(No Model.) 4 Sheets—Sheet 1.

E. W. ROSS.

CARRIER ATTACHMENT FOR FEED CUTTERS.

No. 461,622. Patented Oct. 20, 1891.

Fig. 2.

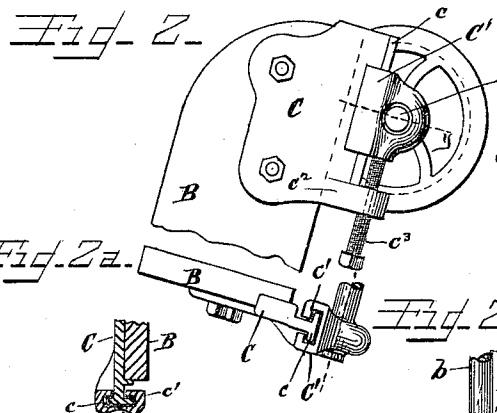

Fig. 2c.

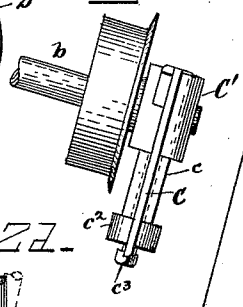

Fig. 2a.

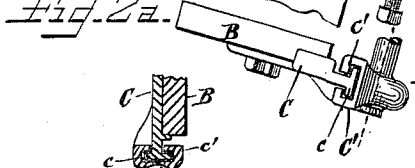

Fig. 2d.

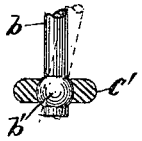

Fig. 2b.

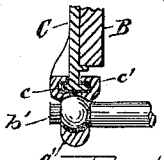

Fig. 3.

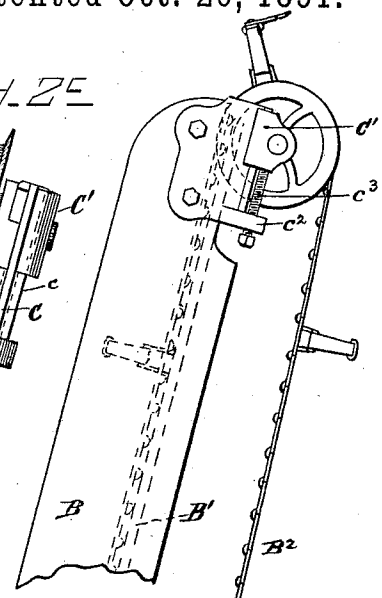

Fig. 7.

