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SCRAPER HAVING MAXIMUM WIDTH BOWL

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FIG. 2.

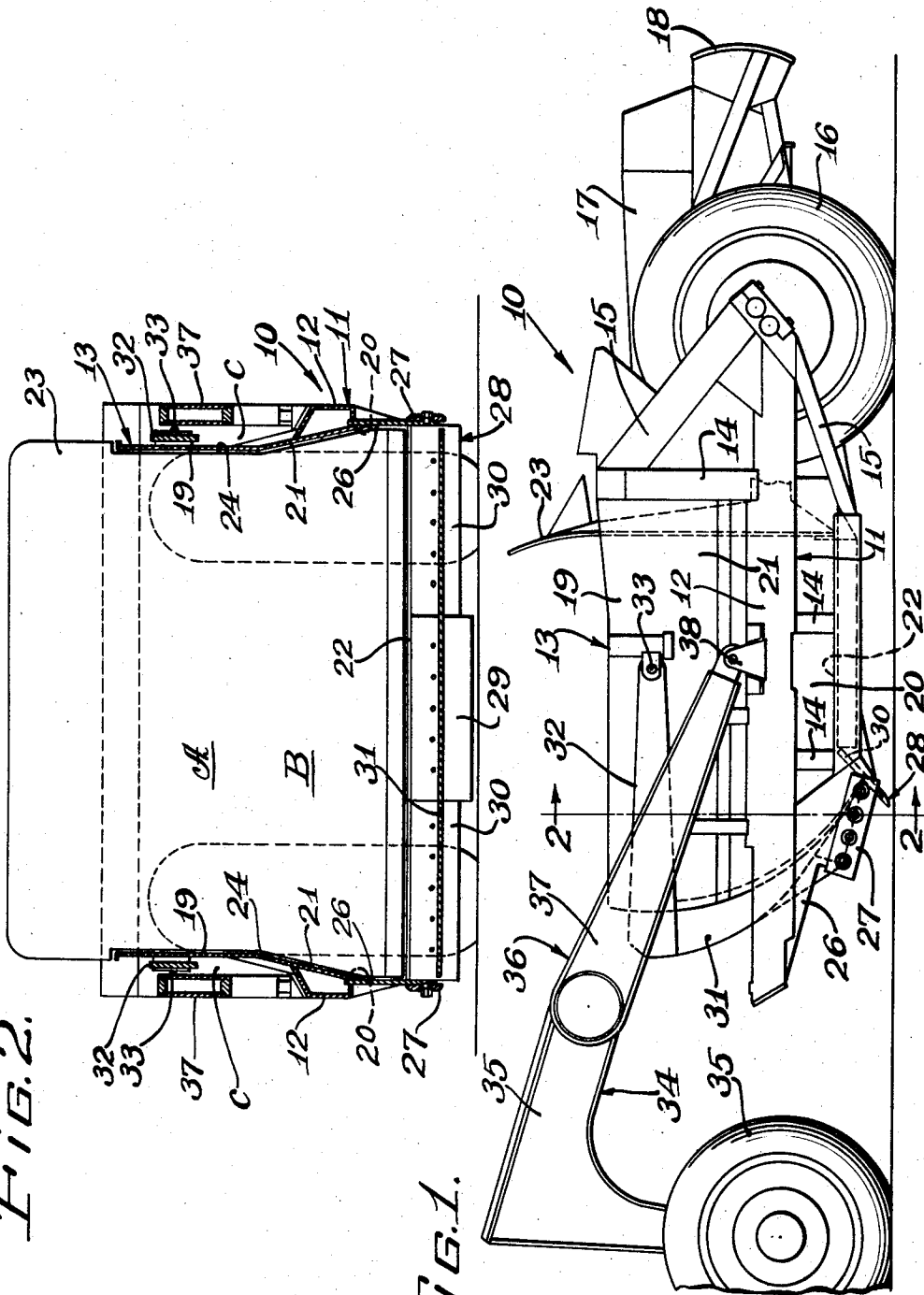


FIG. 1.

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SCRAPER HAVING MAXIMUM WIDTH BOWL

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11 Claims. (Cl. 37—126)

The present invention relates to improvements in the construction of scrapers generally utilized for excavating and grading operations. More specifically the invention relates to a scraper having a maximum width bowl and cutting blade construction.

Generally, the object of this invention is to provide an improved scraper having an increased working capacity normally not obtainable with conventional earth moving equipment.

