3 Sheets—Sheet 1.

A. G. McINTOSH.

Grain-Binder.

No. 204,989. Patented June 18, 1878.

Fig: 1.

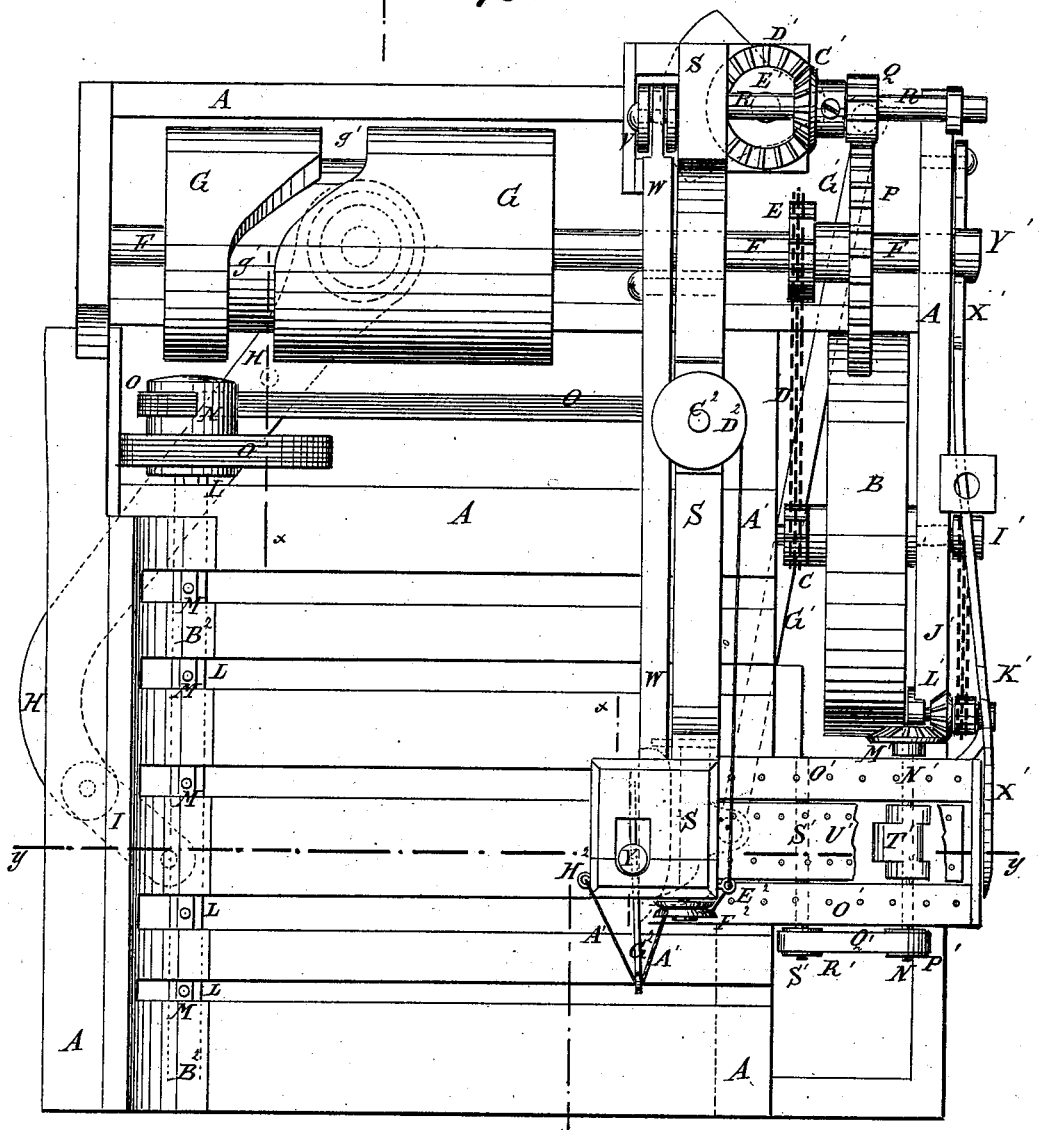
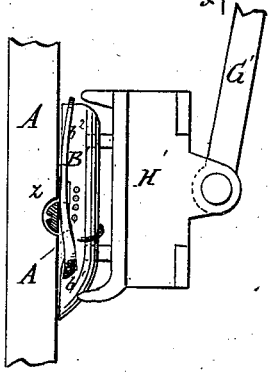


Fig: 2.



