

- [54] **WORK CARRIER FOR ABRASIVE CLEANING ARRANGEMENTS**
- [75] Inventors: **Bernard W. Ixer; Davis Lee Baughman**, both of Hagerstown, Md.
- [73] Assignee: **The Carborundum Company**, Niagara Falls, N.Y.
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- [62] Division of Ser. No. 83,362, Oct. 23, 1970, Pat. No. 3,722,710.
- [52] U.S. Cl. **51/14, 51/215 E**
- [51] Int. Cl. **B24c 3/10**
- [58] Field of Search **51/215 R, 215 AR, 51/215 E, 9, 14, 15; 214/1 BA; 294/95, 97**

References Cited			
UNITED STATES PATENTS			
1,875,994	9/1932	Davis	51/15
2,765,590	10/1956	Belejack et al.....	51/215 E X
3,152,830	10/1964	Pounder et al.	294/95
3,495,720	2/1970	Mann, Jr. et al.	214/1 BA
3,603,037	9/1971	Mann, Jr. et al.	51/14
3,688,445	9/1972	Long.....	51/14

Primary Examiner—Donald G. Kelly
Assistant Examiner—Howard N. Goldberg
Attorney—David E. Dougherty and Robert E. Walter

[57] **ABSTRACT**

A work carrier for use in abrasive cleaning arrangements comprises a support movable in a forward direction with generally vertical work engaging arms having hook-like projections for moving into and out of a work engaging position.

5 Claims, 9 Drawing Figures

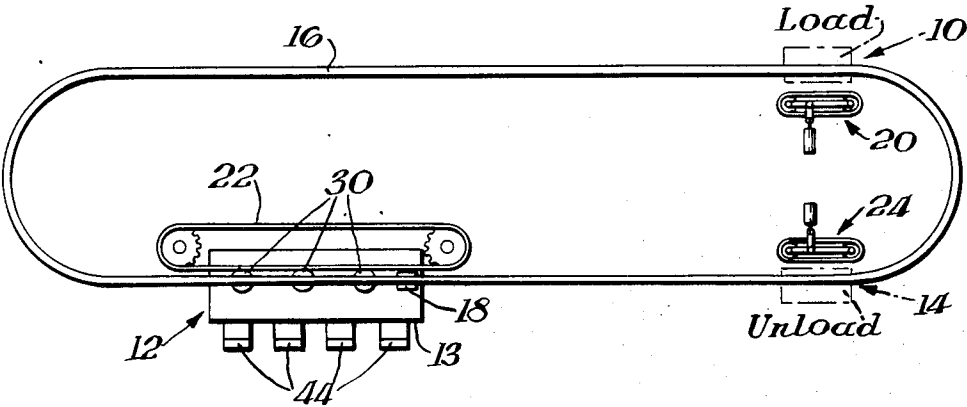


Fig. 1.

