

(No Model.)

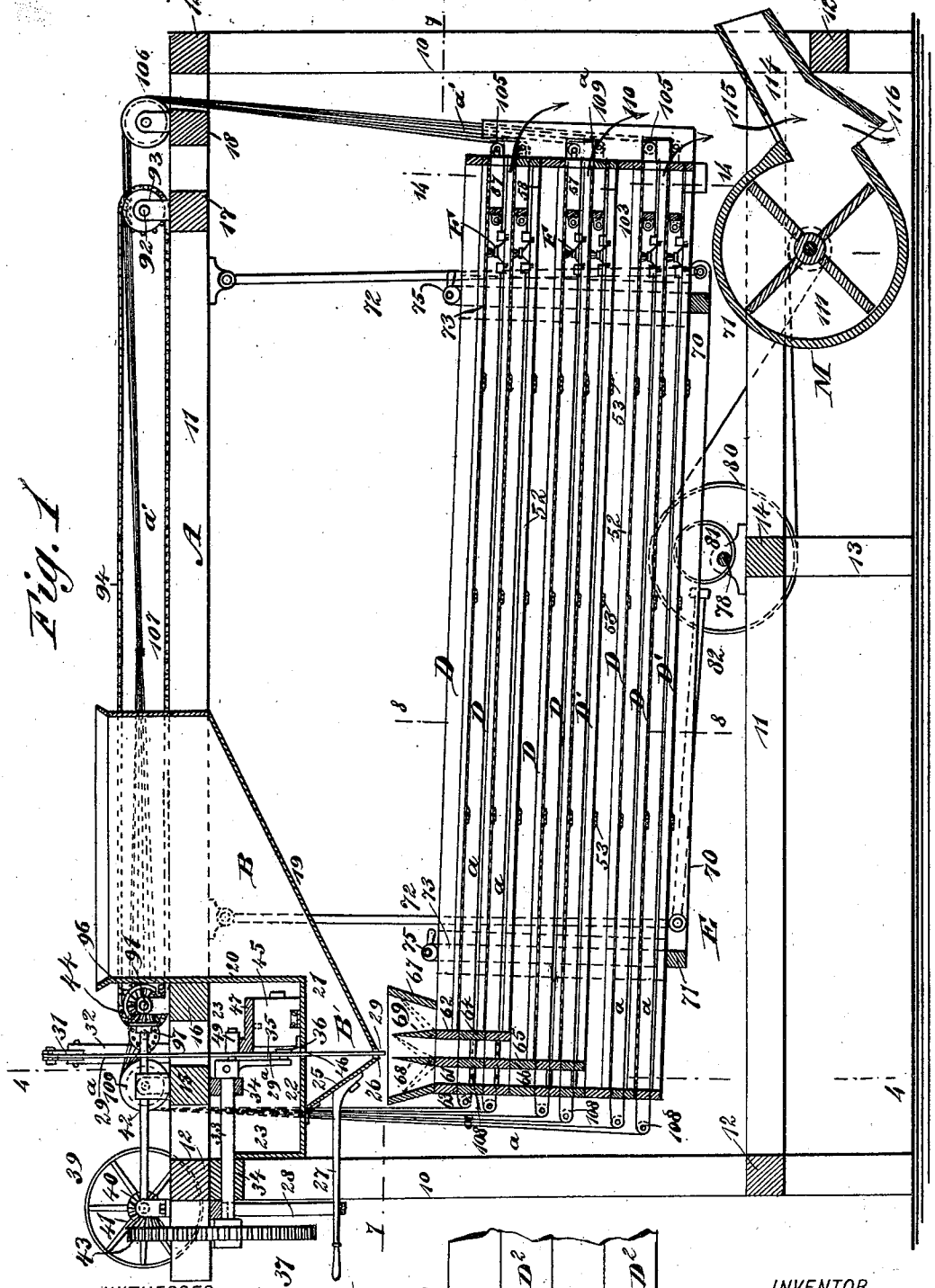
5 Sheets—Sheet 1.

S. BISBEE.
MACHINE FOR CLEANING GRAIN.

No. 510,768.

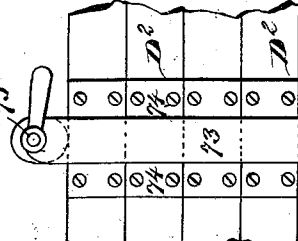
Patented Dec. 12, 1893.

Fig. 1



WITNESSES:
C. N. Vaux
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Fig. 2



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(No Model.)