WITNESSES:

Chas. Nichols
C. Sedgewick

INVENTOR:

A. G. McIntosh

BY Munn & Co

ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

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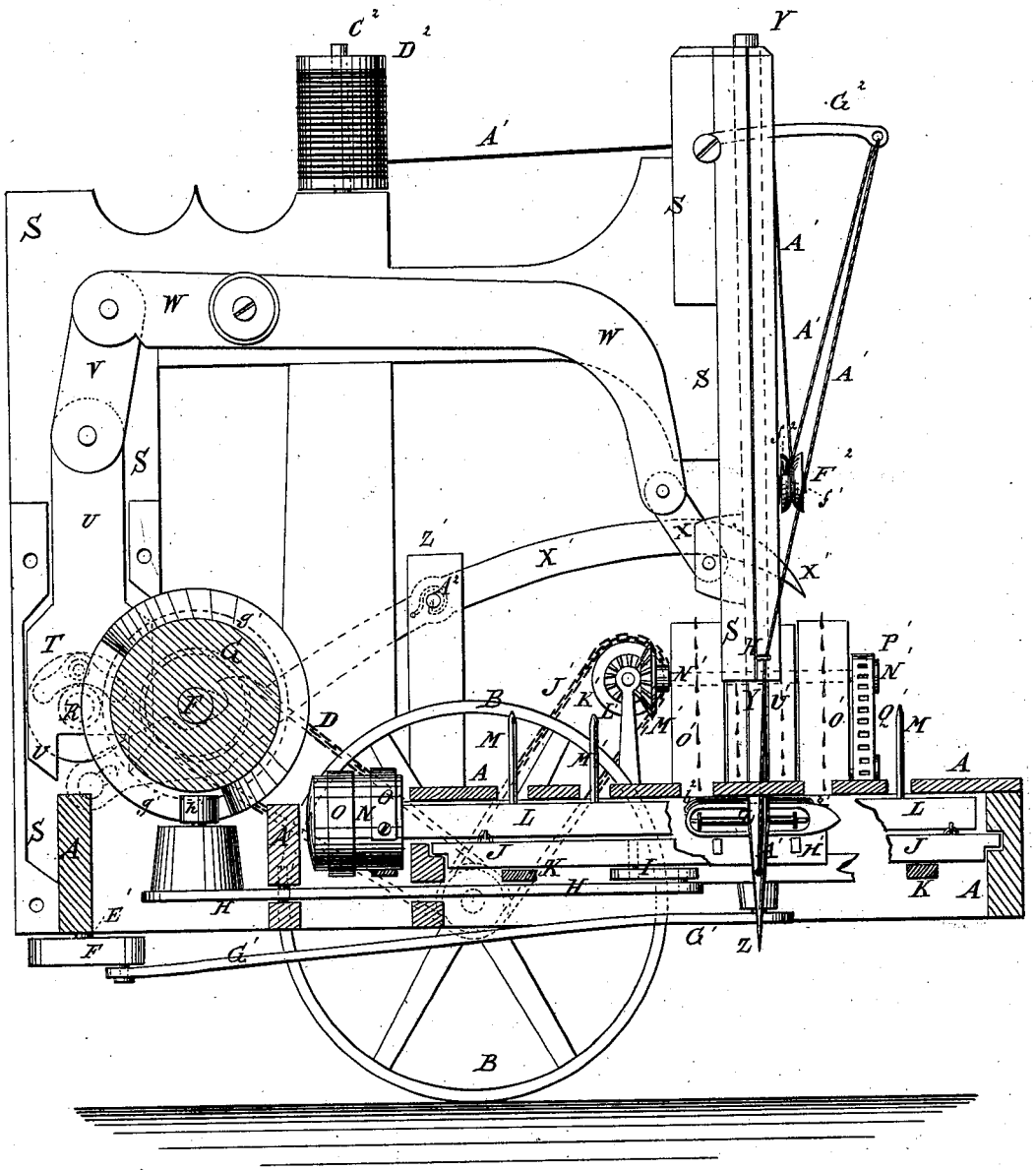
Fig. 3.



WITNESSES:

Chas. Nichols
C. Sedgwick

INVENTOR:

A. G. McIntosh
BY Munn & Co

ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

A. G. McINTOSH.
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Fig: 5.

Fig: 4.