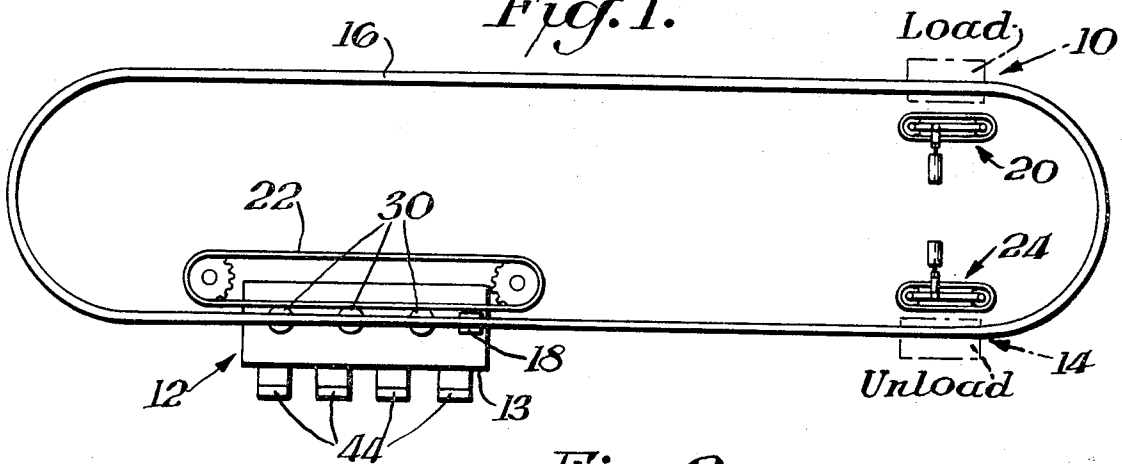
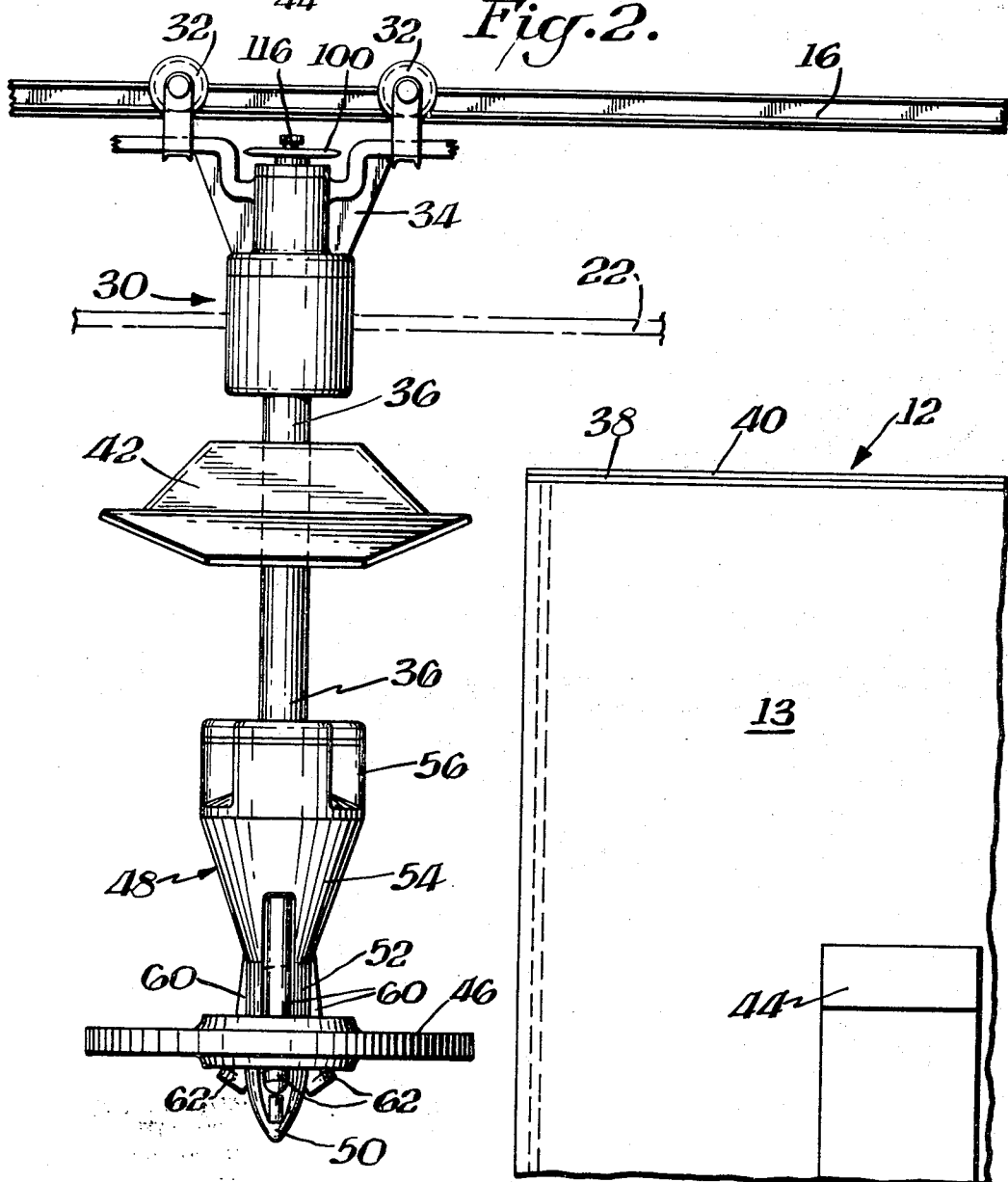


Fig. 2.



