(No Model.)

3 Sheets—Sheet 1.

W. R. BAKER.

HARVESTER.

No. 563,727. Patented July 14, 1896.

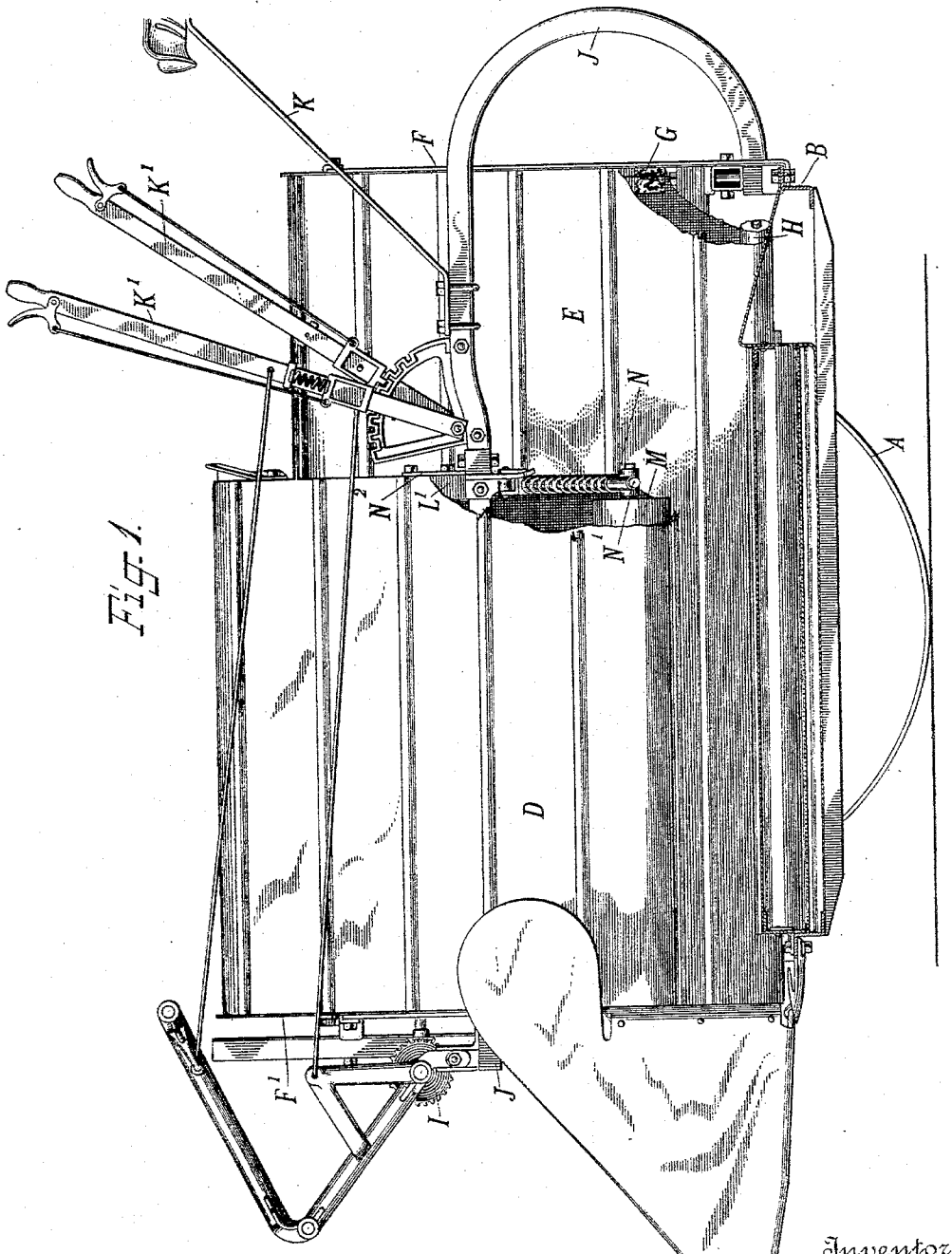

Fig. 1.

Witnesses
John M. Culver
Harry E Tower.

Inventor
Wm. R. Baker
By his Attorney R. B. Swift.

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W. R. BAKER.