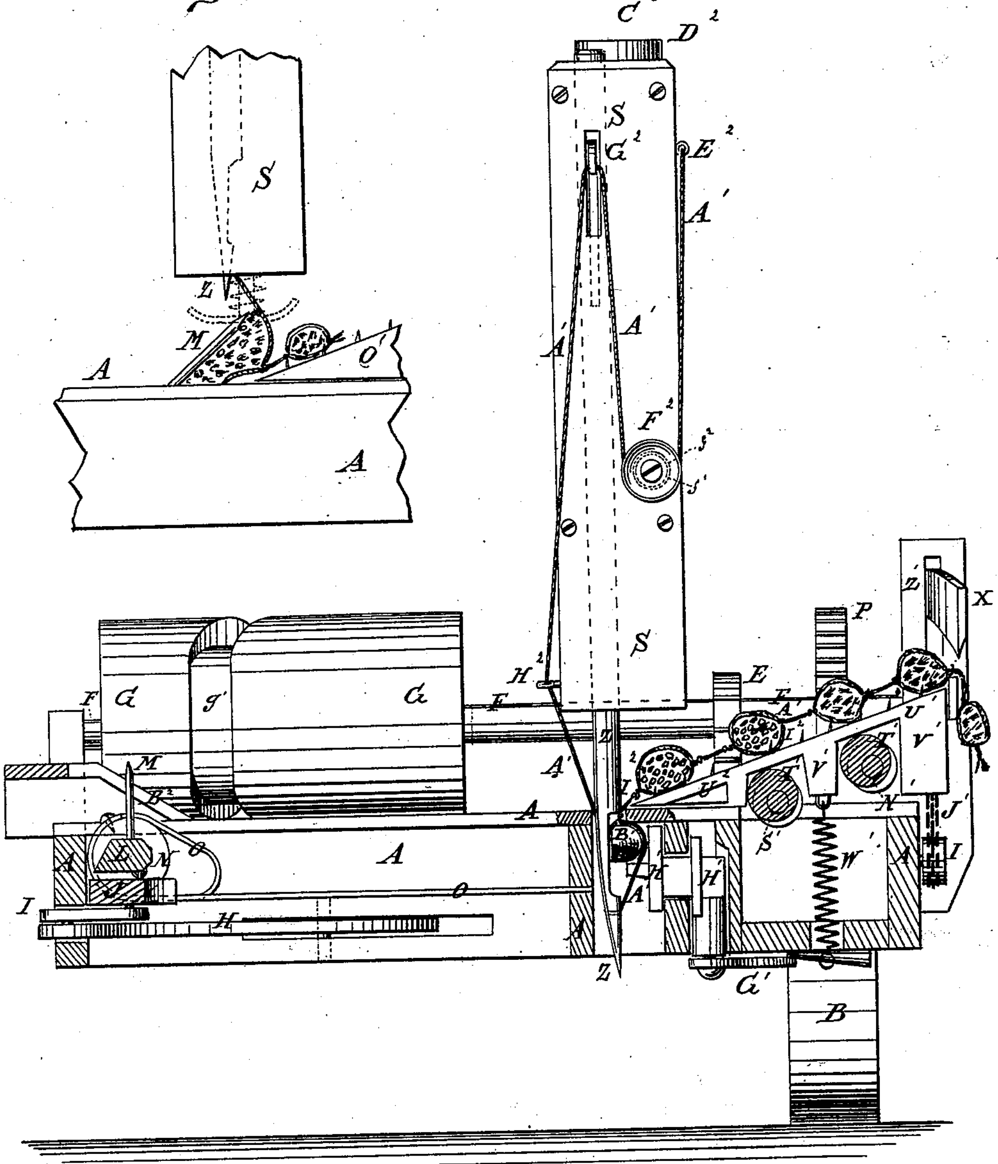
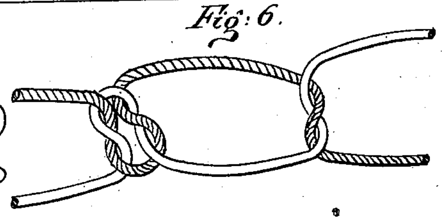


Fig: 6.



WITNESSES:
Chas. Nida
C. Sedgwick

INVENTOR:
A. G. McIntosh
BY Munn & Co
ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALEXANDER G. McINTOSH, OF ATALISSA, IOWA.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **204,989**, dated June 18, 1878; application filed January 7, 1878.

To all whom it may concern:

Be it known that I, ALEXANDER GREGORY McINTOSH, of Atalissa, in the county of Muscatine and State of Iowa, have invented a new and useful Improvement in Combined Reaper and Binder, of which the following is a specification:

Figure 1, Sheet 1, is a top view of my improved machine. Fig. 2, Sheet 1, is a detail top view of the shuttle and shuttle-carrier, the needle being shown in cross-section. Fig. 3, Sheet 2, is a longitudinal section of the machine, taken through the broken line *x x x x*, Fig. 1. Fig. 4, Sheet 3, is a cross-section of the machine, taken through the line *y y*, Fig. 1. Fig. 5, Sheet 3, is a detail section, showing the gavel coming into position to be bound.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved machine which shall be so constructed as to cut the grain, gather it into gavels, and bind it, the various operating parts receiving motion from the drive-wheel of the machine.