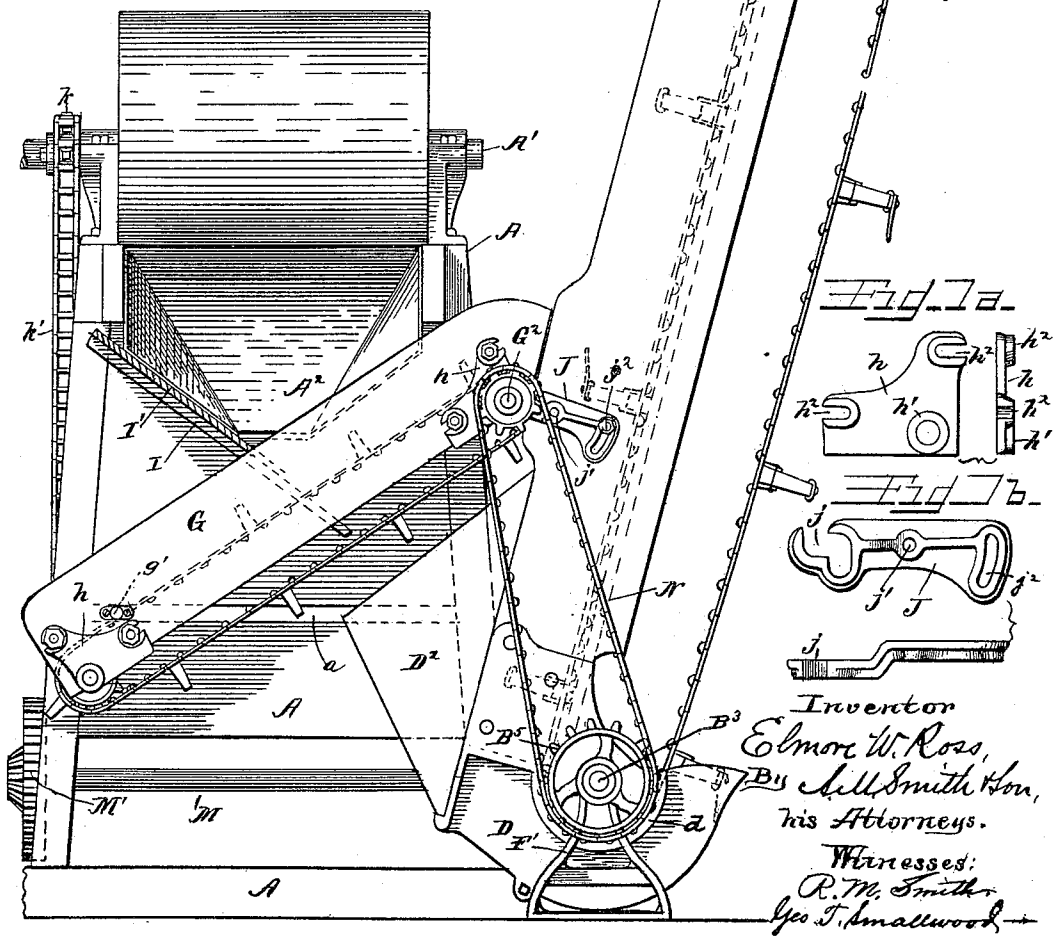

Fig. 7a.

Fig. 7b.

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E. W. ROSS.

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Fig. 3.

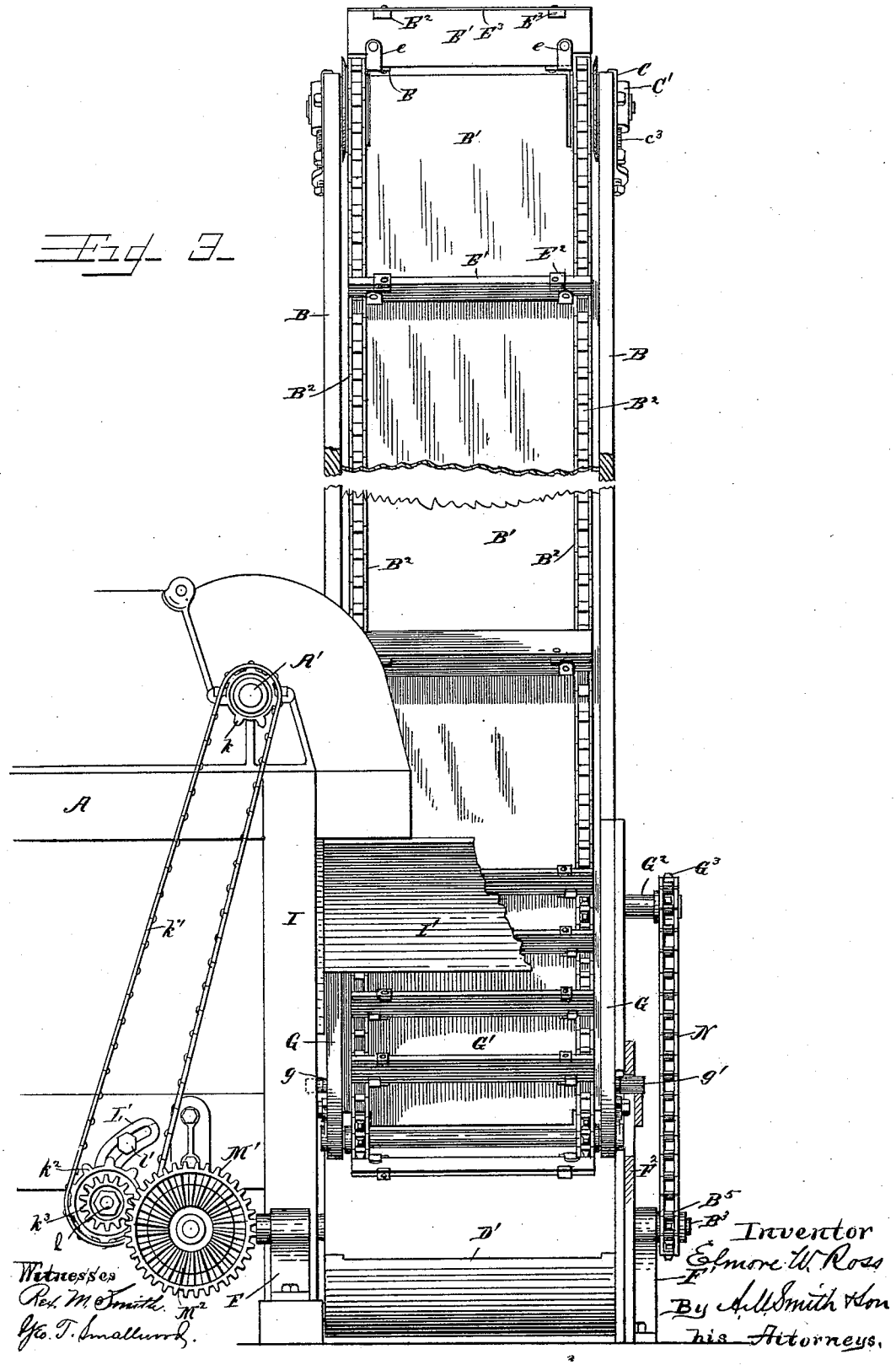

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Fig. 4.