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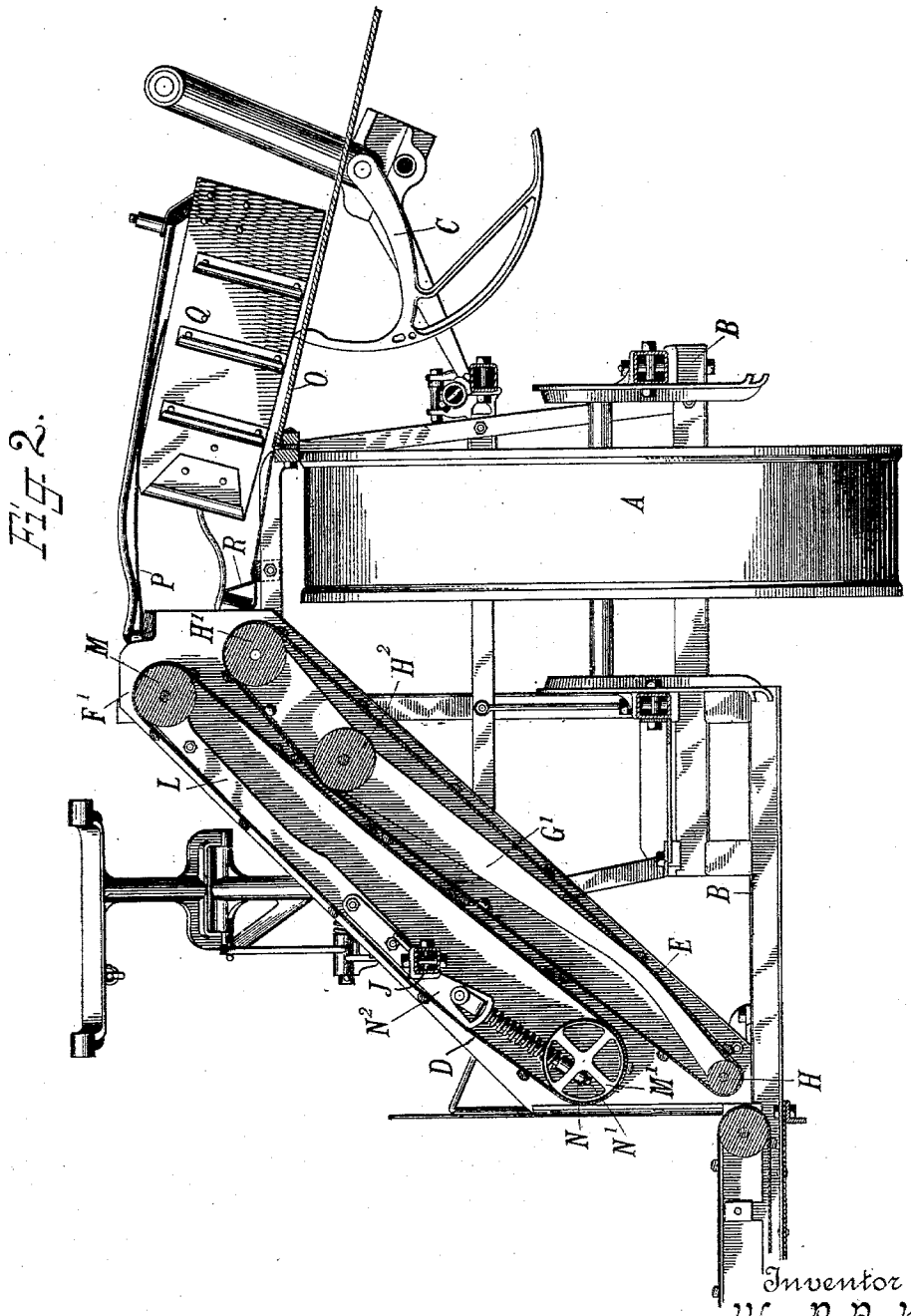
Fig. 2.



Witnesses
John M. Culver
Benj. F. Town

Inventor
Wm. R. Baker.
By his Attorney R. B. Swift.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

W. R. BAKER.

HARVESTER.

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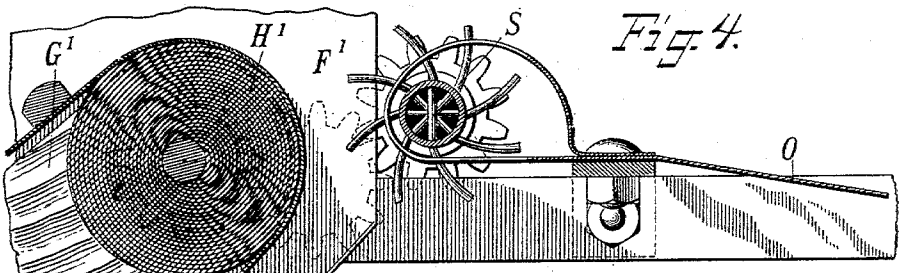

Fig. 4.