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Fig. 3

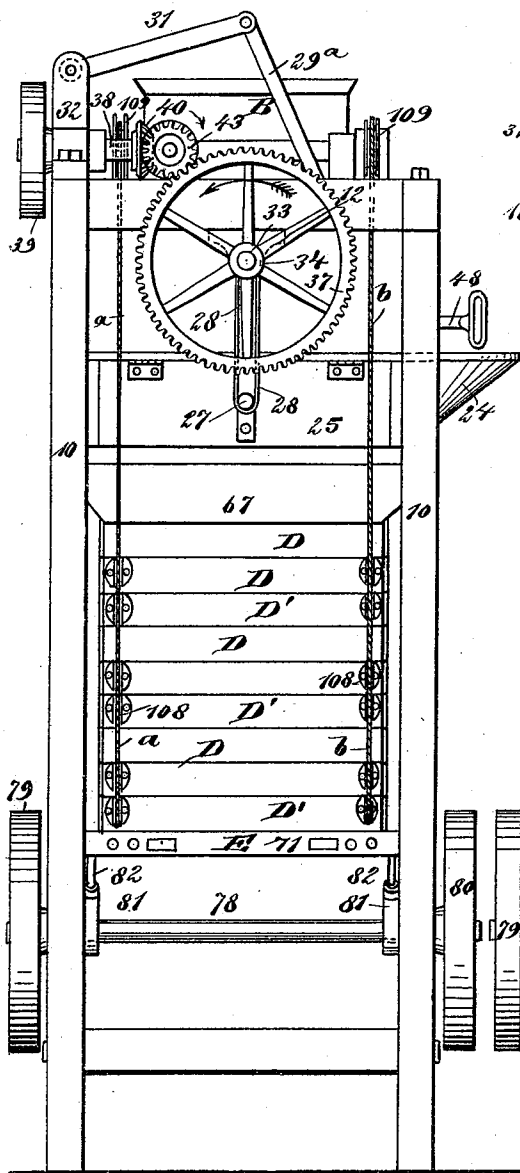


Fig. 4

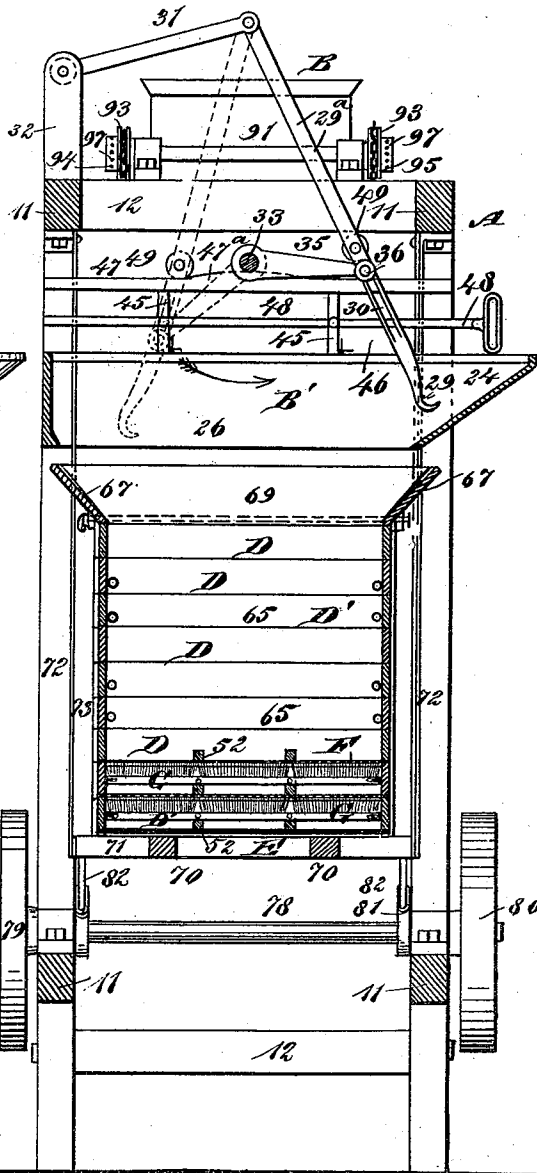
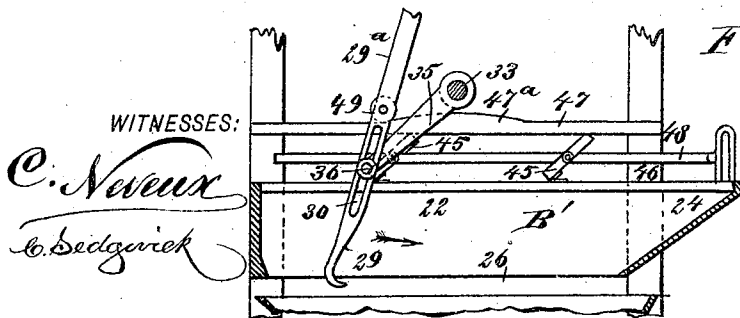


Fig. 5



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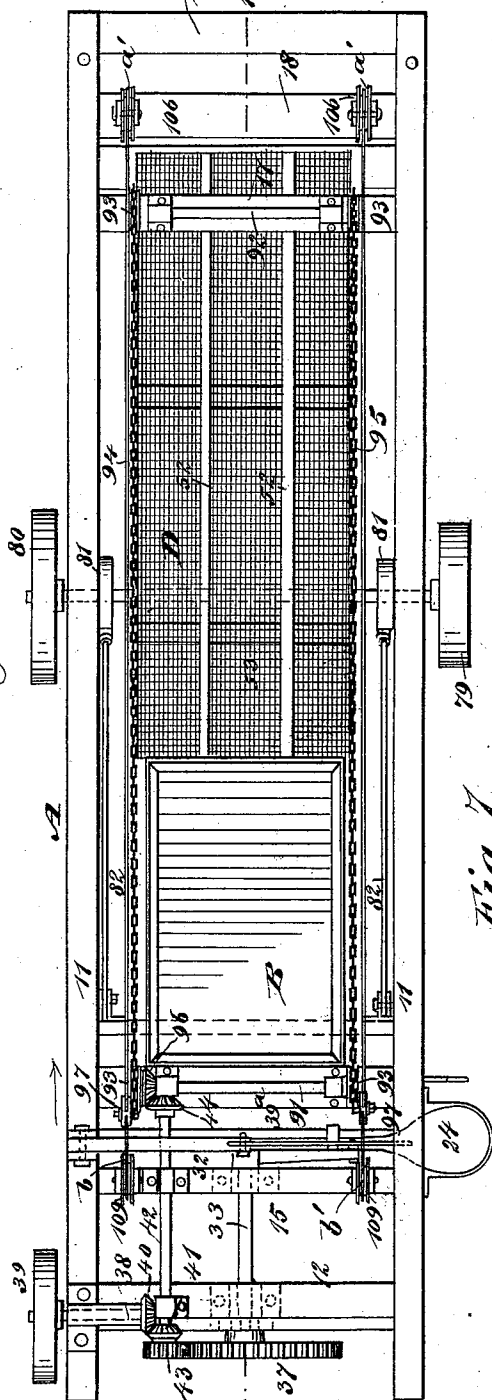
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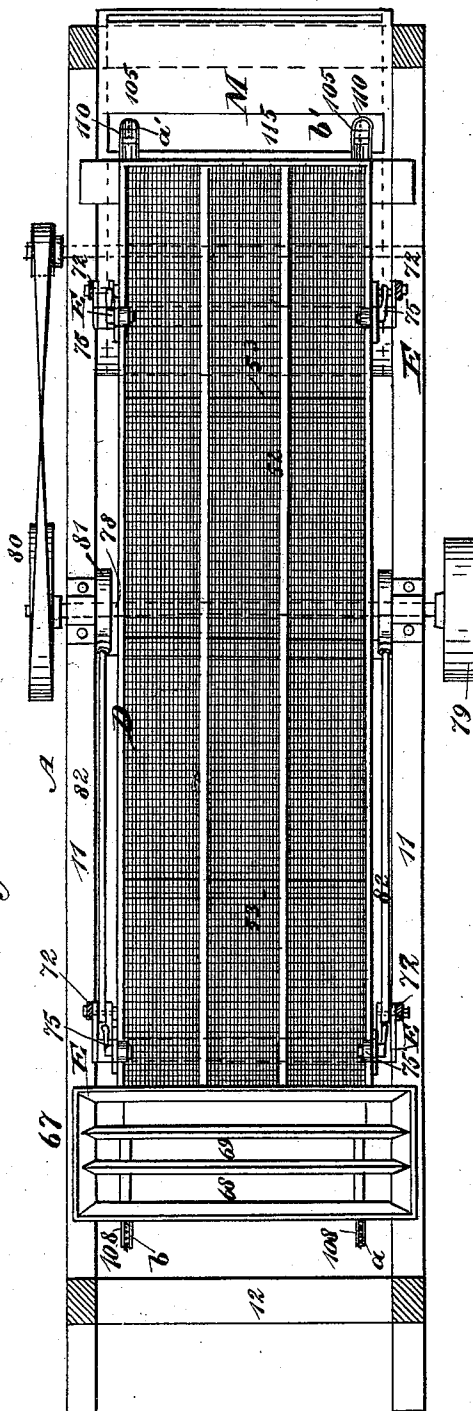
Fig. 6



