W. B. COATES.

Hemp Harvester.

No. 7,719. Patented Oct. 15, 1850.

FIG. 3.

FIG. 2

FIG. 1

UNITED STATES PATENT OFFICE.

WM. B. COATES, OF BIG LICK, VIRGINIA.

IMPROVEMENT IN HEMP-HARVESTERS.

Specification forming part of Letters Patent No. **7,719**, dated October 15, 1850.

To all whom it may concern:

Be it known that I, WILLIAM BAILY COATES, of Big Lick, in the county of Roanoke and State of Virginia, have invented new and useful Improvements in Hemp and Grain Cutters; and I do hereby declare that the following is a full, clear, and exact description of the drawings, with my improvements attached, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view; Fig. 2, the lower half of an iron box; Fig. 3, the right end of the shaft N broken off to disclose the thread of the screw.

Fig. 1: A A is a frame seven feet long, more or less, four wide, more or less, and three high, more or less, composed of dry oak or ash. The pieces should be about four inches square, having grooves cut at *d d d d d d d d*. A seat is placed front, on top, for the driver, to enable him to drive and attend the lever U.

B B is a vertical sliding frame, having five vertical posts, four working in the above-mentioned grooves and the fifth on the left hand and back of B B, with the top mortised in the back transverse piece at the upper part of the frame, and the lower part entering a mortise in the back long transverse piece. The top has four pieces, four inches square, in which the vertical posts are secured by tenons. The posts have bolt-holes at the distance of three inches apart, more or less. The lower part of B B consists of two long transverse pieces eleven feet in length, more or less, united by four pieces, one right and left and two nearly in the center of their entire lengths. The front transverse piece is about three inches deep and five (more or less) wide. The back piece is four inches square. The width of the sliding frame should be two feet both at top and bottom, more or less. The pieces of this frame, as well as those of A A, are put together by mortises and tenons and then pinned by wooden or iron pins, which is optional.

C is an iron axle-tree six feet long, more or less, and two inches in diameter, having two cranks, one on the right and one on the left, the first four, second thirteen, inches from the frame A A on the inside. Each crank is about four inches long, one wide inside, at top, and spreading the reverse part two inches, and made perfectly smooth and at right angle S with each other. The part of the crank marked H should be about one-half inch less in diameter than C.

D is an iron axis about four feet long, two inches in diameter, and having two cranks placed directly opposite to the two on C, of the same form and size.

h h are two iron boxes for the axis D to work in. There is also another on the right back vertical post of B B in a line with the above. (Not seen.) Each box is about six inches long, three wide, and secured to the vertical posts by screw-bolts. The center is thick and sloping toward each end, and containing circular holes for the axis D, two inches in diameter.

E E are two connecting-rods, composed of iron. They work on the right and left inside of A A and unite the cranks. Each rod is one inch wide and circular at each end, with circular holes one inch and a half in diameter, to suit H. The circular part at each end should be three inches in diameter. The body of each E E is one inch wide and two or more thick, and are so constructed as to lengthen or shorten, as is desired. Both sliding bolts and a nut-screw I intend to use. The nut-screw will answer; but letting one half of each arm or rod slide in grooves on the other half will no doubt be preferable.

e' e' are two spoke or cast-iron wheels, three feet in diameter and six inches wide at the tire, which should be set with a number of short stout points running entirely around the tire, as shown in the drawings. If spoke-wheels, any size hub will answer; but should cast-iron be used for the wheels, the center should be about four inches thick, the rest about an inch, and six broad at the tire, with circular holes to fit on the end of the axle-tree front. The front axle-tree is of wood, and six feet long, more or less.

e e are two cast-iron wheels, three feet in diameter, six inches wide at tire, and rough-pointed, like the others. The cast hub should be four inches thick and the body of the wheels two inches or more, to give weight to the back part and overbalance the frame B B, or give the most weight in the frame A A.