In grading and excavating work it is important that the equipment can easily be transported from one job to another with a minimum of time and effort. This is generally accomplished by highway transportation and thus maximum width regulations and laws governing highway vehicles are generally applicable to this type of equipment. In the construction of modern day scrapers and excavators, the scraper bowl is usually positioned between longitudinally extending side members, or booms, forming part of a draft carriage. Additional brackets usually are disposed on the sides of the bowl, such brackets being necessary to the operation of the apron, etc. Since the overall or maximum width of the scraper must be carefully controlled, and in view of these necessary side members, the conventional scraper bowl has been limited in width, thus seriously curtailing the capacity of the bowl both in load carrying and in digging. Thus a limited width bowl necessarily resulted in a limited width cutting blade which of course cannot accomplish the same amount of work that a larger width blade can accomplish. It is extremely desirable therefore to provide a cutting blade having a maximum width limited only by the width of the bowl. Conventional scrapers designed within the limits, also, generally have relatively narrow bowls which are high and as a result are unstable on slope work with a marked tendency to heavy side sway when hauled at high speed. Thus it is another object of applicant's invention therefore to provide an improved bowl for a scraper, the said bowl having at least a portion thereof substantially equal to the maximum overall width of the scraper thus permitting the utilization of a cutting blade of substantially the same maximum transverse width.

A still further object of the invention is to provide a scraper bowl having an improved construction wherein the ejection or discharge of the load is greatly improved and expedited.

A more specific object of the invention is to provide a scraper bowl having a width substantially equal to the maximum overall width of the scraper; operating elements necessary to the operation thereof being disposed within recessed portions of the bowl disposed on opposite sides thereof, portions of said bowl disposed below said recesses providing an increased material gathering and carrying space to provide for increased capacity and load carrying efficiency.

A still further object is to provide an increased capacity scraper bowl, including a transversely extending blade, the scraper blade and bowl having a transverse dimen-

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sion substantially equal to the overall transverse dimension or width of the scraper.

A still further object is to provide a scraper having a relatively narrow material carrying space at the top and a wider space at the bottom providing a lower center of gravity and thus having greater stability.

Another object is to provide an improved scraper having a bowl with tapered side wall portions which permit greater efficiency and ease of dumping, due to a lesser tendency of the material to adhere or wedge to the sides of the bowl.

These further objects will become more readily apparent upon a reading of the detailed description when examined in connection with the accompanying sheet of drawings.

Figure 1 is a side elevational view of a scraper and draft mechanism therefor.

Figure 2 is a cross sectional view through a scraper taken generally along the line 2—2 of Figure 1.

Referring to the drawing the scraper is generally designated by the reference character 10. The scraper 10, which is of a type generally used for excavating and grading, comprises a frame 11 including a pair of transversely spaced longitudinally extending frame members 12, the said members 12 being suitably shaped in box section-like structure to provide maximum strength. A scraper bowl generally designated by the reference character 13 is supported on the frame 11 and is disposed between the frame members 12. Upright braces 14, suitably connected to the bowl 13 and to the frame 11, serve to securely position the said bowl on the said frame 11. The assembly disclosed is generally fabricated by welding the components in assembly and details of such securing means will not be described. The rear end of the frame 11 is provided with diagonal members 15, a pair of which are transversely spaced on opposite rear sides of the frame 11 and to which the pair of ground wheels 16 are suitably connected. Suitable supporting structure 17 is provided on the rear of the frame 11 for containing mechanism used in the operation of an ejector gate, and the said mechanism (not shown) is not described since it forms no part of the present invention. A bumper structure 18 is also suitably supported on the said frame 11.

The bowl 13 comprises a pair of laterally spaced side walls comprising upper wall portions 19 and lower wall portions 20, each of said wall portions 20 being suitably carried by each box section frame member 12. The lower wall portion 20 of the bowl 13 is best shown in Figure 1. The upper side wall portions 19, as indicated particularly in Figure 2, are integrally connected to diagonal intermediate wall portions 21 which slope downwardly and outwardly with respect to the said upper wall portion 19. The lower wall 20 is also integrally connected to the intermediate wall portion 21, the said lower wall portion 20 being disposed vertically and laterally outwardly with respect to the wall portion 19. Thus the side walls of the bowl are relatively narrow at upper portions thereof to provide a relatively narrow upper load carrying space A, and by virtue of the shape and positioning of the wall portions 20 and 21 a substantially wider load carrying space B at the lower portion of the bowl 13 is provided. As indicated in Figure 2 the outer or overall maximum width of the scraper is defined by the outside edges of the frame members 12, all portions of the scraper lying in either flush relation with respect to the said outer edges of the frame 12 or inwardly with respect thereto. By virtue of the shape of the side walls, and particularly since the wall portions 19 are spaced considerably inwardly from the maximum overall width of the scraper, recesses C are provided on opposite sides of said scraper. Thus the spaces above the frame members 12 which are