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Fig. 7



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Fig. 8

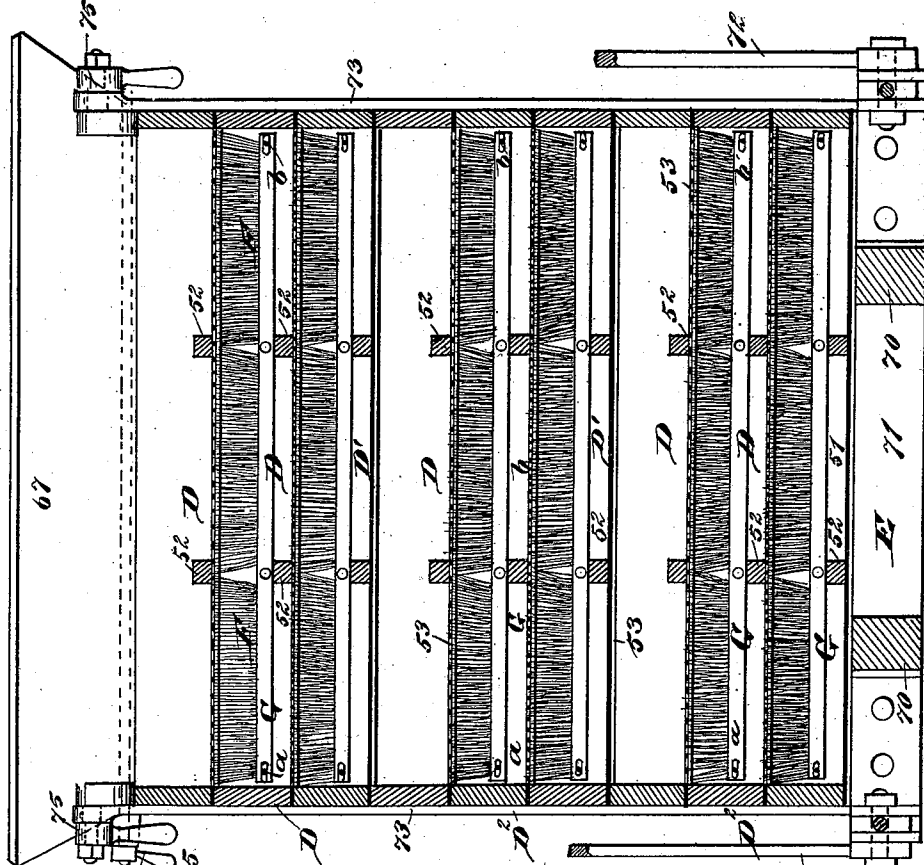


Fig. 9

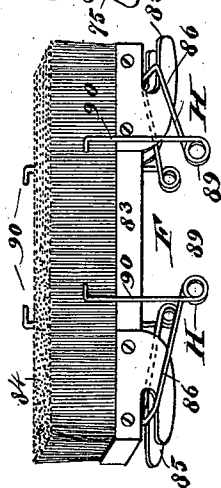
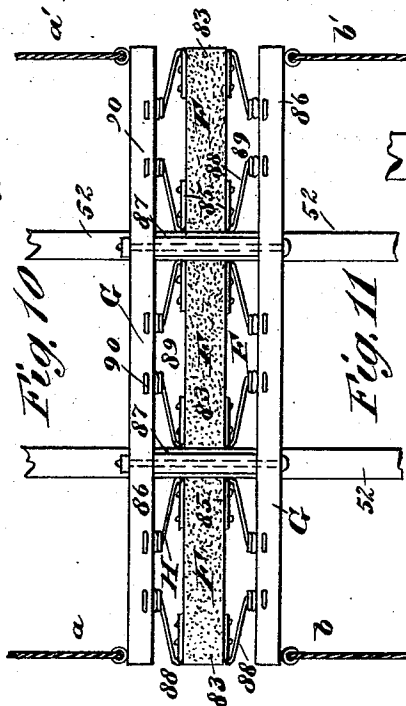