A represents the platform of a reaper, in bearings attached to which revolve the journals of the drive-wheel B. To one of the journals of the drive-wheel B is attached a small chain-wheel, C, around which passes an endless chain, D. The chain D also passes around a larger chain-wheel, E, attached to the shaft F, which revolves in bearings attached to the rear part of the frame of the platform A.

To the shaft F, in the rear of the platform A, is attached a drum, G, in the face of which is formed a groove, *g'*, which is made with two inclines, one on each side. The groove *g'* is designed to receive the pin *h'*, attached to the rear end of the lever H, and which has a roller placed upon it to diminish friction.

The lever H is pivoted to a cross-bar of the platform-frame, and its forward part is curved, as shown in Fig. 1, and to its forward end is pivoted the end of a short connecting-bar, I, the other end of which is pivoted to a bar, J. The bar J rests and slides upon bars K, attached to the frame A, and its ends rest and slide in grooves formed in cross-bars of the said frame A.

To the inner upper corner of the bar J is hinged a bar, L, to the upper side of which are attached the rake-teeth M. The teeth M, when in an erect position, project through slots in the platform A, so as to sweep the cut grain across the said platform.

To the rear end of the rake bar or head L is attached a drum, N, to which are attached the ends of straps O. The straps O are wound in opposite directions around the drum N, and their other ends are attached to the opposite side parts of the frame A.

The straps O are made of such a length as to turn the rake-teeth down and up at the proper time as the rake moves back and forth across the platform, so that it may move back beneath the cut grain, and may carry the said cut grain with it as it moves forward. The strap O, that turns the teeth M down, also presses the teeth against the gavel, and holds it while the needle passes down to bind it.

To the shaft F is attached a large bevel-gear wheel, P, the teeth of which mesh into the teeth of a smaller bevel-gear wheel, Q, attached to the shaft R. The shaft R revolves in bearings attached to the frame of platform A, and its inner end enters the hollow post of the needle-arm S, and has a crank-wheel, T, attached to it.

The crank-pin of the wheel T enters a heart or other shaped groove or slot formed in the lower part of the vertical sliding bar V, or in a block secured to said lower part.

To the upper end of the sliding bar U is pivoted the end of a short connecting-bar, V, the other end of which is pivoted to the rear end of the lever W. The lever W is pivoted to the horizontal part of the needle-arm S, and its forward end is curved downward, and to it is pivoted the upper end of a short connecting-bar, X, the lower end of which is pivoted to the needle bar or holder Y. The needle bar or holder Y works up and down in a guide-socket in the forward vertical part of the needle-arm S, and to the lower end of this bar is attached the needle Z.

In the needle Z, just above its point, is formed an eye to receive the cord or wire A^1, and the outer side of the said needle is notched, as shown in Figs. 2, 3, and 4, for the shuttle B to pass through in forming a knot.

To the shaft R is attached a bevel-gear

wheel, C^1, the teeth of which mesh into the teeth of a bevel-gear wheel, D^1, attached to the upper end of a short vertical shaft, E^1. The shaft E^1 revolves in bearings attached to the frame of platform A, and to its lower end is attached a crank, F^1, to which is pivoted the end of a connecting-bar, G^1. The other end of the connecting-bar G^1 is pivoted to the shuttle-carrier H^1, which slides in a way formed for it in the frame A.

To the outer journal of the drive-wheel B is attached a small chain-wheel, I^1, around which passes an endless chain, J′. The endless chain J′ also passes around a small chain-wheel, K′, pivoted to supports attached to the frame of platform A.

To the chain-wheel K′, or to its journal, is rigidly attached a bevel-gear wheel, L′, the teeth of which mesh into the teeth of the larger bevel-gear wheel M′, attached to the rear end of the shaft N′. The shaft N′ revolves in bearings in the parallel inclined bars O′, attached to the frame A^1, and to its other end is attached a chain-wheel, P′, around which passes an endless chain, Q′. The endless chain Q′ also passes around a chain-wheel, R′, attached to the end of a short shaft, S′, which is placed parallel with the shaft N′, and revolves in bearings in the inclined bars O′.