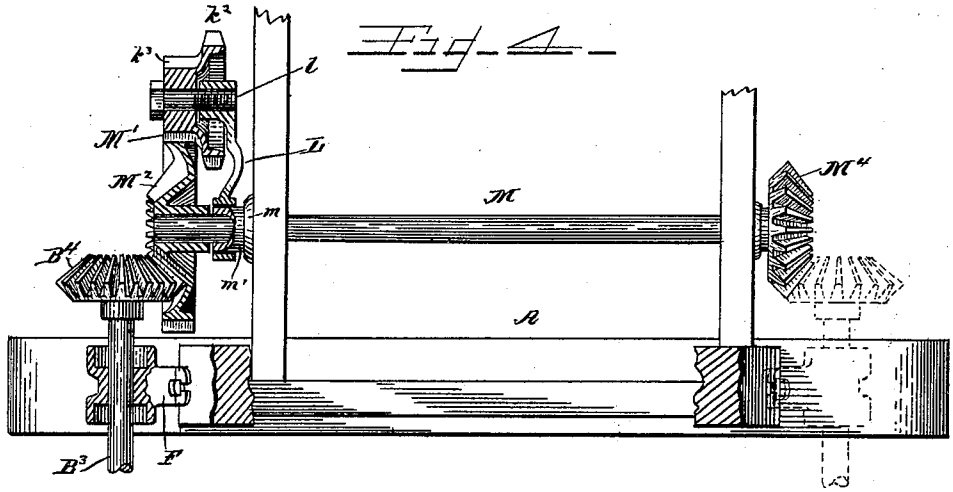


Fig. 5.

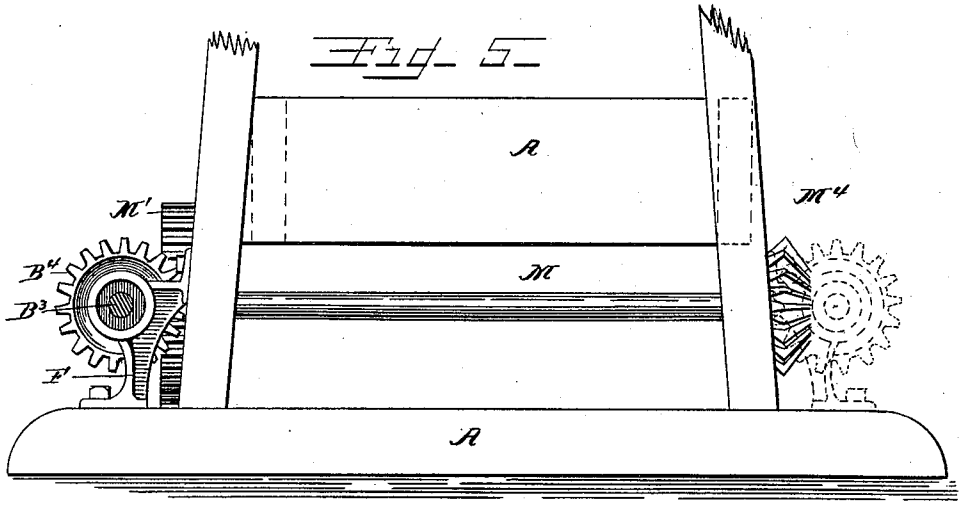
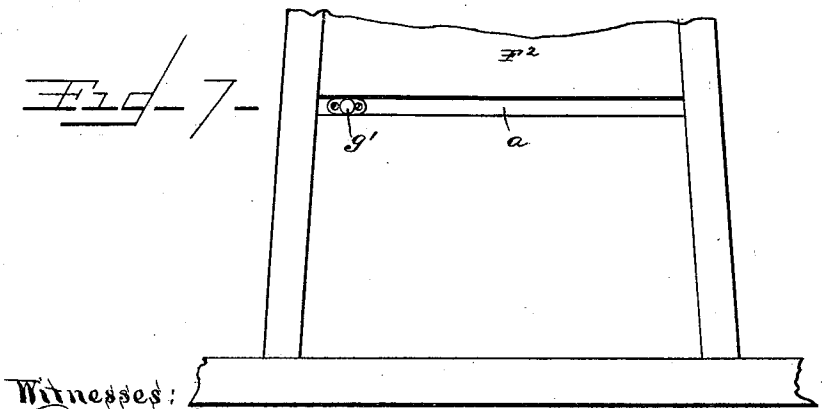


Fig. 7.