Fig. 10



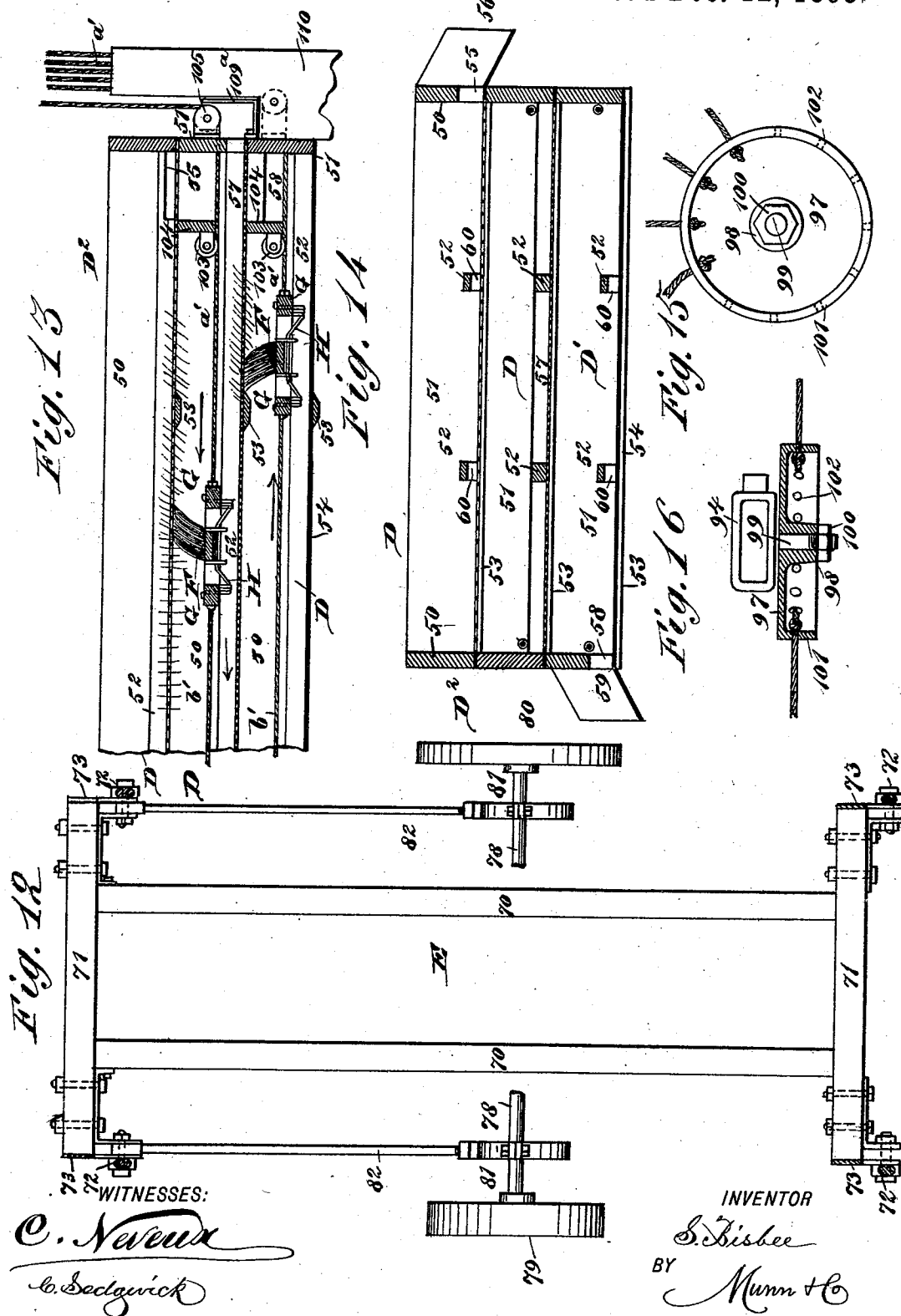
(No Model.)

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S. BISBEE.
MACHINE FOR CLEANING GRAIN.

No. 510,768.

Patented Dec. 12, 1893.



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UNITED STATES PATENT OFFICE.

SYLVESTER BISBEE, OF MADELIA, MINNESOTA.

MACHINE FOR CLEANING GRAIN.

SPECIFICATION forming part of Letters Patent No. 510,768, dated December 12, 1893.

Application filed August 30, 1892. Serial No. 444,563. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER BISBEE, of Madelia, in the county of Watonwan and State of Minnesota, have invented a new and Improved Machine for Cleaning Grain, of which the following is a full, clear, and exact description.

My invention relates to an improvement in grain cleaners, and especially to machines adapted for the treatment of flax grain, and has for its object to provide a machine which will be not only effective but also simple, durable and economical in its construction.

The invention consists in the novel construction and combination of these several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal vertical section through the machine, taken practically on the line 1—1 of Fig. 6. Fig. 2 is a detail view showing the locking mechanism for the screens. Fig. 3 is an end view of the machine. Fig. 4 is a vertical transverse section, taken practically on the line 4—4 of Fig. 1. Fig. 5 is a detail view, illustrating a portion of the cleaning mechanism in position to enter the outlet of the hopper. Fig. 6 is a plan view of the machine. Fig. 7 is a horizontal section taken practically on the line 7—7 of Fig. 1. Fig. 8 is a vertical section through the screens, taken practically on the line 8—8 of Fig. 1. Fig. 9 is a detail perspective view of one of the cleaning brushes. Fig. 10 is a bottom plan view of a series of brushes and the frame in which they are mounted. Fig. 11 is a side elevation of the blower. Fig. 12 is a plan view of the carriage or frame in which the screens are mounted. Fig. 13 is a section taken longitudinally through one set of the screens, this figure being somewhat diagrammatic, as the brushes are represented as moving in opposite directions, while they really all move in the same direction, they being so shown in order that the action of both their rearward and forward movements upon the straw may be fully illustrated. Fig. 14 is a transverse section through one set of

the screens, the section being taken practically on the line 14,—14 of Fig. 1. Fig. 15 is a detail view of the connecting ring to which the cables adapted to actuate the brushes are attached; and Fig. 16 is a sectional view of the ring illustrating the manner in which it is applied to the endless chain carrier.

The main frame A of the machine is generally made rectangular, and consists of corner posts 10, connected at top and bottom by side beams 11 and end beams 12. The lower side beams may be supported between their ends by short posts or legs 13, and are usually connected at said legs by a cross bar 14, while at the top of the frame, near each end, two cross bars connect the side beams, the front bars being designated as 15 and 16 and the rear beams or bars as 17 and 18. Back of the front cross bar 16, the main or delivery hopper B, is located, the said hopper being attached to the frame in any approved manner. Preferably, however, the front of the hopper is secured firmly to the cross bar 16, as shown in Fig. 1. The bottom board 19 of the main hopper is inclined, its inclination being from its rear end downward in direction of the front. The bottom board extends some distance forwardly beyond the front board 20 of the hopper, and between the lower end of the front board and the bottom a space 21, is provided, extending from side to side. As an additional support for the hopper a horizontal partition 22, is made integral with or attached to the front board 20, said partition at its forward end being fastened to the front upper portion of the main frame, producing thereby a compartment 23 in front of the hopper, and a lower forward extension of the latter designated as B', of which the horizontal partition constitutes the top.

