W. GRANTHAM.

Straw Cutter.

No. 1,175. Patented June 18, 1839.

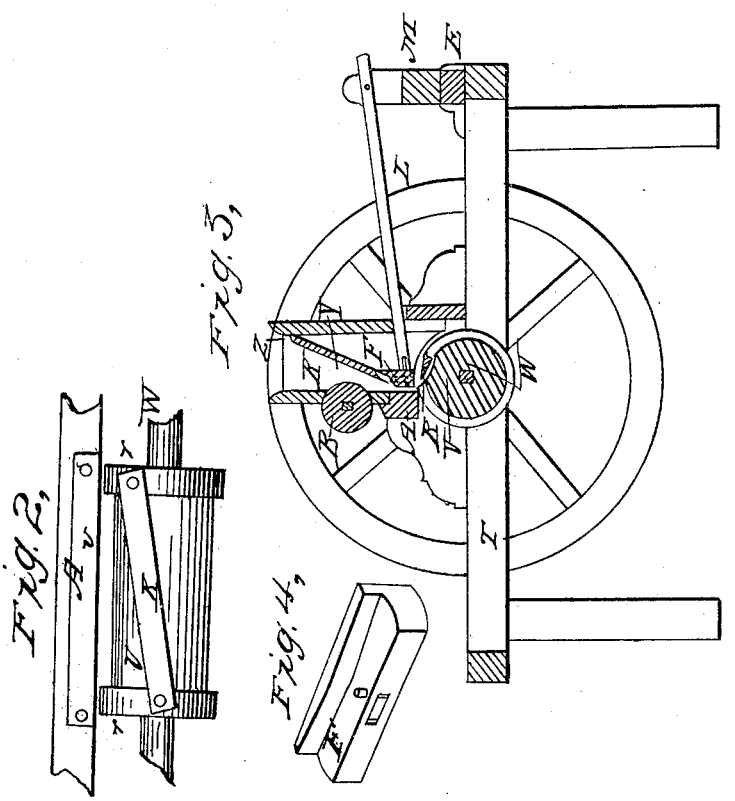

Fig. 2,

Fig. 3,

Fig. 4,

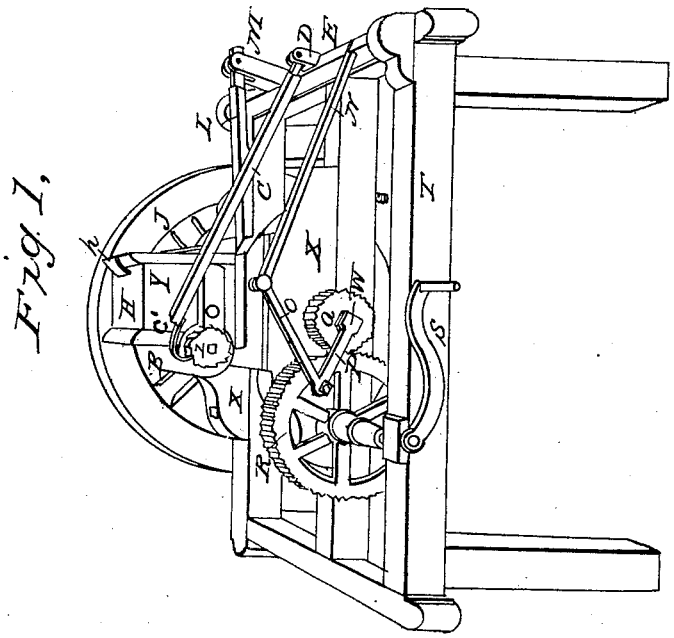

Fig. 1,

UNITED STATES PATENT OFFICE.

WILLIS GRANTHAM, OF GRAINGER COUNTY, TENNESSEE.

STRAW-CUTTER.

Specification of Letters Patent No. 1,175, dated June 18, 1839.