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E. W. ROSS.

CARRIER ATTACHMENT FOR FEED CUTTERS.

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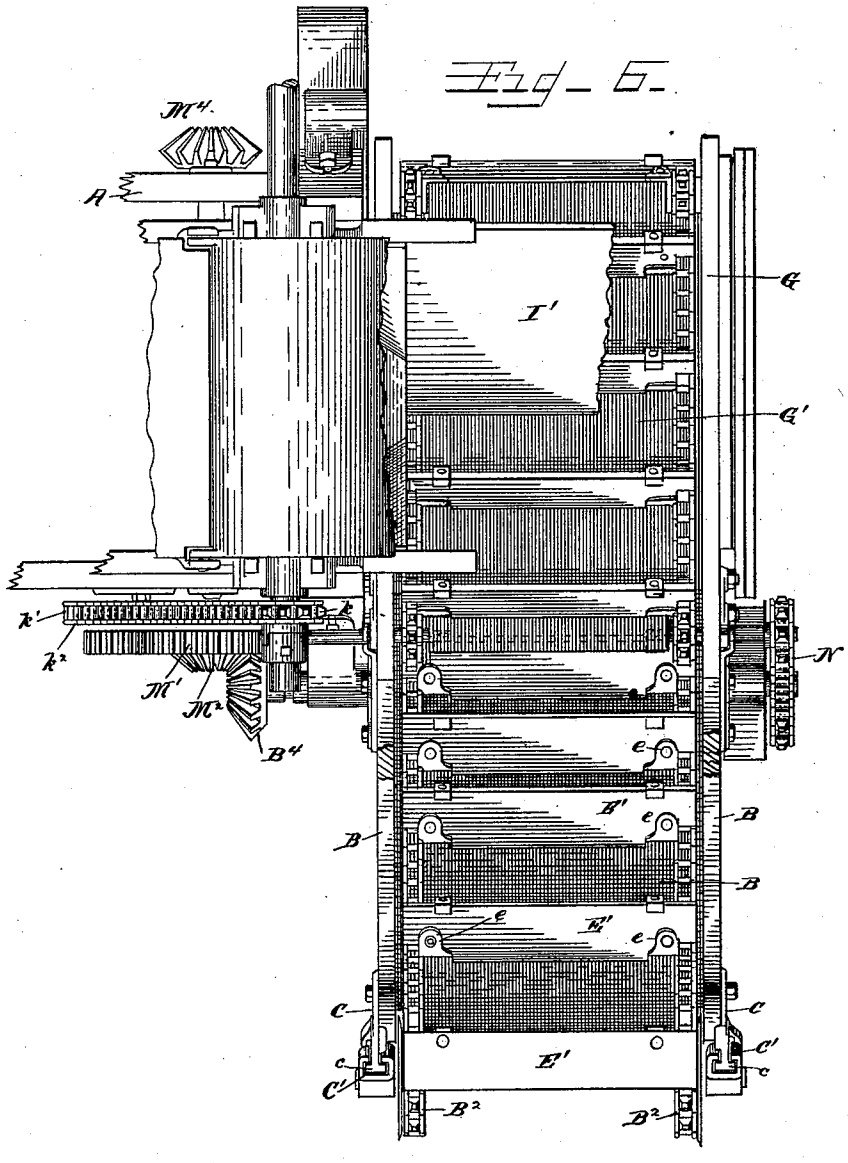
Fig. 6.



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UNITED STATES PATENT OFFICE.

ELMORE W. ROSS, OF SPRINGFIELD, OHIO.

CARRIER ATTACHMENT FOR FEED-CUTTERS.

SPECIFICATION forming part of Letters Patent No. 461,622, dated October 20, 1891.

Application filed February 27, 1890. Serial No. 341,928. (No model.)

To all whom it may concern:

Be it known that I, ELMORE W. ROSS, a citizen of the United States, and a resident of Springfield, county of Clark, and State of Ohio, have invented a new and useful Improvement in Carrier Attachments for Feed-Cutters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to the construction and arrangement of the carrier whereby it is adapted to be set to deliver the cut material at any desired angle of elevation and under any adjustment to take the material directly from the discharge-spout of the cutter; to the manner of combining the carrier receiving the material from the cutter with the latter and a carrier which conveys the material to the desired point of deposit, whereby said carriers are made adjustable relative to the cutter and at the same time held always in the proper working relation to each other; to the means for effecting the adjustment of the tension of the driving and carrier belts or chains; to the arrangement of means for driving the carriers and for preventing the cramping and binding of the parts, and to certain other details of construction and arrangement of parts, all as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a rear end elevation of a feed-cutter with my improved carrier attachment applied to deliver to the left-hand side of the machine, and shown, therefore, in side elevation. Figs. 1^a and 1^b are detail side and edge views of the castings connecting the two parts of the carrier. Figs. 2, 2^a, 2^b, 2^c, and 2^d represent details of construction of the outer end of the carrier. Fig. 3 is a side view of the rear end of the cutter, giving a face view of the carrier attachment. Fig. 4 is a horizontal section through the rear end of the cutting-machine and a part of the gearing connected therewith for driving the carriers, and Fig. 5 an end view of a part of the cutter-frame and carrier driving-gear. Fig. 6 is a plan view of the rear end of the cutting-machine and the carrier attachment thereto, the latter being arranged to deliver to the right. Fig. 7 is a side elevation of the slotted upright frame supporting the outer end of the receiving-carrier.