The hopper extension is closed at each end, but one end portion 24, as shown in Figs. 3 and 4, extends horizontally beyond the sides of the main frame A. The end projection of the hopper is somewhat elliptical in plan view, as shown in Fig. 6, and its outer end surface is inclined from the top downward and inward to a point within the frame A. The projecting end portion 24 of the hopper has its center line also substantially in the same plane as the lower end of the bottom of the hopper.

The lower end or delivery section of the hopper is practically closed by a door 25, hinged at its upper end to the horizontal partition 22, and the door slants down and rearward, as shown in Fig. 1, and may be made to meet the lower edge of the bottom of the hopper, and thus completely prevent exit of material therefrom; but when the machine is in operation an exit opening 26, is left between the door and bottom of the hopper for the downward and outward passage of the grain. This opening may be increased or decreased by manipulating the door, which is accomplished by securing to the door a handle 27, and carrying the handle outward beyond the front end of the main frame between the members of a loop spring 28, capable of clamping the handle, or to an engagement with any form of latch device by means of which the handle may be secured in the position in which it may be placed.

The projecting end portion of the hopper is open at the top, and is adapted to receive straw or other foreign matter removed from the grain before it leaves the hopper, and taken from the exit opening of the hopper to prevent the clogging of the same. The straw is removed from the hopper exit opening and placed in the hopper projection or more properly pocket 24, and the grain in the hopper is kept agitated while the machine is in operation by means of a cleaning or separating fork 29. Shown best in Figs. 4 and 5. The tine or tines of the fork are curved in direction of the pocket 24, and its shank 29^a above the tines is provided with a longitudinal slot 30. The upper end of the fork shank is pivotally connected with one end of a link 31, the opposite end of the link being pivoted upon a post 32, or like device, projecting from the main frame. The fork receives motion from a short shaft 33, journaled longitudinally in proper bearings 34, located at the front end of the frame. This shaft extends beyond the front of the frame, and into the compartment 23 in front of the hopper.

The inner end of the shaft 33, has secured to it a crank arm 35, provided with a pin 36, adapted to enter and to travel in the slot 30 of the fork shank; and the outer end of the shaft carries a large gear wheel 37. The shaft 33, is revolved from a transverse drive shaft 38, journaled upon the upper forward end portion of the main frame, said drive shaft being provided with a driving pulley 39, at its outer end and a beveled gear 40, at its inner end. The gear 40, meshes with a like gear 41 upon an upper longitudinal driven shaft 42, journaled in bearings located upon the front end of the main frame, and the forward intermediate cross bar 15. The drive shaft carries at its outer end a pinion 43, which meshes with the gear 37 of the crank shaft 33, and at its inner end the upper driven shaft 42, carries a beveled gear 44, as shown in Figs. 1 and 6.

In the rear of the compartment 23, in front

of the hopper, a series of blocks 45, is hinged to the bottom thereof, as shown best in Figs. 1 and 5. The blocks are capable of being dropped outwardly in direction of the pocket 24 of the hopper, and are likewise capable of assuming a vertical position. The blocks are located one behind the other, close to the edge of a slot 46, produced transversely in the bottom of the compartment 23, and directly over and parallel with the exit opening of the main hopper, and through this slot 46 the shank of the fork 29, extends downward a sufficient distance to admit of the fork moving in the hopper exit.

The hinged blocks 45, are adapted especially as supports for a track 47, which track is preferably provided with a central arched section 47^a. The track has no support other than the blocks, and consequently rises and falls with them, the movement of the blocks being controlled by a rod 48, having hinged or pivotal connection with the blocks, which rod projects beyond one side of the machine, terminating in a suitable handle. Any form of latch device may be used in connection with the rod. The track is adapted to regulate the downward throw of the fork 29, as sometimes it is desirable that the fork should extend well down in the hopper exit and at other times just approach the exit, the position of the fork being regulated in accordance with the character of the grain treated and the amount of foreign matter contained in the grain. The regulation of the fork's movement is accomplished by locating upon the fork above its shank 30 a wheel or roller 49, which when the fork is on and during its downward stroke, travels upon the track.

The operation of the fork is shown best in Figs. 4 and 5, in which it will be observed that when the crank arm 35, rises, it will carry the fork upward with it when the pin of the crank arm reaches the upper end of the slot 30. The fork is then carried by the crank arm and crank shaft in direction, for example, of the left-hand side of the machine, and as the crank arm lowers the fork drops until its wheel or roller 49, strikes the track 47, and as the slot 30 in the shank of the fork is of considerable length, while the crank arm is turned in direction of the right-hand side of the machine the shank of the fork is carried transversely with the fork in the exit opening of the hopper, practically the full length of the exit opening, at which time the crank arm will act to again elevate the fork and its shank. Thus the grain is constantly agitated over the exit opening, and the opening is kept free from straw and other foreign matter as the hook-shaped form of the fork will carry to the pocket 24 any straw in the path of the fork and deposit it therein, and the curved portion 47^a at the center of the track 47, serves to give the fork at about the middle portion of its lower horizontal stroke an undulating movement, stirring the grain and com-

5 pelling it to pass down through the exit opening, and the movement also tends to throw the straw upward in direction of the pocket 24, from whence it may be removed by the operator as the pocket fills. When the blocks 45 are lowered, the track 47 is lowered also, and the fork will be made to enter and pass through the exit opening of the hopper, and when the blocks are elevated the fork will simply enter, or only closely approach the exit opening.

15 The screens D, are preferably arranged in groups of two, and a box bottom D' accompanies each group of screens, one group being shown in Fig. 14, and such a group is designated as D². The frames of all the screens, and likewise the bottoms are alike in construction, being practically rectangular in general contour, and each consisting of two opposing side boards 50, and two opposing end boards 51. The frames may be of any desired depth, and the frames adapted for use as screens have practically their entire bottom portion covered by wire netting of proper mesh, or other screening material, said material being attached to the side and end boards of the frame in any manner known to the trade. The frames are braced longitudinally by battens 52, extending from end to end, one at each side of the center, and said battens are located above the screening material, while a series of transverse battens 53, is located beneath the screening material, and connect the side boards of the frame. The side edges of the transverse battens are beveled to admit of the passage of cleaning devices to be hereinafter described, over the bottom faces of the screens. The only practical difference existing between the screens D and the box bottom D' of a group of screens, is that the bottom 54 of the box frame is solid or unbroken.