F is a cast-iron cog-wheel, two feet in diameter, more or less, three inches thick at center, with a square hole for its axis, and two inches thick at the edge. This wheel has one hundred teeth, more or less, and very strong. It works on the axis D, and is seen between the

two posts on the left and back of the sliding frame B B.

G is a small cast-iron cog-wheel, (with twenty teeth,) three inches thick at center and two at the edge, with teeth the same size as those of the cog-wheel G.

H is the axis of the cog-wheel G. It is one inch and a half in diameter, and has two boxes to work in. One box is seen at *u*. The other is not seen, but is on the fifth vertical post, the second on the left and back of B B. The left end of H is square for about three inches from the visible box *u* toward the left. A crank (with the part fitting on the square left end of H rounding and growing smaller to its lower part, with a bend at right angles,) is put on. The crank is pinned at the top part to the square end of H. The left end of the lower part has a shoulder or a pin to keep the rod G on securely. On each side of the box *u* are two shoulders to keep the small cog-wheel G in its proper situation. The length of H is fifteen inches, more or less. The crank should be about one foot long, more or less.

I is a connecting-rod, about twelve inches long, more or less, and circular at both ends, with holes one inch and a quarter, or thereabout, in diameter. The ends are one inch wide and the circular part three inches in diameter, more or less. The body should be one inch wide and one and a half deep or thick.

J is an iron lever, about three feet long, rounding at top, with double eyes for the front end of I to work in, growing gradually larger toward the bottom, where are also double eyes. It is about one inch wide in the clear between each set of double eyes at each end. The body at top is about one inch thick and two (more or less) wide. The bottom of the body near the lower double eyes is three inches wide and one thick, more or less. At one-third of the length from the lower double eye is a circular hole to put a bolt through to secure it to K. This lever can be straight or curved backward.

K is an upright piece of iron having a body and two legs, with a circular hole at top of the body to confine J to, with a round bolt, so that it can turn on it. The body is four inches long, two thick, and three wide. The legs are about twelve inches long, and growing larger from the body down toward their lower parts, which should be securely confined in the cross-piece of wood on which it is seen in the drawings.

L is an iron connecting-rod of the same form as I, but a little shorter, and at *b* two inches wide on each division, to attach the hinge *b* to.

M is a short lever, about one foot high, rounding at top, with an eye, and one inch thick. The body grows larger to the lower part, is the same thickness, but half as wide again. The lower part is circular, and has a square hole (one inch and a half long on a side) to fit on the square part of N on the right.

N is a rock-shaft with the choppers attached. The left end is one and a half inch in diameter, more or less, and five long, more or less, and smooth. The right end is six inches long and one and a half inch in diameter, more or less. The extreme end for about one and a half inch is square to fit M on. At the left of the square commences the thread of a screw, which is run around enough to cause the whole of N to move two inches (more or less) toward the right when the lever M is drawn back and downward. The length of N from M to the extreme left is five feet, more or less. The choppers, when down, should act against the right and top part of each tooth in precisely the same manner as a pair of scissors—that is, cut the whole length of the edges, which is three inches, more or less. The front points of the choppers are turned a little toward the right, and this turned part is rounding at point and edge, so as not to cut, but prevent the hemp, &c., from getting to the right of each of them while down. From the point seen at the lower and back part of each chopper they take a short vertical rise and terminate in a gentle curve. The opposite part has a like bend. The choppers are about two inches wide at top, where united to the part cast on N and belonging to it, and thick, so as to get as much weight as possible, then curved, so as to throw the edges against the edges of the teeth. The edges of the choppers are like a chisel from the lower part upward to the right for one inch. The part around the shaft is in the form of a cylinder. It then grows thinner to the intersection of the choppers, where it is about two inches, more or less. The parts at each end are in the form of shoulders, one inch in thickness from the round parts working in the boxes Q Q, and are to prevent the edges of the choppers from going too far to the left when they descend and to the right while rising—about nineteen choppers.

