M. KANE.

GRAIN BINDING MACHINE.

(Application filed July 7, 1900.)

(No Model.)

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GRAIN-BINDING MACHINE.

Application filed July 7, 1900. Serial No. 22,792. (No model.)

To all whom it may concern:

Be it known that I, MAURICE KANE, a citizen of the United States, residing at Austin, in the county of Cook and State of Illinois, have invented a new and useful Grain-Binding Machine, of which the following is a specification.

This invention relates to grain-binding machines.

10 The object of the invention is to improve the construction of machines of this class and to render the same more efficient in operation.

A further object of the invention is to provide means whereby the sprocket or other chain employed for positively driving the elevator and feed aprons may be placed below the line of travel of the carrying-surface of said elevators.

A further object of the invention is to provide an end-gate or door for the space occupied by the elevator carriers or belts, whereby such space may be shortened or closed to accommodate short grain and may be opened and extended to accommodate long grain.

25 Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, reference-sign A designates a traction or master wheel of a grain-binding machine, and B a portion of the main frame of such machine, upon which the various parts of the apparatus are supported. A portion of the main frame of the machine comprises a rod or bar C, formed into substantially U shape and the ends thereof extending horizontally lengthwise of the machine. Upon the upper horizontal leg of this supporting-bar is supported the rear edge of the frame D, which I will hereinafter designate the "upper-elevator frame," as clearly shown at E. Suitably journaled at the lower end of the upper-elevator frame D is a roller, (indicated in dotted lines at F,) and at the upper end of said upper-elevator frame are supported the guide-rollers G H. About these rollers F G H the upper elevator J operates, and the guide-rollers G H are so disposed with reference to each other and to the other parts of the machine as to cause the lower leg or run of the upper elevator J to be brought into close relation with the upper surface of the lower-elevator apron, as clearly indicated in dotted lines and as will presently be more fully explained. At its front edge the upper-elevator frame D is supported upon the machine-frame in the usual or any convenient manner, the upper horizontal leg or member of the U-shaped frame C affording support for said frame D at its rear edge, as clearly shown.

Reference-sign K designates the frame of the lower-elevator apron, the latter being indicated in dotted lines at L. In the lower end of frame K is journaled a roller, (indi-
cated in dotted lines at M,) and in the upper end of said frame K is journaled a cooperating roller, (indicated at N.) Over these rollers the lower-elevator apron I operates in the usual manner, the runs or legs between said rollers of said lower apron being parallel with each other. As above described, the guide-rollers G, H at the upper end of the frame which supports the upper-elevator apron are so disposed with reference to each other as to cause the lower leg or run of said upper apron to approach the top surface of the upper leg or run of the lower apron toward the upper end of said apron, thereby providing a considerable throat or space (indicated at O) at the lower end of said aprons, which throat or space contracts in area toward the upper or delivery ends of said aprons. By reason of this construction and arrangement the aprons are enabled to effect an efficient grasp of the grain between them and which gripping action increases toward the upper or delivery ends of the elevator-aprons. In machines of this class as heretofore constructed the sprocket or other chain through which the lower-elevator apron is positively actuated has been arranged to engage over gears mounted directly upon the shafts of said rollers M, N. The result of this construction and arrangement has been to cause that leg or portion of the drive-sprocket which extends between said rollers M, N to be elevated substantially into the plane of the upper surface of the upper leg or run of the lower apron or even above such surface. This is objectionable for the reason that when long grain is being harvested the heads thereof may frequently project beyond the rear edge of the elevator-aprons, and thereby become entangled or engaged in the operating sprocket-chain. This objection is most frequently encountered with long grain. In order to overcome this objection and to provide a construction and arrangement whereby the lower-elevator apron may be positively actuated, but at the same time whereby the operating sprocket-chain will be carried or depressed below the upper surface of the lower-elevator apron, thereby removing such chain from positive contact with the heads of long grains, and at the same time to enable the space between the frames of the upper and lower elevator aprons to be extended in width when exceptionally long grain is being harvested, instead of having the driving sprocket-chain P operate over sprockets on one or the other, or both, of the rollers over which the lower-elevator apron operates I arrange a gear Q on the shaft of one of said rollers to be engaged and driven by a pinion or idler R, which pinion or idler is driven by a gear S, connected to rotate with a sprocket T, over which the sprocket-chain P operates. The objection above noted in constructions of the ordinary type of machines as heretofore made of the driving sprocket-chain being elevated above the surface of the upper ply or leg of the lower apron is particularly present when the same chain is employed to positively actuate the roller over which the lower platform U is mounted. This is due to the fact that said roller (indicated in dotted lines at V) must necessarily be placed on the grainward side of the lower roller M, over which the lower-elevator apron operates. Therefore in those constructions where the sprocket-chain P operates over the upper roller N and from thence extends to the roller V of the apron U of the lower platform said chain enters the space between the upper and lower elevator aprons, and hence offers a material obstruction to the proper elevation of very long grain. In my construction, whereby this objection is avoided, I arrange the driving sprocket-chain P after passing over the sprocket T to pass around a sprocket W, having connected thereto to rotate therewith a pinion A', arranged to mesh with and to drive an intermediate idler-pinion B', which in turn meshes with and drives a pinion C' on the shaft of roller V. By this construction I am enabled to so place the stud or axis upon which the sprocket W is driven as to cause the leg or run of driving-chain P, which extends between said sprocket W and sprocket T, to operate entirely below the surface of the upper run or leg of the lower-elevator apron, while at the same time securing a positive drive for said lower-elevator apron and for the traveling carrier or apron U of the lower platform, and by employing the intermediate idlers R, B', the desired direction of rotation of the rollers N and V is secured, as clearly indicated by the arrows.