30 In the arrangement of a group of screens one screen frame is placed upon another, they fitting together snugly, and the two screen frames are placed upon a box frame; the mesh of the lower screen is finer than that of the screen above it, and at or near one end in one side of the upper screen of a group an exit opening 55, is located, accompanied by a chute 56, while the exit opening 57 of the lower screen is in one end and extends from side to side. The box bottom of each group of screens is likewise provided with an exit opening 58, having an accompanying chute 59, located however, near the same end as the opening in the top screen, but at an opposite side, as is shown in both Figs. 13 and 14. As the exit opening in the upper screen and in the box bottom of each group of screens is in the sides, the longitudinal battens in these frames are usually provided with recesses 60, shown in Fig. 14, to permit the grain to pass freely to the exits.

65 The above description is that of the lowest group of screens when many groups are employed in the machine. When a machine is adapted to carry three groups of screens, for

example and as illustrated, at the head of all the screens and the box bottom of the first group, two spaced transverse partitions 61 and 62, are located, and the bottom of the box frame and likewise the screening material of the screen frames extend to the innermost partition only, as shown in Fig. 1; thus at the head portion of the first group of screens two independent chutes 63 and 64, are formed. The head portions of the second or intermediate group of screens are provided with but one transverse partition 65, forming a single chute 66, and when the groups of screens are placed one over the other the partition 61 of the upper group will be immediately over the partition in the center group.

85 A hopper 67, is placed upon the upper group of screens at its head, the hopper being of sufficient width to extend beyond the inner partition 62, as shown in Fig. 1; and at the upper edges of the partitions 61 and 62 division or compartment boards are pivoted, said boards being designated as 68 and 69. When these boards are in an upright position the hopper is divided into three compartments, one in communication with each group of screens, and communication with either of the groups may be shut off by inclining the division boards, as shown in dotted lines, Fig. 1.

100 When the groups of screens have been properly placed one upon the other, the coarse or undesirable grain and coarse foreign matter will pass over the upper screen of each group out at the side of the machine; the fine particles of grain and dust delivered by the second screen to the box bottom of a group will be delivered at the opposite side of the machine, while the assorted grain caught and retained by the second screen of a group will pass out at the back of the machine. In practice the hopper for the screens is so located that it will be beneath the exit opening of the main hopper.

115 I will now describe the manner of hanging the screens and their actuating mechanism: The groups of screens are supported by a swinging frame E. Shown in detail in Fig. 12. This frame consists primarily of two side beams 70, end beams 71, and hangers 72, pivotally attached, one at each corner of the frame. The hangers at the head portion of the frame are shorter than those at the foot or rear end, and the upper end of the hangers have a swinging connection with the side beams of the main frame A, as is best shown in Fig. 1. By reason of the difference in the length of the hangers the swinging frame has a gradual downward and rearward slope, and the same slope is given to the screens when upon the frame. The screens rest upon the swinging frame between its hangers, and are held firmly together upon the frame by arms 73, projected upward from the sides of the frame at its ends. These arms are made to pass through guide channels 74, produced upon the upper faces of the screens, as

shown in Fig. 2, and carry at their upper ends locking cams 75, provided with suitable handles. These cams extend over the upper side edge of the uppermost screen frame, and when properly manipulated exert a firm and positive downward tension upon all of the screens, binding them securely to the swinging frame. The swinging frame E, is actuated, and the screens with it, in an even and uniform manner, from a drive shaft 78, journaled in bearings located upon the lower portion of the main frame near its center. This shaft is usually provided with a pulley at each end, designated as 79 and 80, power being applied to one of them. The shaft is below the swinging frame; and near each side of said frame an eccentric 81, is secured upon the shaft, and through the medium of rods 82, the eccentrics are connected with the forward end of the swinging frame. It will be readily observed that the motion imparted to the swinging frame is a laterally-reciprocating, rocking motion, steady and regular in both directions of movement, and that there is no intermittent or jerky movement imparted to the swinging frame and its screens, which latter motion is common to machines of this class.

The cleaning devices are in the shape of brushes F, shown in detail in Figs. 9 and 10, and in operative position in Figs. 8 and 13. Each of the brushes preferably consists of a back block 83 and bristles 84, or their equivalents, located upon one face of the block. An outwardly-extending hook 85, is secured to each block at the end portion of each of its sides, as shown in Fig. 9, the hooks extending virtually below the backs of the brushes. The brushes are held in a frame G, composed of side bars 86, and a series of cross bars 87, connecting the side pieces. Such a frame is provided in connection with each screen, and as the frames extend transversely across the screens and move longitudinally thereof, the length of the brush-carrying frames is slightly less than the width of the screen frames.

In the drawings three brushes are illustrated as carried by each frame, their attachment being best shown in Fig. 10. The connection between the brushes and the frame is of a spring character, and is effected in the following manner: Two springs H, are utilized for each brush, each of these springs comprising a yoke-like body 88, of spring wire or like material, adapted to maintain essentially a horizontal position, and the body terminates at the end of its members in coils 89, the formation of the springs being completed by carrying the wire from which they are made upward from each coil to form shanks 90, standing essentially at a right angle to the body, as is clearly shown in Fig. 9. The shanks of the springs are passed upward through the side bars of the frame G, being secured to said bars at their upper surfaces in any approved manner, usually by bending the upper ends of the shanks downward; the bow portions of the body sections of the springs

are then passed, one body section over each set of end hooks on the brushes, as shown in Figs. 9 and 10, which will bring the coils of the springs connecting each brush with its frame opposite each other back of the hooks and below the back of the brush to which it belongs. It will be understood from the above description that each brush is virtually spring-controlled in a vertical direction, and that by reason of this control the bristles of the brushes will be constantly forced into engagement with the parts of the screens to be cleaned.