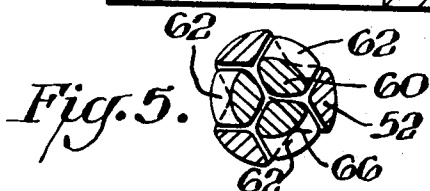
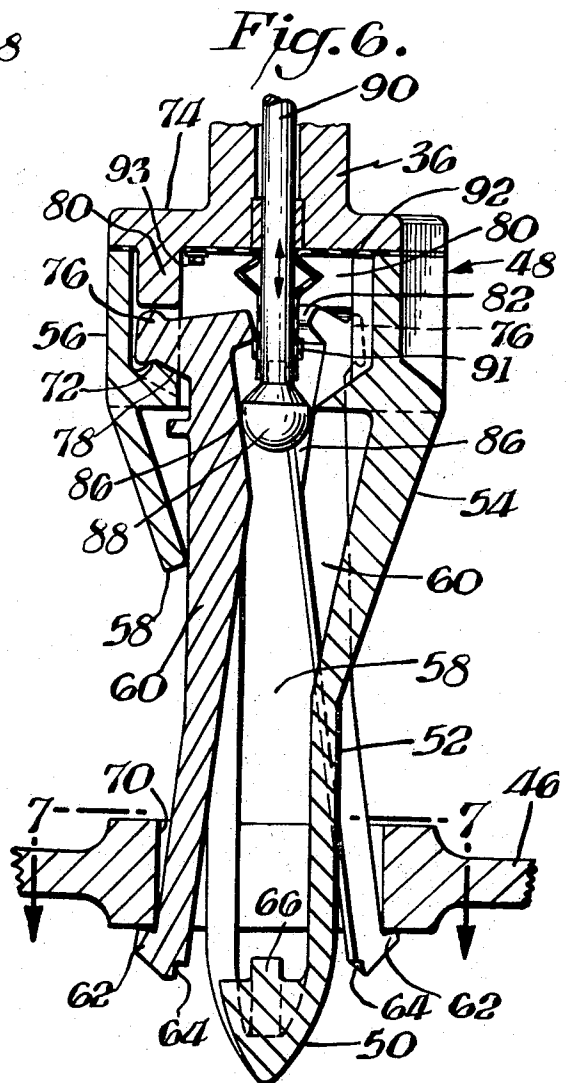
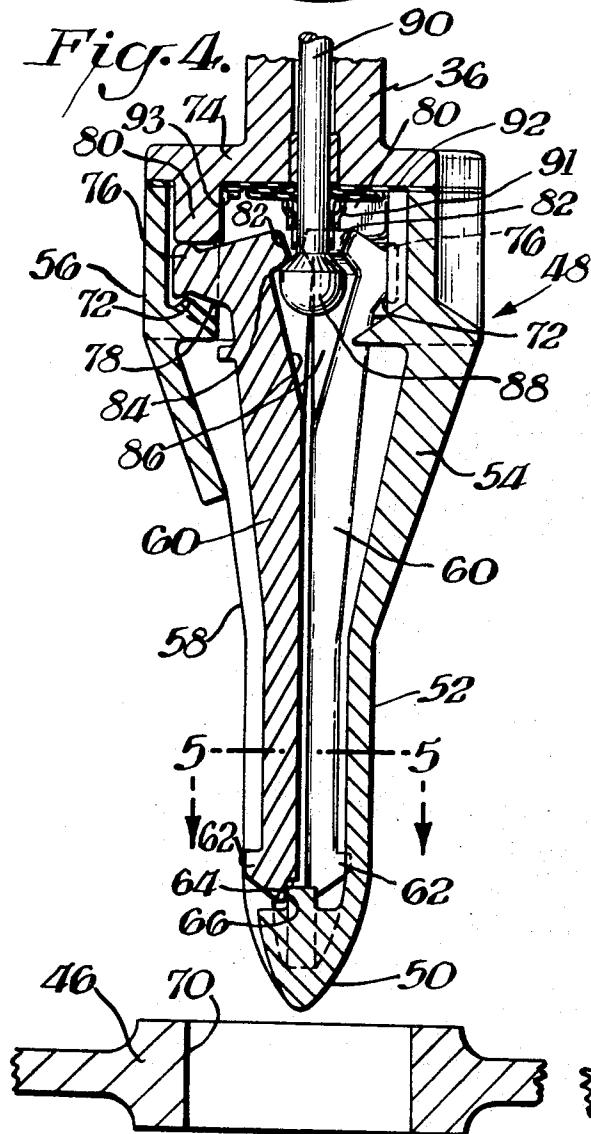
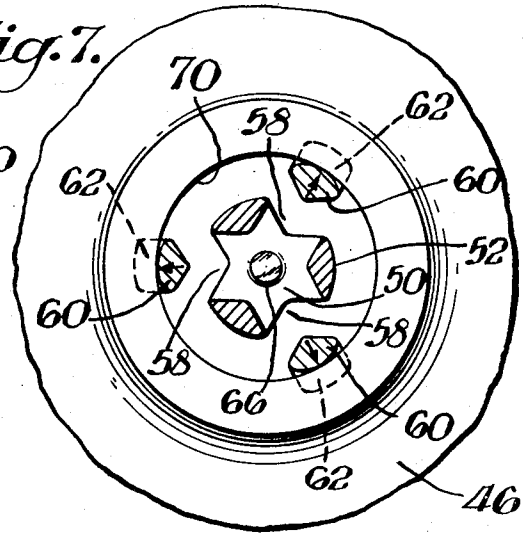