In the ordinary construction and arrangement of carrier attachments adapted to be applied to deliver either to the left or right of the cutting-machine it has been usual to locate the lower carrier shaft centrally of the width of and directly under the discharge-spout of the cutter in order that it might take the cut material directly therefrom, whether delivering to one side or the other. This arrangement caused the cut material to be discharged from the cutter upon the carrier-bottom from a point directly over the sprocket-wheels of the endless carrier-chain, and as a consequence clover, wet cornstalks, ensilage, and other sticky material would get packed solidly between the teeth of the sprocket-wheels and lift the chains out until one side or the other would slip and so cause the breakage of the carrier. Another difficulty resulting from the arrangement described is that with the driving or lower carrier shaft arranged centrally of the width of the cutter it has been found impracticable to elevate the carrier to an angle of more than forty-five or fifty degrees from a horizontal plane, as the carrier would come in contact with some part of the cutting-machine, such as the frame, cutting-cylinder, or hood. These difficulties have been overcome by my improvement, as will appear.

A indicates the cutting-machine frame, which, with its cutting-cylinder and the parts operating in connection therewith, may be of any usual or preferred construction, A′ indicating the cutting-cylinder shaft, and A^2 the discharge chute or spout thereof, the latter being composed, preferably, of an inclined bottom and sides converging thereon to the point of discharge, as shown.

The carrier is a compound one, consisting of what, for the purpose of discrimination, will be called the "receiving-carrier," inasmuch as it receives the cut material directly from the discharge-spout referred to, and a main or delivery carrier, which conveys the material to the desired point of discharge. The latter will be described first. It is constructed with side boards B B, set on edge and

connected near their lower edges by a flooring B′, around which the endless chains B^2, carrying the buckets, pass to discharge the material, moving in close proximity with the upper surface of the flooring on which the material rests. The side boards B have plates or castings C secured to their upper ends, the lower edges of which plates have each a cross head or flange *c* formed on it, giving to the plate a T shape in cross-section, as shown in Figs. 2^a and 2^b, and upon this head is mounted a bearing-block C′, having a T-shaped longitudinal groove *c′* formed in it, adapting it to fit and slide on the cross-head *c*. The plate or casting C is provided at its lower outer corner with a perforated lug c^2, screw-threaded to receive a set-screw c^3, the point or outer end of which bears upon the lower end of the bearing-block C′ and serves by the adjustment of the screw to move said block up or down on the cross-head *c;* but it is evident that any sliding device for attaching said bearing-block could be used which could be operated by a set-screw or its equivalent in the same manner for adjusting the outer carrier-shaft *b*, journaled in said blocks, and so regulating the tension of the driving-chains. The shaft *b*, instead of having its bearings directly in the blocks C′, is by preference journaled in a perforated ball *b*, secured in a socket in the block C′, in which it can turn to permit a deflection of the shaft, as indicated in dotted lines in Fig. 2^d, and thereby prevent cramping of the parts in consequence of any unequal adjustment of the blocks. A swiveled bearing can be substituted for the ball, or the adjustable bearing can be omitted by tightening both sides at the same time. The preferred manner of forming the ball-bearing within the block is to coat the ball previously made ready for the purpose with plumbago or other suitable material and place it upon a rod representing the shaft *b* within the sand mold and then cast the block around it. In cooling, the coating burns off the ball and leaves the latter free to turn in the socket, but too large to escape therefrom through the side openings for the shaft; but said socket may be formed in any suitable manner accomplishing the same result.

To the lower ends of the side boards B are secured plates or castings D, one of which is shown in Fig. 1. They are formed on their outer or lower edges in an arc of a circle concentric, or nearly so, with short central sleeves *d*, which surround the lower carrier-shaft B^3, pivoting the carrier thereat. These sides and the concave bottom D′ constitute what I denominate a "boot," forming a receptacle, into which the cut material falls and from which it is removed to the endless carrier. It is supplemented on the face side of the carrier by a hopper composed of two triangular side pieces D^2 and a connecting bottom for insuring the delivery of the cut material into the boot.