The longitudinal brace bars 52, located over the screening material of the screen frames, are utilized as tracks upon which the brush-carrying frames are adapted to slide. The brushes are distributed so that the screening material of each group of screens will be acted upon, and this is accomplished, as shown in Fig. 8, by placing one brush-carrying frame in the second screen frame of each group, the brushes carried by this frame engaging closely and constantly with the under side of the screening surface of the upper screen, and placing a second brush carrying frame in the tight bottom frame, the brushes of which latter carrying frame engage with the under surface of the second screen of a group. All the brushes are to move simultaneously in the same direction, for example, from the head to the foot of the screens and then back, the movement being constant while the machine is in operation. The action of the brushes on the screen is shown diagrammatically in Fig. 13, in which it will be observed that the brushes in passing in one direction give an inclination to the straw or like material, which tends to gravitate straight through the meshes, and at the same time the brushes force the straw outward; but upon the return of the brushes, they then traveling in an opposite direction, the straw will be forced entirely through the meshes and will fall upon the screens, and be carried off with the grain, &c. The upper brush in Fig. 13, illustrates the first movement, and the lower brush the second movement. It is evident that when the brushes are manipulated in this manner the meshes of the screen will be constantly kept clear for the passage of the material intended to be passed through it.

The following mechanism is preferably employed to automatically reciprocate the brush-carrying frames: A transverse shaft 91, is journaled in suitable bearings located preferably upon the inner, upper and forward cross bar 16 of the main frame A, and a second parallel shaft 92, is journaled in a similar manner upon the corresponding rear cross bar 17. Between the ends of both shafts, however, and the sides of the main frame, quite a space intervenes, as shown in the plan view Fig. 6. Both shafts carry at each extremity a sprocket wheel, all of said wheels being designated as 93; and at each side of the machine an endless belt, preferably of chain character, is located, carried by said sprocket wheels, and

the belts are designated in the drawings as 94 and 95. These endless chain belts are adapted to give movement to devices connected directly with the brush carrying frame and to be hereinafter described the belts being given motion by the shaft 91, which carries a beveled gear 96, meshing with the corresponding gear 44 upon the driven longitudinal shaft 42, heretofore described in connection with the hopper-cleaning and distributing fork. A coupling ring or disk 97, shown in Figs. 15 and 16, is attached to the outer face of a link in each chain belt. These disks are ordinarily provided with a central hub 98, which receives a stud 99, projected from the link, said stud having its outer end threaded for the reception of a lock nut 100. See Fig. 16. The disk is also provided with an outwardly-extending marginal flange 101, in which a series of apertures 102, is produced. At each corner of each brush carrying frame a rope or its equivalent is attached, as shown in Fig. 10, and the ropes at one side are designated as *a* and *a'*, while the corresponding ropes at the opposite side are designated as *b* and *b'*. The ropes *a'* and *b'*, are carried rearward through the screen and box frames in which they are located, under and in engagement with guide rollers 103, secured to partitions 104, forming portions of the frames, as illustrated in Fig. 13, thence out at the rear of the screen frames, upward over guide pulleys 105, located exteriorly upon the rear of the frames at each side. The rear guide pulleys 105, are placed one in advance of the other, so that the ropes in passing from the pulleys will not entangle with each other. All of the ropes *a'*, and likewise all of the ropes *b'*, are carried, each rope independently, upward over rollers or drums 106, located upon the rear upper transverse bar 18 of the main frame; and from each drum each series of ropes *a'* and *b'*, is taken toward the front of the machine, and the ropes are separately fastened to the flanges of the coupling disks 97 by being passed through the apertures 102 in the disks, and knotted or otherwise treated. By this means each brush frame at each end of its rear side is connected with a coupling disk at the corresponding side of the machine, and in securing the ropes to the disks they are passed through successive apertures. As shown in Fig. 1 the ropes of each series are preferably connected rearward of the coupling disks, the connection being designated as 107 on the drawings. In like manner the ropes *a* and *b*, attached to the brush carrying frames are led outward through the front of the screen and box frames. They are then passed over pulleys 108, located upon the forward ends of the frames at the sides thereof, the pulleys being graduated from the bottom upward with respect to the distance they shall extend from the forward ends of the frames. From the pulleys 108 the ropes *a* and *b*, are carried upward in separate groups over drums 109, journaled upon the forward cross bar 15 of the main frame of the machine, and after

leaving these drums the ropes *a* and *b*, are secured to the coupling disks in like manner as has been described with reference to the rear group of ropes.

It is evident from the foregoing description, that as the chain belts are revolved the coupling disks will be carried by the chain belts in the same direction that they travel, and consequently the brush-carrying frames will be made to move longitudinally in the screen and box frames, alternately in direction of front and rear, and that the screens with which the brushes engage will be kept constantly clean, and being so kept the screens may be moved regularly and evenly, since there is no necessity of imparting a quick or jerky movement to the screens, which damages them, since the brushes prevent the meshes from becoming clogged.

Where the ropes are connected with the brush carrying frames and are passed through the leads from the screen chute, said ropes are inclosed by tubes 108^a, to prevent the grain being stopped in its downward passage to the screens, as shown in Fig. 1; and at the delivery end of the inner screen of each group, at the sides of said end, a guard 109^a, is located, to prevent the grain from drifting toward the sides of the machine and to protect the grain from the rear set of pulleys; larger guards 110, are also placed at the side portions of the rear ends of the screens to protect both pulleys and ropes, as shown in detail in Fig. 13.

Beneath the lower end of the screens a blower M, is located, the body portion 111 of which is provided with a sliding door 112 and a locking device 113 to regulate the amount of air entering the blower. The blower is of a width corresponding essentially to the width of the screens, and its body portion is provided with an upwardly or rearwardly extending exit spout 114, provided with an opening 115 in the top between its outer and inner ends, and a registering opening 116 in its bottom surface, the latter opening having a forward inclination. The good grain falling from the inner screen of the groups passes into the blower spout through its upper opening, and while in the spout all chaff and foreign matter are blown from the grain, and the latter in a clean condition passes out from the spout through its lower opening to any receptacle placed to receive it.

In the general operation of the machine the grain is fed into the main hopper B, from whence it passes down to the lower section B' of that hopper. The fork 29, is constantly reciprocated laterally, and given a vertical movement as well, through the medium of the driving mechanism heretofore referred to, and the fork in so moving enters and passes substantially the length of the exit opening in the hopper, clearing the opening and removing any straw, or foreign matter capable of clogging it, to the pocket 24, located at one side of the exit opening, from which pocket the

material deposited therein may be readily removed. The width of the exit opening is regulated by the manipulation of the door 25, forming the end wall of the hopper extension, and the fork may be made to travel just within the exit opening of the hopper, just above it, or it may be made to extend some distance through it, by adjusting the track 47, which serves as a guide device for the vertical movement of the fork. The screens through the medium of their driving mechanism heretofore set forth in detail, are given a constant forward and rearward regular and even motion, and the grain falling from the principal hopper B, will enter the screen hopper 67, and will find its way through any of the open leads therein into the group of screens to which said leads carry.