To all whom it may concern:

Be it known that I, WILLIS GRANTHAM, of the county of Grainger and State of Tennessee, have invented a new and Improved Mode of Cutting Straw; and I do hereby declare that the following is a full and exact description, reference being had to the accompanying drawings, making part of the specification, in which—

Figure 1 is a perspective view of the machine; Fig. 2, a longitudinal section, and Fig. 3 a section showing the cylinder with the knife attached to it and the steel against which it cuts.

The nature of my invention consists in providing a cylinder V with a straight knife K to pass a straight steel U at an angle of five inches, with a pressure at the time of cutting sufficient to prevent the straw from pulling out, which pressure is regulated by a small wooden spring N and leaves the straw in the slant the knife passes through, which permits the straw to fall in the proper place for cutting with a feed roller B with a rag wheel on the left hand end of it put in front of a perpendicular hopper H at bottom of the hopper, which roller is drawn by a feed hand C with a small flat hook on it. This hook works on the rag wheel, the other end of the feed hand is attached to a lever D, that is fastened in a roller E to which the spring is attached that gives the pressure. This spring N is 19 inches long with a seven inch pitman O on it, as is shown in the accompanying drawings. This pitman O works on a six inch crank P. This crank P is put on the left hand end of the cylinder shaft W with the wrist directly opposite the knife K. When the knife cuts the straw the crank is down, which gives the pressure at the time of cutting, and as the knife passes over the crank and spring rises the press arm L is drawn back. This press arm is fastened to a lever M. The lever M is fastened to the same roller E that the feed arm and spring is. This press arm is made in the form of the letter T. The part that goes inside of the hopper H, which I term or call the press block F is put on the arm L, with a joint tenon. This is to work in the inside of the hopper. It is circled at each end in order that it may turn inside of the hopper H in order that if the draft of straw is greater on one side of the hopper than the other it yields to it, always making the pressure equal on both sides of the hopper. I also put an apron Y 18 inches long on the inside of my hopper at the back. I fasten it at the top with hinges or screws or nails. The lever end of the apron leaves the hopper 4 or 5 inches. This is done that the press block F may draw back behind it, in order that the apron Y may take the straw off of the press block. When the spring N rises the press block F is drawn back and the roller B is turned by feed hand C and if the straw is such that it will not fall of itself it is driven down by the feed roller B.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

I construct my machine by making a frame T of timber 3 inches thick, 4 inches wide. I make my frame four feet long, three feet wide. I have 3 side rails, 2 end rails. The side rails are tenoned into the end rails, leaving of, 2 spaces, one of 18 inches and one of 6 inches. The 18 inch space is for the cylinder V and the 6 inch space is for the gearing R, and I make my cylinder V 18 inches long and from 7 to ten inches in diameter, through which I put an iron shaft W, one inch and a quarter square, 30 inches ling. It is so divided, so as to give sufficient space on each end of the shaft for the gearing and balance wheel, the gearing on the left hand side of the frame and the balance wheel on the right hand side. I then put the shaft through the cylinder and turn it down to the proper size that I want it, which is from 7 to 10 inches. I then at each end of the cylinder leave a head *r r* or ream *r r* of 2 inches, turn out between those heads or reams down the depth of one inch and a quarter, which gives the length of the straw that it cuts. I have two head block X, two feet six inches long, seven inches wide, three inches thick. I then take the head block that I design for the left hand side 13 inches from one end which I term the left hand or front end, strike a line clear across the inside of the block and the bottom and top edge, or all around both sides and edges which line or scribe is to go, over the center of the journal of the shaft W. I then get the size of the journal of the shaft with my dividers and on the lower edge of the head block strike a half circle. Then cut or saw it out, which half circle forms a cap for the journal of the shaft at the left hand end. I then on each side of that line 2½ inches from the line that goes over the journal of the shaft I strike 2