P are cast-iron teeth, with smooth sharp edges at top on the right, and sides oblique right and left, then coming to a point front, two-thirds of their distance from *t*. Their length is about nine inches, with a space between each tooth of one inch. Their width is two inches, more or less; depth two for one inch from *t*, as shown at +, to where they commence striking off to a point, about five inches, one inch wide, more or less. From the front of +, on P, there is a small slope of one inch in every space between the teeth, as is shown by the first space in the drawing. The object of this slope is to keep the hemp, &c., from getting closer than two inches to *t*, that when the edges of the choppers cut down they may not strike but about half an inch below the right upper edge of the teeth, and consequently cut all between the teeth and prevent half an inch of the edge toward the back of the choppers from cutting. If this were not the case, but the slope taken away, and the back part of the space vertical, the hemp might not all get cut, especially the stalk

jammed in the corner. With the slope, the hemp in the back part of the spaces is against the front of the slope at the lower part of the teeth, and standing out one inch from the back of the slope, and allowing the back point of the edge at [] to go a half inch below the top of tooth, as described. The part *t* is cast to the teeth; should be about five feet long, hollow inside its whole length, five inches by three, to fit the front lower piece of B B, having a shoulder one inch in height from the top of the teeth and the same below the teeth. This is put on the front long transverse piece of B B previous to the extreme left piece being united to the long transverse pieces by tenons and mortises and pinned—about nineteen teeth, more or less.

Q Q are two iron boxes, eight inches in length, four wide, with the front part of each about four inches in height and the back part two inches. The front part of the left has a circular hole for the left end of N to work in. The right one has a female thread cut in the bottom and sides to suit the male thread on the right end of N, and of such a length as to throw the part N two inches toward the right and left. Those boxes are secured to the lower part of B B front by strong screw and nut bolts—two in each. A hole is seen in the left box near its front. This is to pour oil in. The right box has a similar opening to pour oil in. The oil runs down around the screw and rests in the lower part of the female screw, which is cut deeper than the male and retains the oil.

R R are two long arms, curved toward their back part, of iron, one inch, more or less, in diameter and about seven feet long, secured at their front ends to S, while the others slide in the long slide-eyes at Z Z.

S is an iron lever or arm, with an eye front and back. The fore part is one inch wide, the back part is rounding and three inches wide at the eye for a few inches, then sloping toward the front. It should be one inch thick at the back part and three-quarters, more or less, front.

T is an iron connecting-rod, about four feet long, more or less, half an inch wide, one deep, and small bolt-holes at the front part. Each extreme end has a small hook. This is to be lengthened when the frame B B is lowered.

U is a wooden lever, about three feet long, and strong, with its fulcrum one foot from the lower end. An iron bolt, with a screw-nut at end, holds it on the front and top of A A and permits it to move freely.

V is a spiral spring of iron, about one foot in length. It draws forward the lever.

W is an iron box for the right side of the axle-tree C to work in. There is another just like it on the left of the lower part of A A, for the left end of C to work in. The axle-tree is kept in the proper places in the boxes by shoulders on C.

X X are two light iron frame sides, five feet wide at the top and one at their lower part, having two long eyes, Z Z, on their lower and back parts. The main rods rise from *c c* on the left part of sliding frame B B, run with a gradual ascent to four feet in height, more or less, then run slanting a little for about seven feet back, turn round and slanting toward the right and left for three feet, leaving the lower and back parts one foot from the ground, from which they run slightly slanting toward the two long pieces of B B, which they enter, and are secured by pins or bolts. Short and small pieces connect the upper and lower main pieces at equal distances apart.

Y is a smooth floor of metal or wood, coming even with the top of the long pieces of the frame B B.