disposed inwardly of the outer edge of the frame member 12 are defined as recesses C.

The bowl 13 further includes a floor or bottom 22. An ejector gate or movable upright wall 23 is positioned for reciprocation within the said bowl 13. The ejector gate mechanism previously mentioned and not shown is effective to move the said gate 23 forwardly for discharging material from the bowl. The ejector gate 23 includes oppositely disposed side edges 24 which are slightly spaced from the wall portions 19, 20 and 21 but are so shaped as to generally conform thereto. The forward portion of the bowl 13 is defined as the gathering end, the said gathering end opening outwardly from the substantially wide material carrying space B. A pair of side plates 26 are suitably supported on the frame members 12 and project vertically downwardly thereto. The plates 26 are in the same general vertical plane as the lower wall portions 20. Side cutting blades 27 are connected to the plates 26 as indicated. A cutting blade at the forward bowl portion is designated generally at 28. The cutting blade 28 comprises a center section 29 and oppositely disposed outer sections 30, these sections being suitably connected to a moldboard (not shown) supported by the bottom 22.

The scraper bowl 13 is provided at its forward end with an apron 31, the said apron 31 being generally of conventional construction and being suitably connected to operating mechanism (not shown) whereby the said apron 31 may be raised and lowered relative to the gathering end of the scraper depending upon the particular operation performed. The apron 31 comprises laterally spaced side arms 32 which are suitably pivotally connected to the bowl as indicated at 33. It will be noted that the arms 32 are positioned substantially close to the upper wall portions 19 so that the said arms are completely disposed within the recesses C.

A draft carriage at the forward end of the scraper is generally designated by the reference character 34. The said carriage or forward bowl supporting means 34 comprises essentially a goose-neck 35 to which a yoke 36 is pivotally connected. The yoke 36 includes boom or side arms 37 which extend longitudinally along the sides of the scraper and are connected to the frame members 12 by means of a pivotal connection indicated at 38. It will be particularly noted that the side arms or booms 37 are also disposed within the recesses C so that they are substantially flush with respect to the outer edges of the frame members 12.

The maximum overall width or maximum transverse dimension of the scraper bowl 13 is thus defined by the outer edges of the frame members 12 and the boom arms 37. This maximum width or transverse dimension is generally established by statute or law in order for scrapers to be permitted to travel or be transported on public highways. By constructing the bowl with the upper side portions 19 spaced inwardly from the maximum width the recesses C serve to adequately accommodate the necessary draft arms or booms and the apron raising arms 32. By virtue of the outwardly diverging intermediate wall portions 21 and the lower wall portions 20, which is disposed outwardly with respect to the upper wall portions 19, the scraper bowl has an increased capacity and efficiency since the main working element, namely the scraper blade 28 can be made substantially or approximately the same width as the maximum overall width of the scraper bowl. Thus with the blade at the maximum width, larger bites may be taken by the scraper and the efficiency may be greatly enhanced. Furthermore the gathering end or mouth of the bowl is increased and loading of the same is greatly facilitated. It has also been determined that loading of the bowl generally is greatly enhanced by virtue of the shape of the enlarged lower space B. It has been further determined that during the unloading procedure wherein the ejector gate 23 moves toward the front end of the scraper bowl, discharge of the material through the material gathering end is

greatly facilitated since the shape of the bowl results in a tendency for the material to flush out during discharge. Generally in straight side scraper bowls, the bowl sides are push loaded to a high crown of dirt, causing the sides to bulge. This causes the dirt to become wedged against the sides making ejection difficult. This is eliminated by the improved bowl wherein the tapered sides permit the material to be discharged in sections as the ejector moves to discharge material. The terms "gathering end" has been utilized though it is apparent that this end is also utilized to discharge the material during operation of the ejector gate. Thus it is apparent that discharge of material is accelerated by the design of the bowl as indicated and gathering of the material is also greatly facilitated. Furthermore, by utilizing the enlarged space B which has a transverse dimension substantially equal to the overall dimension, the capacity of the bowl is greatly increased. The detail operation of the draft carriage 34, the apron 31 and the ejector gate 23 have not been described since conventional control means may be utilized. The advantages of the particular bowl design and appurtenant structure have been clearly described and it is believed readily apparent that the objects of the invention have been fully achieved. It is not the intention to limit the invention to the exact details of construction herein disclosed since changes and modifications may be made which do not depart from the spirit of the invention or the scope thereof as defined in the appended claims.