Fig. 9.

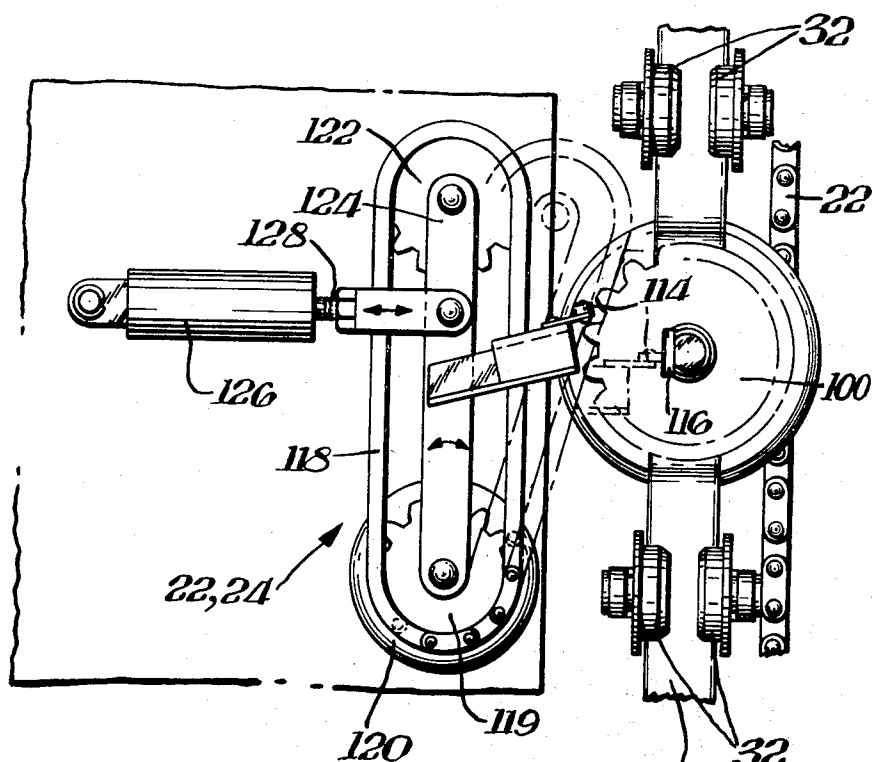
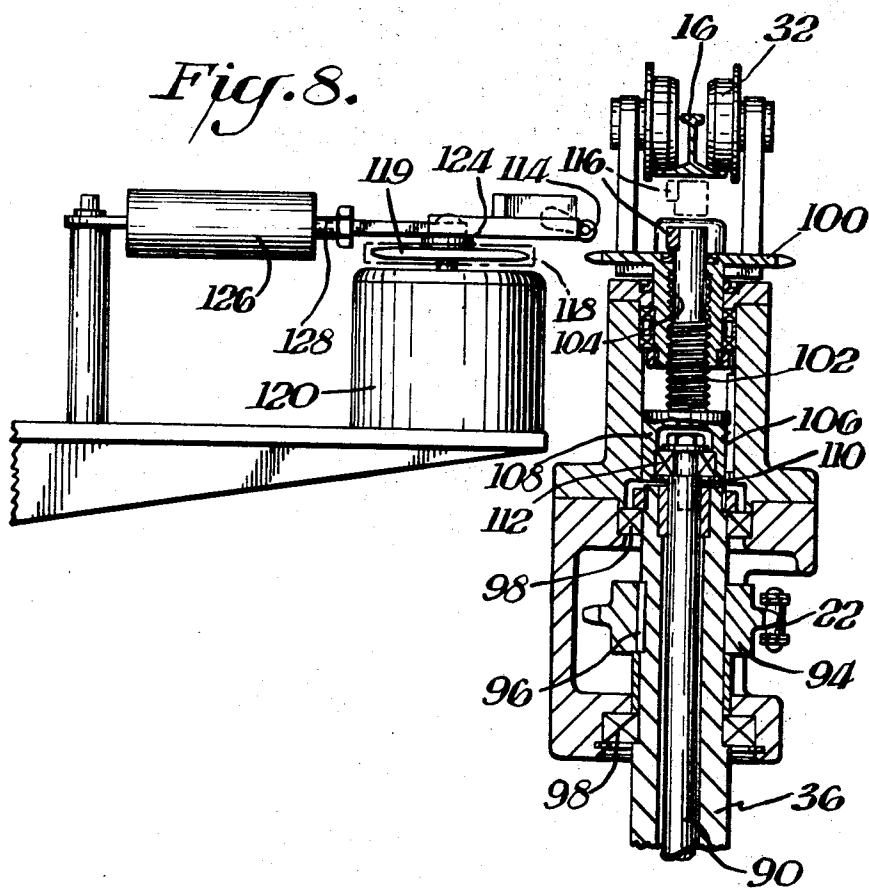


Fig. 8.



WORK CARRIER FOR ABRASIVE CLEANING ARRANGEMENTS

This is a division, of a copending application Ser. No. 83,362, filed Oct. 23, 1970 now U.S. Pat. No. 3,722,710.

BACKGROUND OF THE INVENTION

This invention relates to a work carrier for holding and transporting work pieces which are subjected to a cleaning action such as by abrasive throwing wheels. Various carriers exist for various purposes. One particularly advantageous carrier is illustrated and described in U.S. Pat. No. 3,495,720 which includes a self-powered trolley having some type of work engaging means thereon. In addition to the above carrier, there is a need for work carriers which may be reliably used for holding particular types of work pieces which are to be conveyed through various cleaning stations.

SUMMARY OF INVENTION

An object of this invention is to provide such a work carrier which is particularly adaptable for transporting articles having openings therethrough such as railroad car wheels.