Z Z are two slide-eyes, one foot long, half inch thick, secured to bottom of each frame and having a space of one inch and a half for the rods R R.

c c are two flat pieces of iron, six inches long, four wide, and one thick, to which the front ends of *x x* are secured. The pieces *c c* are secured to the frame B B by bolts running through the wood.

a a a a a a a a are bolt-holes, one inch in diameter, in the four vertical posts.

d d d d d d d d are grooves, one inch deep, four and a quarter long, in the main pieces of the frame A A.

b is an iron hinge on the right side of L, and when the choppers move laterally and upward it opens so as to lengthen the rod L two or more inches. It is three inches long toward the right of L, and secured to both divisions of L by screws.

u is an iron box on the back and left post of the frame B B. There is another on the next post to it toward the right. They are about eight inches in length, thick at center, and sloping toward each end. Those are for the axis H to work in.

o o o o o o o o are bolts with keys about eight inches long and one in diameter. Each has a large head on the outside of A A and holes for keys inside. Cords prevent the bolts from losing.

p is a strong wooden or iron lever, seven feet long, with a small chain front to fasten to the staple on top the frame B B. The back end has a strong chain to hook on the frame A when raising or lowering the frame B B.

q is an angular supporter, secured at bottom to the top of the frame A, and a bolt-hole at top to fasten the lever *p* to by a bolt.

Fig. 2: & & is an enlarged view of the lower half of the right box Q, with the female screw-thread or depression in it.

Fig. 3: & is the right end of the part N broken off to show the male thread.

Having described the drawings and referred to the parts by letters, I shall proceed to state the particular nature of my invention. This consists in placing choppers with their edges so as to strike obliquely on a rock-shaft, N, that by a lateral and semi-rotary motion combined they may cut an oblique stroke against the top and right edges of the teeth P. In ob-

taining this motion I employ a male and female screw, as before described; also, in placing a light frame, *x x*, with a spring bottom, R R, to catch the hemp when it falls back. This frame can be made with the rods R R closer to the back long transverse piece of frame B B, and placing the long pieces closer together, it would then catch rye, wheat, &c.

Mode of operation of the machine.—The choppers and left part of B B can be constructed to go on the right side of the frame A A, if necessary. All the motive power is derived from the hind wheels. The horses are attached to the tongue on front of A A, and walk a foot or so from the side of the hemp, &c. The hind wheels move the rods E E. They move D and F, which latter sets G in motion and works the crank on H. The crank moves the rod I. The latter works the lever J. This moves the rod L, which acts on M and raises the choppers while moving them laterally. The cutting-edge of the choppers when up, by moving toward the right, permit the hemp, &c., to enter the space between the teeth. When descending and moving to the left they cut it at an angle. The hemp falls back into the frame-sides X X and slides down on the spring-bottom R R. The longest and heaviest part falls on R R, which throws the butt-ends up out the way of the choppers. The butt-ends rest on the top of N, and are thrown back on Y. The driver at any time and distance pushes back the lever U, which draws out the left parts of R R, and the most weighty part of the hemp falls on the ground. The spiral spring V draws forward the lever U, and this throws the left ends of R R back into the long eyes Z Z. The foot-space between the bottom of the eyes Z Z and the ground gives ample room for the hemp to fall in a bundle or heap and allow the parts R R to close instantly and catch the hemp next falling. The choppers cut three inches, or the sharp edge is three inches in length, and, including the part turned to the right, are about four and a half inches long from the part marked □ to the curved point front. The depth of each chopper should be four inches from the lower part of the curve beneath them to the prominent part on top. Each chopper is smooth on all parts, as well as the cylinder part, on which they are cast or set. The horses should not be driven out of a fast walk.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The box on the right marked Q, which is a constant oil-retainer.

2. The combined sides X X and spring-bottom R R, for catching and laying the hemp, &c.

3. Casting (or securing in any firm manner) choppers on a rock-shaft, N, with the edges chisel-shaped, and set so as to strike obliquely against the top and right edges of the teeth P when the part N moves by a lateral and semi-rotary motion. In procuring this combined motion I employ a male and female screw-thread, as already fully described in the preceding part of these papers. I do not desire to be understood as confining myself to the screw in getting this motion in N, but will employ any other method most suitable to produce the desired result, and which shall be substantially the same.

WILLIAM BAILY COATES.

Witnesses:
C. A. DAVIS,
ALEXR. JACKSON.