What is claimed is:

1. A scraper comprising a movable frame, ground wheels connected to said frame at the rear end thereof, a wheeled carriage disposed at the front end of said frame, means connecting said wheeled carriage to said frame comprising a pair of longitudinally extending booms connected to said carriage and disposed on opposite sides of said frame, means pivotally connecting said booms to said frame, a bowl supported on said frame, said bowl comprising a bottom wall and side walls, each side wall having a lower wall portion, an upper wall portion, and an intermediate wall portion connected to said lower and upper wall portions, said upper wall portions being disposed laterally inwardly with respect to said lower wall portions to provide longitudinally extending recesses on opposite sides of said bowl and substantially coextensive therewith, an apron disposed at the forward end of said bowl, apron arms on said apron pivotally connected to said bowl, said booms and said apron arms having portions thereof disposed within said recesses, a transversely extending blade connected to the forward end of said bowl, said blade having outer portions thereof extending laterally outwardly with respect to said upper wall portions, and an upright movable wall in said bowl, said upright wall having an upper narrow portion adjacent said upper wall portions and a lower wider portion adjacent said lower wall portions.

2. A scraper comprising a movable frame, ground wheels connected to said frame at the rear end thereof, a wheeled carriage disposed at the front end of said frame, means connecting said wheeled carriage to said frame comprising a pair of longitudinally extending booms connected to said carriage and disposed on opposite sides of said frame, means pivotally connecting said booms to said frame, a bowl supported on said frame, said bowl comprising a bottom wall and side walls, each side wall having a lower wall portion and an upper wall portion, said upper wall portions being disposed laterally inwardly with respect to said lower wall portions to provide longitudinally extending recesses on opposite sides of said bowl substantially coextensive therewith, an apron disposed at the forward end of said bowl, apron arms on said apron pivotally connected to said bowl, said booms and said apron arms having portions thereof disposed within said recesses, and a transversely extending blade supported on said bowl at the forward end of said bowl, said blade having outer portions thereof

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extending laterally outwardly with respect to said upper wall portions.

3. A scraper comprising a movable frame, a ground wheel connected to said frame at the rear end thereof, a wheeled carriage disposed at the front end of said frame, means connecting said wheeled carriage to said frame comprising a pair of longitudinally extending booms connected to said carriage and disposed on opposite sides of said frame, means pivotally connecting said booms to said frame, a bowl supported on said frame, said bowl comprising a bottom wall and side walls, each side wall having a lower wall portion and an upper wall portion, said upper wall portions being disposed laterally inwardly with respect to said lower wall portions to provide longitudinally extending recesses on opposite sides of said bowl, said booms having portions thereof disposed within said recesses, and a transversely extending blade supported on the forward end of said bowl, said blade having outer portions thereof extending laterally outwardly with respect to said upper wall portions.

4. A scraper comprising a movable frame, draft elements connected to the sides of said frame, said draft elements and said frame having a maximum overall width, a bowl supported on said frame, said bowl comprising a material carrying bottom and substantially upright side walls, a movable upright transversely extending wall supported in said bowl, an apron mounted on the forward portion of said bowl, said bowl having a lower material carrying portion disposed between the side walls of a width substantially equal to the maximum overall width and an upper material carrying portion disposed between the side walls of a width substantially less than the maximum overall width, said material carrying portions extending substantially the length of said material carrying bottom, a blade supported by said bowl bottom wall adjacent the front of said bowl, said apron and blade being of substantially the same width as said lower portion of the bowl, and side edges on said movable wall conforming generally to the contour of said bowl.