In accordance with this invention a work carrier for use in abrasive cleaning arrangements comprises a support movable in a forward direction with generally vertical work engaging arms having hook-like projections for moving into and out of a work engaging position.

Rotation means may be provided for rotating the arms and the work carrier thereby to facilitate the complete cleaning of the work.

The arms may be loosely pivotally engaged with ledges in a housing and the pivotal action may be controlled by the vertical movement of a ball or spherical member engaging the inner surfaces of the arms for moving the arms into and out of engagement with the work.

The ball may be at the end of a spindle which has a threaded extension engaged with a rotatable sprocket in such a manner that rotation of the sprocket causes the spindle to move up or down. The housing for the arms may have a tapered nose to assure positioning of the arms in the work and may include a skeletal framework to permit the arms to subsequently move out of the housing into engagement with the work.

A load station and an unload station may be provided on opposite sides of a blasting station with limit switches at the load and unload stations for controlling a piston cylinder assembly to each of such stations which in turn moves a chain-sprocket assembly into and out of engagement with the sprocket on the spindle.

THE DRAWINGS

FIG. 1 is a schematic plan view of an arrangement including the work carrier of this invention;

FIG. 2 is an elevation view of a work carrier in accordance with this invention;

FIG. 3 is a plan view of the work carrier arms and its housing in accordance with this invention;

FIG. 4 is a cross-sectional view in elevation of the lower portion of the work carrier shown in FIGS. 2—2;

FIG. 5 is a cross-sectional view taken through FIG. 4 along the line 5—5;

FIG. 6 is a cross-sectional view in elevation similar to that shown in FIG. 4 in a different phase of operation;

FIG. 7 is a cross-sectional view taken through FIG. 6 along the line 7—7;

FIG. 8 is a cross-sectional view in elevation of the upper portion of the carrier shown in FIG. 2 whereby the portions shown in FIGS. 4 and 8 comprise a cross-sectional view in elevation of the entire work carrier shown in FIG. 2; and

FIG. 9 is a plan view of the work carrier shown in FIG. 8.

DETAILED DESCRIPTION

FIG. 1 shows a general arrangement which includes a load station 10, a blast cleaning station 12, and an unload station 14. The stations are interconnected by means of an overhead rail 16. It is on this rail that the work carrier 30 is supported and pulled in a forward direction by any suitable translatable drive means such as power operated tractor 18. A sprocket chain assembly 20 is provided at load station 10 to cause the carrier to engage a work piece and a further sprocket chain assembly 22 is located at blasting station 12 to rotate the carrier and its work with a still further sprocket chain assembly 24 being provided at unload station 14 to disengage or release the work from the carrier.

FIG. 2 is an elevation view of a work carrier 30 in accordance with this invention. As indicated therein carrier 30 includes a pair of wheels 32 which are supported on rail 16 and pulled in a forward direction by the tractor 18 schematically shown in FIG. 1. It is to be understood that a single tractor may be provided for each work carrier or as shown in FIG. 1 a plurality of work carriers may be interconnected with a group of such carriers moved by a single tractor.

Referring again to FIG. 2 a housing 34 is supported by wheels 32 with a spindle casing 36 extending therefrom. The blast station 12 may be of a suitable construction and may include a treating chamber 13 having a pair of rubber lips 38, 40 at its upper end which are opened by plow 42 whereby the lips and plow form a traveling seal. This type of seal is described in greater detail in U.S. Pat. No. 3,418,756 the details of which are incorporated herein by reference thereto. FIG. 2 schematically shows one of a plurality of centrifugal throwing wheels 44 which may be arranged at different elevations to thoroughly clean the work piece or railroad wheel 46 in a conventional manner.