The lower shaft B^3 of the carrier is journaled at its end adjacent to the machine in a casting F, secured to the end upright and projecting end of the foot-piece of the cutting-machine frame, as shown in Figs. 4 and 5, and may be applied at either side of the frame, as indicated by dotted lines in said Figs. 4 and 5, and the other end is journaled in a stand or casting F′ of any suitable form.

The receiving-carrier is similar in construction to that above described, but is preferably made shorter, being shown of sufficient length to cross at an angle the end of the cutting-machine underneath the discharge-spout to receive the cut material directly therefrom and to discharge said material at its elevated end into the delivery-carrier. It is supported at its lower end by studs *g g′*, by preference secured to the side boards G, the stud *g* resting in a horizontal slot *a* in or between the timbers of the cutting-machine frame, and the stud *g′* in a similar slot in an an upright F^2, secured to the stand or casting F′, the arrangement being such as to permit the studs to slide in the slots for adjusting the carrier as may be required. It will also be evident that the front shaft of this receiving-carrier could be farther extended and inserted in the slots *a a* in the cutter-frame and upright frame F^2 in place of the studs *g g′*. G′ indicates the bottom board of this carrier, and *h* corner castings secured to the ends of the side boards G. One of these castings is shown detached in Fig. 1^a. They are provided each with a short sleeve *h′*, in which the carrier-shaft G^2 is journaled, and with horizontal slots h^2 h^2, through which they are bolted to the side boards and which permit their endwise adjustment for giving proper tension to the carrier-chains.

To the rear end of the cutter-frame cleats I are attached, set inclined, as shown, and upon these a hopper or chute board I′ is secured, which extends between the side boards into close proximity to the passing buckets, as shown by dotted lines in Fig. 1, for insuring the proper delivery thereto of the cut material from the discharge-spout. This board I′ can be moved up or down between the cleats to adapt it to the position of the carrier as the latter is moved transversely of the machine-frame.

The delivery-carrier is pivoted to the discharge end of the receiving-carrier by means of plates J. (See Fig. 1.) These plates are secured to the sides B of the main or delivery carrier at a suitable distance from the lower or receiving end of the latter to connect with the shaft G^2 of the sleeves *h′*, in which said shaft is journaled, and for which purpose they are provided with angular slots *j* in their ends adjacent to said shaft. They are secured to the side boards, each by two bolts, one forming a pivotal attachment passing through a perforation *j′* and the other through a slot j^2, formed in the arc of a circle of which the bolt at *j′* is the center. By loosening the bolt at j^2 the casting can be vibrated on its pivot

at j' for setting the delivery-carrier higher or lower, and thereby adjusting the tension of the receiving-carrier's driving-chain.

The delivery-carrier can be vibrated on its pivotal connection with the receiving-carrier for setting it at any desired angle of relation thereto, and its boot-and-hopper attachment described insures its proper reception of the cut material at any desired adjustment. The attachment of the receiving-hopper to the machine-frame, whereby it is adapted to move laterally and to have its angle changed to conform to the adjustment of the delivery-carrier, further facilitates the adjustment of the latter.

The arrangement of the gearing, &c., for driving the carrier is as follows, viz: The cutting-cylinder shaft A′ (or any other suitable shaft on the cutter) is provided with a sprocket-wheel k, from which a drive-chain k' extends to a sprocket-wheel k^2, mounted on a stud-shaft l on the arm L, (see Figs. 1 and 4,) pivoted upon and around a transversely-arranged counter-shaft M, journaled in the lower part of the cutter-frame. Preferably the bearing m for the carrier counter-shaft M is provided with a projecting sleeve m', and a sleeve on the end of the arm L, connected therewith, surrounds and pivots said arm on the sleeve m', thereby removing it from frictional contact with the shaft. The outer end of the arm L has a screw-threaded sleeve formed on it, and the stud l is secured therein, and from said end a curved and slotted arm L′ extends upward and is secured by a set-screw l' to the machine-frame. The slot in the arm L′ is in an arc of a circle of which the shaft M is the center, and by loosening the set-screw the arm L can be adjusted up or down around said shaft for giving proper tension to the drive-chain k'. The sprocket-wheel k^2 has a pinion k^3 rigid on its outer face, which engages and drives a spur-gear M′, fast on the end of the shaft M, for driving the latter in an opposite direction of movement to pinion k^3. The gear-M′ is a double one or has a bevel-gear M^2 formed within its toothed rim, which, when the carrier is connected to the cutter to deliver to the right, as shown, (see Fig. 6,) engages and drives a bevel-wheel B^4 on the end of the lower shaft B^3 of the delivery-carrier. The shaft M is provided at its opposite end with a bevel-gear M^4, with which the gear on the carrier-shaft B^3 (at its opposite end) engages for driving the carrier when arranged to deliver to the left, as shown in Figs. 1 and 3. By this arrangement the carrier is always driven in the proper direction, and, its driving-shaft being arranged at the side of the machine, the carrier can be adjusted to deliver vertically, or nearly so, without obstruction from the machine-frame, &c. The carrier-shaft B^3 has a sprocket-wheel B^5 on its outer end, from which a drive-chain N extends to a sprocket-wheel G^3 on the shaft G^2 of the receiving-carrier, to which the delivery-carrier is pivoted, and by the adjustment of the connecting pivotal plates, as explained, a proper tension can be given to the chain N for driving the receiving-carrier.