other lines which are five inches apart, and by these 2 last lines I give the angle to the breast and knife and then 2½ inches farther toward the front or left hand end strike another line which is four lines on the left hand head block and makes 3 divisions, 2 of which are on the left hand or front end of the head block from the cap that goes over the journal of the shaft. The first division from the front end, left hand end, is for the breast piece to be let in, the second division to give the angle to the breast, the third to give the angle to the knife. I then take the other head block which I term the right hand head block, and ten inches from the left hand or front end strike a scribe all around both sides and edges, which scribe or line is to go over the right hand end of the cylinder shaft W and has a cap formed in it to cap the journal, the same as in the left hand head block, and then 2½ inches from that line toward the front or left hand end I strike another line, which makes 2 lines and one division on the right hand head block, which division is for the breast piece to be let in. I then get out my breast piece 22 inches long, 2½ inches thick, 3 inches wide. I then put 4 legs in my frame T 2 feet 4 inches long, having cut the six inch space for the gearing on the left hand side of the frame. I then measure seventeen inches from the front or left hand end rail, strike a scribe across the right hand and middle side rail. On this scribe in the middle and right hand side rail I let in brasses for the journals of the cylinder shaft W to work in. I then 17 inches from that line or these brasses toward the back or right hand end strike another line across the whole frame. On this line I let in roller E. The roller is long enough to reach clear across the frame. I let the journals into the 2 outside side rails, as is shown in the accompanying drawing. I then make my roller E 3 feet long, 3 inches square, turn journals of 3 inches long at each end, and then put it in its place on the frame and then measure nine inches from the right hand end of the roller E or in the middle of the 18 inch space I let in my lever M, which is 13 inches long, 2½ inches square and then 10½ inches to the left hand over the middle side rail, I let in my lever D, which is let in the same side of the roller that the lever M is. I then in the middle of the 6 inch space let my spring N into the same roller E so that when the lever M is perpendicular the spring N is level or in a horizontal position and extends to shaft W. I make my spring 19 inches long, one and a quarter inch wide, ¾ of an inch thick. I put a 7 inch pitman O on it. It has an eye turned at each end of it and they are turned contrary. One is to go on crank P that is on the cylinder shaft W, the other end on a hinge that is on the spring N. I then put my roller E in its place on the frame. To the lever M, I fasten my press arm L. To lever D I fasten my feed arm C, as is shown in the accompanying drawings. I then make my knife K 18 inches long, 3 inches wide, and one-eighth thick. I punch a hole through each end about 1 inch from the end and the same distance from the back. I twist it 2 inches and seven eighths, which is done in a mandrel, and then temper it. It is then ready to put on the cylinder. I then take the cylinder V, put it in its brasses on the frame. I then take the head blocks, X put them to their proper places. I then take the crank P, which is made of iron 6 inches long, the wrist 1½ inches long, and put it on the left hand end of the cylinder shaft. I then turn the cylinder around until the wrist of the crank P is down. My knife cuts to the left hand or front end of the frame. I then take the knife, place the end of the knife against the right hand head block, and just let the edge come to that line that goes over the center of the cylinder shaft at the right hand end, and then with the left hand or other end of the knife fall back to the last or back line on the left hand head block and at that place on the cylinder bed my knife, the back of it being let down some lower than the surface of the reams or heads *r r* of the cylinder and the edge lies up flush with the surface at the head of the cylinder. I put it on with screw bolts about 2 inches long. It has screws cut on both ends. One end is screwed into the cylinder and the other end comes through the hole in the knife with a tap or nut in it. I put my knife on in this way. I then take the cylinder V with the knife on it, place it in its brasses on the frame, and place the head blocks to their proper places. I turn the cylinder over until the edge of the knife is at the right hand, come to the first line spoken of made on the right hand head block, the line that goes over center of the cylinder shaft, and there make a dot or mark on that line level with the surface or face of the knife, I then turn the cylinder over until the edge of the knife at the left hand end of the cylinder or that end that is next to the gearing comes to the second line on the left hand, or front end, of the left hand head block and at that scribe or line I make another dot or mark level with surface or face of the knife. These dots or marks are to show how low down the breast piece is to go. The lower edge of it is to come just level with those dots. I then cut my mortises in each one of my head blocks 2½ inches long, 1 inch wide, the lower edge of which comes to those named dots on the head block. I then frame my breast piece and head blocks together. I have my tenons all on the bottom side of my breast piece. I then make my U 15 inches long, ¾ of an inch