FIGS. 3—7 show the details of the work engaging elements of carrier 30. As indicated therein a housing 48 is provided and in general includes a tapered nose portion 50 which merges into a vertically straight portion 52 which in turn merges into an outwardly tapered 54 and terminates in a vertically straight portion 56. Parts of straight and tapered portions 52, 54 are made of skeletal form to provide a plurality of spaced openings 58. Within the housing 48 are a plurality, such as three, symmetrically arranged arms 60. Each arm terminates at its lower end in a hook-like projection 62 and includes a recess 64 for fitting against shoulder 66 of nose 50 so that when the arms are in the position shown in FIG. 4, which might be considered the work releasing position, the hook-like projections 62 conform to the general profile of housing 48 and thus the housing may be inserted into opening 70 in wheel 46. Tapered portion 54 prevents the housing from being inserted completely through the opening. Ledges 72 are provided in housing 48 to act as a pivot for each of the arms 60. As shown in FIGS. 4 and 6 housing 48 is open at its upper

end and this upper end is closed by the cap-like member 74 provided at the end of spindle casing 36. Each arm 60 includes an offset extension 76 which has a rocking lever surface 78 for contacting pivot ledge 72. Disposed above each offset portion 76 is a flange or a shoulder 80 which acts in such a manner in conjunction with ledge 72 so as to confine offset portion 76 in loose pivotal engagement with ledge 72. A further knob or projection 82 is provided on each arm thereby forming a recess 84 with the arm having a contact surface 86 which tapers inwardly from the recess toward the longitudinal center line of ball or spherical actuating member 88 to a point below the ball 88 so that the ball is confined in the generally pyramidal space formed jointly by all of the arms.

In operation carrier 30 is in the work releasing position shown in FIG. 4 when it arrives at load station 10. The carrier is inserted through opening 70 in wheel 46 by, for example, raising the wheel or if desired by lowering the carrier in any suitable manner (not shown). If carrier 30 should be somewhat misaligned from the axial center of opening 70 nose 50 would act as a guide surface to assure proper entry of the carrier into the wheel. In the position shown in FIG. 4 ball or spherical contact member 88 is in its uppermost position reacting against knobs 82 to assure that they are in the closed position and will not project from housing 52. When the carrier has been inserted a sufficient extent so that the hook-like projections 62 are below the hub of wheel 46 ball 88 is moved downwardly in a manner later described to cause the arms to pivot on ledges 72 to the position shown in FIG. 6 wherein the hook-like projections 62 engage the underside of the hub of wheel 46. Only a slight vertical movement downward is necessary to actuate the arms into this work engaging position. Advantageously, the downward movement of arm 88 on its spindle 90 is effectuated while maintaining a seal between spindle 90 and cap 74. In this regard as shown in FIGS. 4 and 6 an expandable annular sealing member 92 is intimately secured in its central area 91 to a spindle 90 while its outermost portion 93 is secured to cap 74. Sufficient material is provided for expandable seal 92 so that the seal can properly function in both the expanded work engaging position shown in FIG. 6 and the contracted work releasing position shown in FIG. 4.

FIGS. 8-9 show the details for rotating work carrier 30 and for moving the arms into and out of the work engaging position. As shown in FIG. 8 a sprocket 94 is provided on spindle casing 36 and is secured to the casing in any suitable manner such as by key 96. When the work is in the blast area shown in FIG. 1 chain 22 engages sprocket 94 to cause rotation of the sprocket and spindle casing and thereby also rotation of the work carrier arms and the work itself. The rotation is facilitated by suitable bearings 98.

The actuation means of work engaging arms 60 is also illustrated in FIGS. 8-9. As indicated therein a further sprocket 100 is mounted coaxially around spindle 90. Spindle 90 includes externally threaded extension 102 which is threadably engaged with the internal threads 104 of sprocket 100. The extension 102 is, however, prevented from rotation by any suitable locking means as key 106. When sprocket 100 is rotated the extension 102 is caused to move up or down in accordance with the direction or rotation of sprocket 100. As best shown in FIG. 8, threaded extension 102 is con-

nected to spindle 90 by means of a hollow extension 108 which includes flanges 110 whereby the end of spindle 90 is confined in the housing in such a manner that the spindle will move up and down with extension 102 but may rotate relative thereto with suitable bearings 112 being provided to facilitate the rotation. As is readily apparent spindle 90 is thereby arranged in such a manner as to rotate along with casing 36 but moves up and down with respect to the casing, whereas the spindle 90 is arranged for movement up and down along with its extension 102 but rotates relative thereto.