Parts of the carrier not hereinabove particularly described may be constructed in any usual or preferred manner.

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

1. In a carrier attachment, a main delivery-carrier pivoted at its receiving end, in combination with a receiving-carrier pivoted at its discharging end to said main carrier at a point above the pivotal point of the latter and adjustable with said main carrier, substantially as described.

2. In a carrier attachment, a main delivery-carrier pivoted at its receiving end, in combination with a receiving-carrier pivoted at its discharge end and made adjustable endwise bodily transversely of the machine-frame, substantially as described.

3. The combination, in a carrier attachment, of a carrier arranged to receive the cut material directly from the discharge-spout of the actuating-machine, and a delivery-carrier hinged to and adjustable with said receiving-carrier and having a pivotal support independent thereof, substantially as described.

4. The combination, with a main or delivery carrier pivoted at its receiving end upon its lower driving-shaft, of a receiving-carrier pivoted at its discharging end at a point above the pivotal support of the latter, and means, substantially as described, for driving said receiving-carrier from the delivery-carrier.

5. The receiving or feeding carrier, having a pivotal and slidable connection with the machine-frame, in combination with an adjustable main or delivery carrier, substantially as described.

6. The combination, with a main carrier and a receiving-carrier adjustable therewith, of a hopper-board for preventing the escape of the cut material at the rear of the receiving-carrier, made movable to accommodate the passage of the endless carrier-belt, substantially as described.

7. The combination, with the receiving or feeding carrier, of a main or delivery carrier and a pivotal casting connecting said carriers and made adjustable for tightening the drive-chain, substantially as described.

8. The combination, with the main or delivery carrier, of a receiving-carrier driven from the lower shaft of the main carrier, and a casting connecting said carriers, made adjustable for tightening the drive-belt, substantially as described.

9. The receiving-carrier pivoted at its discharging end, in combination with a main carrier pivoted at its receiving end, and a boot or pocket formed to partly surround the lower end of the main carrier and extending below

the plane of the bottom board to prevent the escape of the cut material discharged by the receiving-carrier.

10. The main or delivery carrier pivoted at its lower shaft, and a receiving-carrier driven therefrom and connected to main carrier at a point above its lower shaft, substantially as described.

11. The main or delivery carrier pivoted at its lower end, in combination with a receiving or feeding carrier driven therefrom and adapted to be adjusted into a working position relative to said main carrier when the position of the latter is changed, substantially as described.

12. The main or delivery carrier pivoted at its lower end, in combination with a receiving-carrier and a support upon which the latter carrier is arranged to slide back and forth to maintain its working position relative to the main carrier, substantially as described.

13. In a carrier attachment, a receiving-carrier arranged transversely of the frame of the machine delivering thereto at the discharge end thereof, and a delivery-carrier connected to and adjustable with said receiving-carrier and having a pivotal support independent thereof, substantially as described.

14. In a carrier attachment, the combination, with a counter-shaft located transversely of the frame of the machine delivering thereto, of a main delivery-carrier and a receiving-carrier connected with and actuated by said delivery-carrier, and a lower driving-shaft for said delivery-carrier, arranged to be driven at either end for reversing the carrier from one side of the machine to the other, substantially as described.

15. A compound carrier attachment composed of a main delivery-carrier and a short receiving-carrier, in combination with a counter-shaft for driving said compound carrier, the lower or front delivery-carrier shaft thereof being driven directly from said counter-shaft and journaled in bearings located on one side of the center of the frame of the machine delivering thereto, substantially as described.

16. In a carrier attachment for cutting-machines, a receiving-carrier arranged transversely of said cutter, and a main or delivery carrier connected to and adjustable with said receiving-carrier, a counter-shaft arranged transversely of said cutter for actuating said carriers, the lower shaft of said delivery-carrier being arranged to receive motion from said counter-shaft on the one side of said carrier and upon the other side to transmit motion to the receiving carrier, substantially as described.