By the arrangement above described I am also enabled to provide means for extending the width of the space between the upper and lower elevator aprons, and this result I secure by hanging an end-gate or plate D' along one edge thereof to the frame K, which supports the lower-elevator apron. This end-gate or hinged plate may be rocked or swung into raised position and held in that position by any suitable means, as by means of pivoted fingers E', carried by the rear edge of frame D, which supports the upper-elevator apron, and when desired said end-gate or plate D' may be bolted down, so as to form an extended shelf or support for the heads of very long grain when occasion requires. By supporting the frame D of the upper-elevator apron, as at E, upon the upper leg or horizontal member of the U-shaped frame C said end-gate or plate D' is not required or called upon to support any of the weight of the upper-elevator frame, but merely folds up against the rear edge of such frame, where it is suitably held to form a closed way in which the elevator-aprons operate when short grain is being harvested. The provision of the U-shaped frame C enables said plate or end-gate D' to be rocked or lowered, as required, for the accommodation of long grain.

I have above described the lead of the op-
eating sprocket-chain \( P \) to be around a sprocket \( T \). In practice I arrange this sprocket upon the shaft of a roller \( E \), which is located slightly above and to one side of the upper roller \( N \), over which the lower-elevator apron operates, and which roller \( I \) will herein designate as the "force-feed roller," inasmuch as its function is to aid and assist the delivery of the grain from the elevator-apsorns to and upon the deck \( F \) of the binder mechanism. It may sometimes occur, however, and particularly where the material being fed is damp or green, or partially so, that this force-feed roller \( E \) becomes clogged or choked and hence held against rotation. In such case the danger of breakage of the driving sprocket-chain \( P \) or of some of the gears or pinions actuated thereby is incurred. In order to avoid this objection, I propose to drive the force-feed roller \( E \) frictionally. To this end I provide said roller with a gudgeon \( G \), forming a journal therefor, and which is received through a suitable bearing formed in the upper end of the frame \( K \) of the lower-elevator apron or other suitable part of the framework. Upon this gudgeon \( I \) form or otherwise suitably secure a shoulder \( H \), and in the manner shown the casting of sprocket \( T \) and pinion \( S \) to be received upon the projecting end of the gudgeon \( G \) and to bear against the surface of shoulder \( H \) thereon, and said casting may be frictionally clamped against the surface of said shoulder by means of a clamp-nut \( J \), mounted upon the threaded end of gudgeon \( G \). Thus by turning up or backing off of the clamp-nut \( J \) the degree of clamping friction of the casting of said sprocket and pinion upon gudgeon \( G \) may be increased or diminished, as desired, to secure the desired result. The frictional clamping-nut \( J \) may be held in any suitable manner in its adjusted position—as, for instance, and by way of illustration, by providing the flange thereof with a series of openings (indicated at \( L \) thru which a pin \( L' \) may be passed and inserted in a slot or seat in the end of gudgeon \( G \). Of course it will be understood that in turning up or backing off clamping-nut \( J \) it must be turned up or backed off sufficiently to enable the pin \( L' \) to be passed through one of the series of openings \( K \) and to be inserted into the slot or seat in the end of gudgeon \( G \), and to this end said nut \( J \) is provided with a large number of such openings \( K \), so that only a slight rotative movement of nut \( J \) is necessary to bring the slot or seat in gudgeon \( G \) and an opening in said nut \( J \) into registering relation to receive the pin \( L' \).