5. A scraper comprising a movable frame, draft elements connected to the sides of said frame, said draft elements and said frame having a maximum overall width, a bowl supported on said frame, said bowl comprising a bottom and substantially upright side walls, an apron mounted on the forward portion of said bowl, said bowl having a lower material carrying portion disposed between the side walls of a width substantially equal to the maximum overall width and an upper material carrying portion disposed between the side walls of a width substantially less than the maximum overall width, and a blade supported adjacent the front of said bowl, said apron and blade having at least portions of substantially the same width as said lower portion of the bowl.

6. A scraper comprising a wheeled frame, said frame including longitudinally extending side members, the frame with said side members having a certain overall width, a bowl supported on said frame, said bowl comprising a material carrying bottom and laterally spaced side walls, said bowl having a material gathering end, and a transversely extending blade supported on the bowl adjacent the material gathering end of said bowl, a lower portion of said material gathering end of said bowl disposed between the side walls being substantially as wide as the overall width, said bowl having portions disposed between said side walls extending substantially the length of said material carrying bottom and of substantially less width than said overall width, said blade being substantially as wide as said material gathering end.

7. A scraper comprising a wheeled longitudinally extending frame, said frame being adapted to be connected to a draft member, a bowl mounted on said frame, said bowl having a material carrying bottom and including upright side walls, said bowl having a material gathering

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opening, the bowl with said frame having a maximum overall width, said bowl having a lower material carrying space between said side walls of substantially the same width as said maximum width and extending substantially the length of said bottom, said bowl having a second material carrying space of substantially less width as defined by said side walls and extending substantially the length of said bottom, whereby draft elements of a draft member may be connected to said scraper outside of said bowl within the said maximum width.

8. A scraper comprising a movable frame, said frame having a maximum width and being adapted to be connected to a draft member, a bowl mounted on said frame, said bowl including upright side walls, said bowl having a material gathering opening, said bowl having a material carrying bottom with a first material carrying space above said bottom and between said side walls of substantially the same width as said maximum width, said bowl having a second material carrying space above said first space of substantially less width as defined by said side walls whereby draft elements of a draft member may be connected to said scraper outside of said bowl within the said maximum width, and a scraper blade supported on said bowl adjacent said opening, said blade having a transverse dimension substantially the same as the first material carrying space.

9. A scraper comprising a wheeled frame, a bowl supported on said frame, said bowl having a material carrying bottom, transversely spaced side walls and a movable upright wall, said bowl having a material gathering opening, an apron positioned adjacent said opening, said side walls having upper portions spaced apart at a certain width and lower portions spaced apart at a greater width to provide an upper narrower material carrying space and a lower wider material carrying space, said material carrying spaces extending substantially the length of said material carrying bottom, said material carrying spaces having forward portions terminating substantially adjacent said material gathering opening, a blade supported by the bowl adjacent said opening and substantially coextensive therewith, arms connected to said apron and pivotally supported on said frame, said arms extending longitudinally on opposite sides of the bowl adjacent said narrow side portions, and having at least portions of said arms disposed inwardly with respect to vertical planes extending through said lower side portions.

10. A scraper comprising a wheeled frame, a bowl supported on said frame, said bowl having a material carrying bottom, transversely spaced side walls and a movable upright wall, said bowl having a material gathering opening, said side walls having upper portions spaced apart at a certain width and lower portions spaced apart at a greater width to provide an upper narrow material carrying space and a lower wider material carrying space, said spaces extending substantially the length of said material carrying bottom, said material carrying spaces having forward portions terminating substantially adjacent said material gathering opening, a blade supported on the bowl adjacent said opening, and transversely spaced edge portions on said movable wall spaced substantially close to the side walls and substantially complementary thereto.

11. A scraper comprising a wheeled frame, a bowl supported on said frame, said bowl having a longitudinally extending material carrying bottom and a material gathering and discharging forward end, a movable ejector in said bowl adapted to eject material from the forward end of said bowl, laterally spaced side walls on said bowl, said side walls having upper portions spaced apart to provide an upper material gathering space extending longitudinally substantially the length of said material carrying bottom, lower portions on said side walls spaced apart at a greater width than said

upper portions to provide a lower material gathering space extending longitudinally substantially the length of said material carrying bottom, said ejector having an outer contour generally conforming to the side walls, the outer surfaces of said upper portions of the side walls defining laterally spaced recesses extending longitudinally on opposite sides of said bowl, and scraper operating means disposed in said recesses having at least major portions thereof spaced inwardly with respect to the outer surfaces of the lower portions of said side walls.

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