17. In a carrier attachment, the short receiving-carrier frame provided with shafts for endless chains, and the end plates having bearings for said shafts, and slots and bolts for adjusting the tension of the chain, substantially as described.

18. In a carrier attachment, the combination, with the carrier-shaft, of the adjustable bearing-block and a ball-and-socket connection of the shaft therewith, whereby cramping of said shaft is avoided, substantially as described.

19. The carrier-frame, in combination with the endless carrier-belt, the top or outer plates secured to said frame, the swiveling bearings adjustable on said plates, and the carrier-shaft journaled in said bearings, whereby one end of said shaft is made adjustable independently of the other, substantially as described.

20. In an endless carrier, the combination, with the adjustable carrier-shaft, of the endless carrier-belt, the fixed adjusting-plates C, secured to the outer ends of said carrier, sliding ways upon said adjusting-plates, sliding blocks attached to said adjusting-plates, having bearings for the carrier-shaft located underneath said plates and pendent therefrom, and set-screws pressing against the inner ends of said sliding blocks, substantially as described.

21. The combination, in a carrier attachment to the frame of a machine delivering thereto, of a counter-shaft for driving said carrier attachment, a gear thereon, a stud-shaft carrying a sprocket-wheel, and a pinion in mesh with the gear on said counter-shaft, and a drive-chain connecting said sprocket-wheel with its actuating-shaft, substantially described.

22. In a carrier attachment for cutting-machines, the combination of a counter-shaft located below the main shaft of said machine, a spur-gear thereon, a sprocket-wheel upon the cutting-machine shaft, a stud-shaft carrying a sprocket and a pinion in mesh with the gear on the counter-shaft, and a drive-chain connecting said sprocket-wheels, the stud-shaft being adjustable about the counter-shaft as a center for adjusting the tension of the drive-chain, substantially as described.

23. The combination of the carrier counter-shaft journaled transversely of the cutter-frame, a spur-gear on said shaft for actuating it, and a double gear mounted on a stud adjustable around said shaft, substantially as described.

24. The combination, with a carrier attachment and the frame of the machine delivering thereto, of a counter-shaft for driving the carrier attachment, having a gear thereon, a stud-shaft carrying a sprocket and a pinion in mesh with the gear on the counter-shaft, and a bevel-gear upon the counter-shaft in mesh with one on the carrier drive-shaft, substantially as described.

25. The combination, with the lower carrier-driving shaft having a bevel-gear thereon, of a stud-shaft carrying a spur-pinion and a carrier counter-shaft provided with a double gear composed of a spur-gear in mesh with the pinion on the stud-shaft and a bevel-gear in mesh

with the bevel-gear on the carrier-driving shaft, substantially as described.

26. The combination, in a carrier attachment, of a main delivery-carrier and a receiving-carrier driven from said main carrier, a driving counter-shaft journaled in bearings transversely of and extended beyond the side of the frame of the machine delivering thereto and carrying a bevel-gear thereon, the main carrier-shaft being journaled in bearings located outside of the cutter-frame and the bevel-gear thereon, substantially as described.

27. The carrier counter-shaft arranged underneath the cutter-shaft in bearings on the cutting-machine frame and provided with beveled gears outside of said frame, in combination with a carrier-shaft, also supported in bearings outside of said frame, and a bevel-gear thereon engaging and actuated by a bevel-gear on said carrier counter-shaft, substantially as described.

28. The carrier-shaft provided on one end with a bevel-gear engaging and actuated by a bevel-gear on a counter-shaft journaled under the cutting-machine transversely thereof, said carrier-shaft being extended beyond the carrier-frame at its other end and carrying a sprocket-wheel for driving a receiving and feeding carrier, substantially as described.

29. The combination, in a carrier attachment, of a main or delivery carrier and an adjustable receiving or feeding carrier arranged in working relation to the discharge end or spout of the machine delivering thereto and to the feeding of the main carrier, supporting-bearings on said receiving-carrier, and suitable supports for said bearings, permitting the adjustment of said receiving-carrier transversely of said discharge end of the machine, substantially as described.

30. The combination, with a carrier attachment composed of a main delivery-carrier and a short receiving-carrier driven therefrom, the lower driving-shaft of said main delivery-carrier being extended at both ends to receive a bevel-wheel at either side, as desired, whereby said carrier attachment is made reversible, the lower shaft being located outside the adjacent upright of the cutter-frame on either side, at will, of a counter-shaft for driving said carrier attachment extended to receive a bevel-gear at either end to mesh with the bevel-gear on the lower carrier-shaft, substantially as described.

In testimony whereof I have hereunto set my hand this 18th day of January, A. D. 1890.

ELMORE W. ROSS.

Witnesses:
J. E. BOWMAN,
JOHN L. ZIMMERMAN.