wide, and one fourth inch thick. The reason my steel is 3 inches shorter than my knife is in order that it may pass between the taps that fasten the knife on. I then let my steel in the breast the thickness of the steel at the lower edge. On the right hand side or the side next to the knife the straight edge of the steel comes even with the lower side of the breast. It is put on with screws. This being done, I put my head blocks and breast together. All being fast together, put them on the frame T by means of screw bolts through each end of the head blocks and through the frame, and when made as herein described the knife passing the steel acts somewhat on the principle of shears. I then make my hopper H 2 feet high, 12 inches one way 16 inches the other way at top and 12 inches by 14 at bottom. The back plank at the hopper is 6 inches shorter than the others. That is done for the reception of the press block F, and it is made in a diagonal or angular form. It is in this shape ▭. It has the same angle that the breast has in order that it may set parallel with the frame and head block. I then set it on the breast and head blocks. The inside of the front plank of the hopper comes even with the back or right hand side of the breast, the side on which the steel is put. I then and there at that place on the breast and head blocks confine my hopper by cribbing it in with plank, so as to confine it permanently so that the pressure against the straw cannot move it, as is shown in the accompanying drawings. I then insert my feed roller B in the lower end of the front or left hand side of my hopper, which roller is 18 inches long, 3 inches in diameter, with a rag wheel I on the end next to the gearing 3 inches in diameter. It is put on backward or right to the reverse of the usual way of putting on rag wheels. The cause of that is it is drawn by a hook or feed hand C. The surface of this roller B goes about one inch in the inside of the front plank of the hopper. I then hang an apron Y to the inside of the back plank of the box. It is made of plank ¾ of an inch thick and just wide enough to go inside of the hopper H. It is confined only at the top to the inside of the back plank with hinges 2 or nails. The lower end leaves the back of the inside of the hopper 4 or 5 inches, which is done for the press block F to go behind in order that the apron may take the straw off of the press block and let it fall in the proper place for cutting. I then make my press arm L 2 feet long, 2 inches square. I make my press block F 14 inches long, 3 inches square, and in the center of that cut a mortise and let the press arm L into that mortise with a joint tenon so that it plays backward and forward. I circle the block F at each end, so that it can play in the inside of the hopper. The object of this is that if the draft of straw is greater on one side than the other of the box the press block yields to it always making of the pressure equal on both sides. The press arm L and press block F when framed together are in the form of the letter T. I then put the press block F in the inside of the hopper. Put it within an inch of the breast, set the lever M in a perpendicular position, and confine the press arm L to it, so that it works like a hinge. Put the feed hand *c* and hook *c'* on the rag wheel I and put pitman O on crank P, that is on the shaft W, which pitman is put on the crank. After the gearing is put on I gear my machine with cast gearing a spur wheel R and pinion or trundle head Q. The pinion or trundle head, forms 2 and a half revolutions while the spur wheel forms one. The pinion Q is put on the left hand end of the cylinder shaft W W and the spur wheel R to a separate shaft to itself and geared to the pinion and is turned by means of a crank S on the shaft of the spur wheel, as is shown in accompanying drawings. I also put a balance wheel J, made of timber three feet 6 inches in diameter, weighing about 100 pounds, which I put on the right hand end of the cylinder shaft. This is to regulate the motion of the machine, as is shown in accompanying drawings.

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

The combination of vertical hopper, feed roller, apron and press block, and these parts thus combined in combination with the rotary diagonal knife, the whole being constructed in manner substantially as herein described.

WILLIS GRANTHAM.

Witnesses:
ISRAEL COLE,
JESSE RIGGS.