From this construction it will be seen that the force-feed roller is driven frictionally, and hence in case of any obstruction being interposed to retard or prevent the rotation of such roller and of sufficient force to overcome the frictional engagement of the sprocket and pinion casting therewith said roller will be held against rotation until the obstruction is removed; but the machines and the other parts thereof which are actuated by the sprocket-chain \( P \) may continue to operate in their usual and ordinary manner and without danger of breakage of the parts. The driving sprocket-chain \( P \) may be driven from any suitable source of power and in the ordinary manner, as will be readily comprehended by persons skilled in the art.

It is obvious that many variations and alterations in the details of construction and arrangement would readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited to the exact details of construction shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a grain-binder, a main frame, an upper-elevator frame and a lower-elevator frame, elevator-apsorns operating on said frames, said upper-elevator frame supported at one end by said main frame, means for supporting the other end of said upper-elevator frame, and a door or plate independent of the supporting means for said upper-elevator frame and hinged to the lower-elevator frame and arranged to inclose the space between said upper and lower elevator frames, or to be folded down to form an extension, and a sprocket-chain for actuating the apron of said lower frame, said chain being located below said door or plate, as and for the purpose set forth.

2. In a grain-binder, a main frame including a longitudinally-extending beam, an upper-elevator frame supported upon said main frame at its front edge and supported by said beam at its rear edge, a lower-elevator frame supported upon the main frame, aprons operating upon said elevator-frames and a section or plate hinged to the lower-elevator frame and adapted when folded down to form an extension of the supporting-surface of such frame, and when swung up against the rear edge of the upper-elevator frame, to form an enclosure for the space between said upper and lower elevator frames, and a sprocket-chain for actuating the apron of said lower frame, said chain being located below said section or plate, as and for the purpose set forth.

3. In a grain-binder, a platform-carrier, an actuating-roller therefor, a drive-gear engaging and driving said roller, an elevator comprising upper and lower aprons to which said carrier delivers, a driving-roller for said lower apron, a drive-gear engaging and driving said roller, a sprocket-chain operating directly upon said drive-gears for positively actuating said carrier and elevator, said chain being normally located below the surface of the lower apron of said elevator, in combination with a foldable extension for said elevator, as and for the purpose set forth.
4. In a grain-binder, an upper elevator, a lower elevator, an extension hinged to said lower elevator, a platform-carrier arranged to deliver into the space between said elevators, actuating-rollers for said carrier and lower elevator, a train of gearing for driving the actuating-roller of said carrier, and a driving-sprocket for actuating said train of gearing and the roller of the lower-elevator apron, said sprocket arranged below the space between said upper and lower elevators to accommodate said extension when the latter is folded down, as and for the purpose set forth.

5. In a grain-binder, a platform-apron, an elevator to which said apron delivers, said elevator provided with a hinged extension-plate, actuating-rollers for said apron and elevator, in combination with a force-feed roller arranged at the delivery end of said elevator, a gear arranged adjacent to the delivery end of said apron, a driving-chain engaging with said force-feed roller and over said gear, and intermediate gearing between said force-feed roller and the actuating-roller of said elevator for actuating the latter, and gearing intermediate said gear and the actuating-roller of said apron for actuating said apron whereby the sprocket-chain normally lies beneath the effective surface of the elevator and out of the way of said plate when folded down to form an extension, as and for the purpose set forth.

6. The combination with a platform-carrier and a lower-elevator apron, actuating-rollers for said carrier and apron respectively, gears mounted on the shafts of said rollers, a drive-gear for each of said gears, and a chain-driven sprocket-wheel mounted on the shaft of and connected to each of said drive-gears, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 3d day of July, 1900, in the presence of the subscribing witnesses.

MAURICE KANE.

Witnesses:

S. E. DARBY,
E. C. SEMPLE.