The screens by their movement operate as follows: The upper screens of the groups retain upon them the large particles of foreign matter, coarse straw, &c., that have escaped from the main hopper, and this refuse material is delivered from the machine at one of its sides. The good grain falls through the meshes of the upper screens to the lower screens of each of the groups, and it finds its way out through the rear end of the machine, drops into the blower H, and is there cleared from foreign matter adhering to the grain, the grain leaving the blower in perfect commercial condition. The fine particles of refuse matter, broken grain, &c., pass through the meshes of the second screens of the groups, into the box bottoms of the groups, and such matter is delivered from the machine at the side opposite that from which the material from the upper screens is discharged. The brushes working against the screens are kept in constant motion while the screens have movement, and they serve to thoroughly clean the meshes of the screens and promote the efficiency of them, rendering them capable of delivering material much more quickly and in better condition than where such devices are not employed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for cleaning grain, the combination, with a stationary hopper having an exit opening in its lower portion, of a fork adapted to move in the said hopper and to extend down through the exit opening thereof, a driving mechanism for imparting a lift and laterally reciprocating motion to the fork, and a guide device for limiting the downward throw of the fork, substantially as and for the purpose specified.

2. In a machine for cleaning grain, the combination, with a stationary hopper having an exit opening in its lower portion and a pocket at one end of the opening, of a fork adapted to extend within the opening, a crank shaft connected with the fork, and a guide device limiting the downward throw of the fork, substantially as and for the purpose specified.

3. In a machine for cleaning grain, the combination, with a stationary hopper having an exit opening in its lower portion, and an adjustable section constituting a wall of said opening, of a fork adapted to extend within the opening, provided with a shank pivoted at its upper end and having a slot in its body, a crank shaft connected with the shank at its slotted portion and having play therein, and an adjustable guide device limiting the downward movement of the fork, substantially as shown and described.

4. In a device for cleaning grain, the combination, with a hopper having an exit opening in the bottom portion thereof, and a fork capable of extending through the opening, the shank of which is provided with a slot and is pivoted at its upper end, of a crank shaft the crank of which has play in the slot of the fork shank, a guide roller projected from the fork shank, a track with which the roller engages, and a device, substantially as shown and described, for raising and lowering the track, as and for the purpose specified.

5. In a machine for cleaning grain, the combination, with a hopper having an opening in its lower portion, a fork capable of movement in the opening, the shank of which is provided with an elongated opening and the upper end pivoted, and a crank shaft the crank arm of which has sliding connection with the shank of the fork through the medium of its opening, of a track, hinged supports upon which the track rests, a draw bar connected with the supports, whereby the track may be raised and lowered, and a guide roller carried by the shank of the fork and adapted for engagement with and to travel upon the track upon the downward movement of the fork, as and for the purpose specified.

6. In a machine for cleaning grain, the combination, with a hopper having an extension at its lower end, an exit opening in the bottom of the extension and a door regulating the width of the opening, and a fork adapted to travel in the exit opening of the hopper, the shank of which is pivoted at its upper end, of a pocket formed in one end of the extension of the hopper near one end of the exit opening, a crank shaft the crank of which is connected with the shank of the fork and has limited movement in said shank, a track, supports for the track hinged at their lower ends to an adjacent support, a draw bar connected with the supports of the track, and a guide roller carried by the shank of the fork and adapted at times in the movement of the fork to travel upon the track, as and for the purpose specified.

7. In a machine for cleaning grain, the combination, with a stationary main frame, and a main hopper located thereon, of a reciprocating frame connected with the main frame, screens arranged in the said reciprocating frame, and a hopper located on the reciprocating frame and provided with partitions for alternately delivering the grain issuing from

the said main hopper, to each of the said screens, substantially as specified.

8. In a machine for cleaning grain, the combination, with a stationary main frame, of a reciprocating frame connected therewith, screens arranged in the said reciprocating frame, brushes located in the frame and having their bristles in contact with the screens, traveling belts and means for driving the same, coupling disks secured to the belts, and ropes each connected at one end with one of the said brushes and at the other end with one of the coupling disks, substantially as specified.

9. In a machine for cleaning grain, the combination, with a stationary frame, of a reciprocating frame connected therewith, and hangers having a pivotal connection with the stationary frame and with the reciprocating frame at opposite ends thereof, the hangers at one end of the frame being shorter than those at the other end thereof substantially as and for the purpose specified.

10. In a machine for cleaning grain, the combination, with reciprocating screens, of frames held to travel beneath the screens, brushes carried by the frames, constantly engaging with the screens, a spring connection between the brushes and the frames, endless chain belts, driving mechanism for the belts, and cables connected with opposite ends of the frames and connected with a link of each chain belt, substantially as and for the purpose specified.

11. In a machine for cleaning grain, the combination, with screens held to reciprocate, frames having sliding movement beneath the meshes of the screens, brushes carried by the frames, in constant engagement with the meshes of the screens, and a spring connection between the brushes and the frames, of endless chain belts, a driving mechanism connected with the belts, an apertured disk secured to a link of each of the belts, guide rollers located upon the frame of the machine, and cables carried from opposite ends of the brush carrying frames over the guide rollers to a connection with opposite sides of the apertured disks, substantially as and for the purpose specified.

12. In a machine for cleaning grain, a device adapted to clear the meshes of the cleaning screens, said device consisting of a frame brushes carried by the said frame and provided with sockets at their extremities, and springs comprising a yoke section, a coil section and shank sections, the yoke sections engaging with the sockets of the brushes, the coil sections facing inward beneath the backs of the brushes, and the shank sections being adapted for engagement with the frame, substantially as shown and described, whereby the brushes are held in connection with the frame by a spring cushion, as set forth.

SYLVESTER BISBEE.

Witnesses:

A. H. BENTEN,
JOHN BISBEE.