inoperative position, extend downwards, rest on the plates 26 and operate to prevent the arms from tilting or swinging outwards beyond their inoperative position. The distal parts 46 of the arms are so shaped that when the arms 41 are in their operative position, they fit within the angle bars

14. The portions of the distal parts 46 that face the vertical legs 24 of the angle bars when the arms 41 are in their operative position, are provided with integral boss-like feet 49 which are adapted to abut against the adjacent portions of said legs and coact therewith to hold the arms in their said operative position. The portions of the distal parts that overlie the horizontal legs 25 of the angle bars when the arms are in their operative position, are provided with integral boss-like feet 50, and these are adapted to rest on the horizontal legs and to coact therewith to hold the arms in their said operative position. The corner portions of the distal parts 41 that are remote from the pivot pins 42 are provided with integral outwardly extending lugs 48. The latter, when the arms 41 are in their operative position, extend horizontally and project inwards an appreciable distance beyond the free side edges of the horizontal legs 25 of the angle bars 14. The saddle-like members 44 are arcuate and have the central portions thereof welded to the surfaces of the lugs 48 that face upwards when the arms 41 are in their operative position. The end portions of the members 44 are reinforced by way of triangular gusset plates 52, certain marginal portions of which are welded to the sides of the lugs 48 and other marginal portions of which are welded to the inner surfaces of the end portions of the saddle-like members 44. Such members are adapted when the arms 41 are in their operative position to fit within and support the upper portions of the ends of the coil 6 as shown in Figure 4 of the drawings. In order releasably to hold the arms 41 in their inoperative position, a pair of pins 53 is provided. These pins are designed to extend horizontally through aligned holes 54 in the upper ends of the pivot brackets 43 and are adapted when in place while the arms 41 are in their inoperative position to fit within the apices of the V-shaped spaces between the proximal and distal parts of the arms 41. When the pins 53 are in their inoperative position, the lugs 51 prevent outward tilting of the arms as hereinbefore pointed out and the pins 53 while extending through the holes 54 prevent inward tilting or swinging of the arms. When it is desired to release the arms 41 so that they may be swung inwards and downwards into their operative position, it is only necessary to withdraw the pins 53 from the holes 54 by sliding them longitudinally or axially. In order to prevent the pins 53 from being lost or misplaced, the pins are provided with chains 55, certain ends of which are anchored to the pins and the other ends of which are anchored to certain of the lower members 13 of the jaws 8 as best shown in Figure 3 of the drawings.

When it is desired to use the lifter in connection with the handling of the stack 5 of metallic sheets, the arms 41 of the auxiliary devices 10 are first swung upwards and outwards into their inoperative position and then locked in place by inserting the pins 53 through the holes 54 in the upper ends of the pivot brackets 43. As soon as the arms 41 are locked in place, the lifter is manipulated into straddled relation with the stack. Thereafter, the hand wheel 37 of the gearing 9 is turned so as to swing the jaws 8 together. The hand wheel 37 is turned until the angle bars 14 at the lower portions of the jaws are brought into gripping relation with the side margins of the sheets. After the conclusion of this operation, the lifter may be hoisted and then transported to any desired place.

When it is desired to utilize the lifter in connection with handling of the coil 6, the pins 53 are first removed

from the holes 54 and then the arms 41 are swung inwards and downwards into their operative position. Thereafter, the lifter is brought into straddled relation with the ends of the coil 6 and the jaws 8 are swung or shifted inwards in order to bring the saddle-like members 44 into a position wherein they directly underlie the upper end portions of the coil. When the members 44 are properly positioned, the lifter may be hoisted so as to move or transport the coil 6 where desired.

The herein described lifter is essentially simple in design and is characterized by the fact that it includes the auxiliary devices 10. Because the lifter includes such devices, it is in effect a dual purpose lifter because it is capable of being used to handle metallic coils or like articles as well as stacks of sheets.

The invention is not to be understood to be restricted to the details set forth since these may be modified within the scope of the appended claim without departing from the spirit and scope of the invention.

Having thus described the invention what we claim as new and desire to secure by Letters Patent is:

In a lifter of the type that is adapted normally for use in handling a stack of sheets and comprises a horizontal supporting element, a pair of oppositely disposed depending complementary jaws having means between their upper portions and the element whereby they are permitted to swing towards and away from one another; and provided at their lower portions with fixed horizontally extending angle bars adapted to grip and support opposite side margins of the stack when the jaws are swung towards one another in connection with a stack handling operation and consisting of vertical legs and inwardly extending horizontal legs along the lower margins of the vertical legs, and gearing extending between the element and side jaws and operative when driven in one direction to move the jaws towards one another and when driven in the opposite direction to move the jaws away from one another; a pair of auxiliary devices mounted on, and associated respectively with, the jaws, adapted when in use to enable the lifter to handle a tubular article, and comprising brackets connected fixedly to, and extending upwards from, the upper margins of the vertical legs of the angle bars, vertically extending L-shaped arms consisting of proximal parts and distal parts, having the outer ends of their proximal parts connected to the brackets by horizontal pivot pins so that they are capable of swinging back and forth between an inoperative position wherein they extend upwards with respect to the angle bars and an operative position wherein they extend inwards and downwards and the distal parts thereof rest on the horizontal legs of the angle bars, and provided on the outer ends of their distal parts with lugs that extend inwards of and beyond said horizontal legs when the arms are in their operative position, and arcuate saddle-like members connected fixedly to said lugs and adapted when said arms are in their operative position and the jaws are moved towards one another in connection with an article handling operation to fit within and support the upper portions of the ends of the article.

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