Because the translatory drive means such as tractor 18 is located in the same general area as sprocket 100 the inventive arrangement includes novel means for selectively engaging and disengaging sprocket 100 with its drive chain without causing any interference to the tractor. This novel means includes a limit switch 114 disposed for contacting cam 116 when the work carrier has moved to the load or unload station with such a limit switch being provided at each station. The arrangement also includes a sprocket chain 118 driven at one end by a sprocket 119 fixed on air motor 120 while its other end moves around a slidable sprocket 122. Sprockets 119 and 122 are interconnected by a lever 124 which in turn is secured to a piston cylinder assembly. The sprocket drive and piston cylinder assembly generally assume the position indicated in solid in FIG. 9 with the piston rod 128 being retracted in cylinder 126 to thereby provide sufficient clearance for the tractor 18 to move past chain 118. The arrival of the tractor at the load or unload station operates a suitably located limit switch (not shown) which actuates the piston cylinder assembly to extend piston rod 128 and move the sprocket chain 118 to the position indicated in phantom in FIG. 9 whereby the chain 118 engages sprocket 100. Each of such actuating assemblies is provided at the loading and unloading station so that spindle 90 can be moved up or down in accordance with the direction of rotation of sprocket chain 118. At the load station, cam 116 moves down and operates limit switch 114 which signals that the hooks are engaged. This causes the piston assembly 126 to retract and the loading device to move away. Similarly, at the unload station, cam 116 moving upwards operates switch 114 which signals that the hooks are disengaged and the piston 126 retracts and the unloading device takes the work away.

What is claimed is:

1. A work carrier in combination with an abrasive cleaning station, said work carrier comprising a housing, means for supporting said housing, translatory means for moving said support means in a forward direction, means for rotating said housing and work carried thereby, a plurality of generally vertical work engaging arms, each arm having a hook-like projection at one end for engaging work and an offset extension at the other end, said housing having a plurality of ledges, each of said offset extensions being in loose pivotable engagement with a respective ledge, an actuation member disposed in said housing, said arms being disposed between said actuation member and said ledge, a spindle connected to said actuation member for selectively moving said arms outwardly away from each other into a work engaging position and inwardly toward each other into a work releasing position, a spindle casing, said spindle being connected to said spindle casing for

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rotation therewith and for relative vertical movement within and with respect to said casing, said abrasive cleaning station having abrasive cleaning means therein, and a sprocket chain for causing said rotation means to be operative while the work is in said cleaning station.

2. A work carrier as set forth in claim 1 including a load station upstream from said cleaning station and an unload station downstream from said cleaning station, vertical downward moving means being at said load station for causing said arms to move to said engaging position, and vertical upward moving means at said unload station for causing said arms to move to said releasing position.

3. A work carrier as set forth in claim 2 wherein each of said loading and unloading stations includes limit switch means disposed for contact by said carrier to detect when the work is at its respective stations, each of said vertical downward and upward moving means including a sprocket chain and drive assembly, and a piston-cylinder assembly actuated by said limit switch for

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moving said assembly into and out of engagement with said threaded sprocket.

4. A work carrier as set forth in claim 3 wherein said housing includes a guide surface comprising an outwardly tapered nose merging into a first vertically straight portion which merges into an outwardly tapered portion which then merges into a second vertically straight portion, a part of said tapered portion and said first straight portion being of skeletal form to form said openings for said projections, said projections conforming to the general outline of said housing when said arms are in said work releasing position, said arms being three symmetrically arranged arms, and each of said offset extensions having a rocking lever shaped surface for contacting said ledge.

5. A work carrier as set forth in claim 4 wherein said translatory means includes an overhead rail, a power operated tractor in driving engagement with said rail, and said support means connected to and driven by said tractor.

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