To the shafts N′ S′, between the inclined bars O′, are attached two cams, T′, which, at each revolution, strike against the inclined bar U′, placed between the inclined bars O′, and raise it, and then strike against the downwardly-projecting arms V′, attached to the said bar U′, and force it outward.

The gearing is so arranged that the bar U′ V′ may be moved upward and outward four times between the successive gavels. The inclined bar U′ V′ is drawn downward and inward, as the cams release it, by the spiral spring W′, one end of which is attached to the said bar V′, and its other end to a bar of the frame A.

To the bars O′ U′ O′ are attached teeth to take hold of the bundles, the teeth of bar U′ carrying the bundle upward and outward, and the teeth of the bars O′ keeping the said bundles from slipping back, and from being drawn back by the downward and inward movement of the bar U′.

As each bundle drops from the upper end of the elevator O′ U′ O′ the cords or wires are cut off, to separate the bundles, by the knife X′. The rear end of the knife X′ is pivoted to the rear part of the platform-frame A, and the said knife is forced down to make a cut by a cam, Y′, attached to the end of the shaft F.

The knife X′ passes through a guide-slot in a post, Z′, attached to the platform-frame A, and is raised and held up until forced down by the cam Y′ by a spiral spring, A^2, placed beneath it in the slot of the post Z′.

B^2 is an inclined plate or board, attached to the outer end of the platform A, and slotted transversely from its inner edge to correspond with the slots in the said platform A that the rake-teeth M project through. The inclined board B^2 receives the cut grain that falls upon the outer end of the platform A, and causes it to slide inward, so as to be out of the way of the rake-fingers M as they rise at the end of their outward movement.

To the top of the horizontal part of the needle-arm S is attached a pin, C^2, to receive the spool D^2, that carries the needle cord or wire A^1.

From the spool D^2 the cord or wire A^1 passes through a guide-eye, E^2, around a tension device, F^2, through the eye of the take-up arm G^2, which projects from a slot in the upright forward part of the needle-arm S, through a guide-eye, H^2, attached to the lower end of the said needle-arm, and thence to the needle Z. The needle-arm S should be provided with a presser-foot to press upon the gavel while being bound, and which should have its side parts curved upward to prevent it from catching upon the stalks of grain.

The tension device F^2 consists of two disks, flared from each other, and held together and to the upright forward part of the needle-arm S by a thumb-screw, f^1, and pressed together by a spiral spring, f^2, interposed between the inner disk and the said part of the needle-arm, so that the tension may be regulated by tightening and loosening the said screw f^1.

With this construction, as the machine is drawn forward the cut grain forms upon the slotted platform A, and is swept by the rake-teeth M beneath the end of the needle-arm S, and into the loop formed by tying the ends of the needle cord or wire A^1 and the shuttle cord or wire I^2 together, and hooking them upon a tooth of the elevator O′ U′. The shuttle B^1 then moves to the rearward, and the needle Z descends, passing between the said shuttle B^1 and the shuttle-cord I^2. As the needle Z continues to descend the shuttle B^1 passes forward through the notch in the needle Z and above the needle-cord A^1. The said needle then rises, passing out of the coil or loop of the shuttle-cord, and drawing the needle-cord through it, thus forming a half-knot. The gavel is then moved up a little by the elevator O′ U′, and a second half-knot is tied. The bundle is then carried up the elevator O′ U′ another step, and its expansion draws the two half-knots together, forming a firm knot. At the same time the needle and shuttle form a third half-knot. The bundle is then carried up the elevator another step, and a fourth half-knot is formed. As the fourth half-knot is formed the rake-teeth sweep another gavel into place, the pressure of which draws the fourth and third half-knots together into a firm knot. The second bundle is then bound in the same way, four half-knots being formed between each bundle and the next one. As each bundle passes off the upper end of the elevator O′ U′ the knife X′ descends and cuts the cord between the two knots, and allows the bundle to drop to the ground or into a basket attached to the side of the machine.

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

1. The combination, in a harvester, of the knife X′ and the elevator U′ O′, as and for the purpose specified.

2. The combination, with the fixed tooth-bars O′ O′, of the median movable bar U′ V′, operated by the cams T′ T′ and spring W′, as specified.

3. The combination of the two straps O, wound in opposite directions, with the hinged bar of the rake L M, for raising and lowering the rake-teeth, and for pressing down the gavel while being bound, substantially as herein shown and described.

4. The combination, in a harvester, with the elevator and knife, of a knotting or binding mechanism that ties two knots between each sheaf, as and for the purpose specified.

ALEXANDER GREGORY McINTOSH.

Witnesses:

J. N. B. PARVIN,

W. H. JONES.