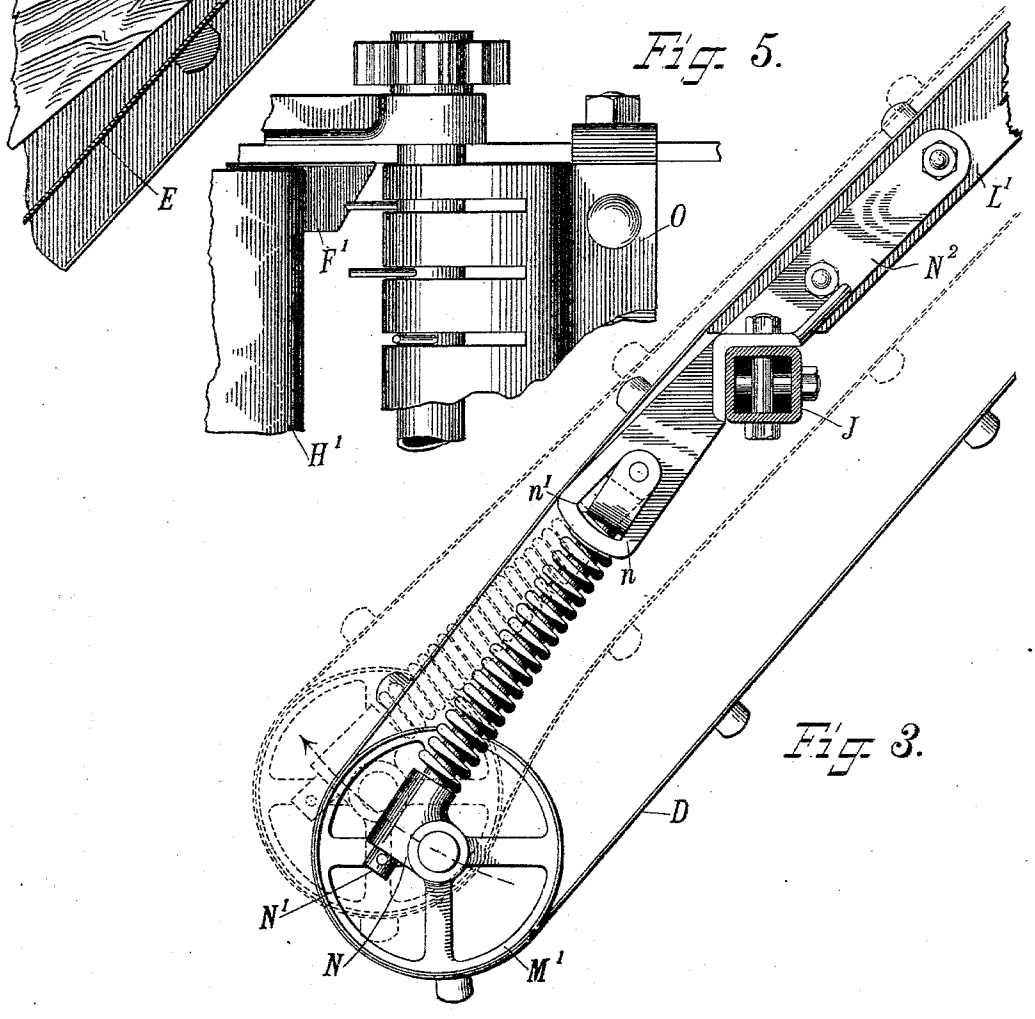

Fig. 5.

Fig. 3.

Witnesses
John M. Culver
Harry E Dowell

Inventor
Wm. R. Baker.
By his Attorney R. B. Swift.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM R. BAKER, OF CHICAGO, ILLINOIS.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 563,727, dated July 14, 1896.

Application filed November 17, 1891. Serial No. 412,166. (No model.) Patented in England September 5, 1891, No. 15,046.

To all whom it may concern:

Be it known that I, WILLIAM R. BAKER, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harvesters, (for which an English patent was obtained on a communication from Cyrus H. McCormick, of Chicago, Illinois, with my knowledge and consent, said patent being dated September 5, 1891, No. 15,046,) of which the following is a specification.

The usual form of handling grain with the self-binding harvester is to cut the stalk as the machine advances upon it, and, by suitable mechanism, cause it to be thrown on an endless horizontal apron that travels on the cutting-platform. This apron, as it advances, carries the grain to elevating devices, which lift it over the wheel and deliver it to the binding attachment, which encircles suitably-sized bites of the grain with a band and discharges the bound bundle from the machine. It is desirable in machines of this type that the stream of grain be lifted as little as possible in order to get it over the wheel and into the binding attachment. It is evident that the height to which the grain is lifted could be lessened by decreasing the height of the main or driving wheel, over which the grain is carried. This, however, is not desirable, as in the rough grounds of the grain-field the small wheel makes the machine of heavier draft and less easy to handle. Another difficulty with the low wheel and elevators of the usual type has been that the lower or delivery end of the binding attachment, in order to give it the necessary pitch, so that the grain would slide into it, would be so near the ground that the bundles in long and tangled grain would with difficulty be ejected, the fall not being sufficient to furnish the separation for the grain-stalks. This difficulty would be greatly increased whenever the bundle-carrying attachment, a device to receive the bundles from the binder and to group them into convenient piles for shocking, was attached to the machine.

In a certain type of a machine heretofore made the main wheel was placed at a considerable distance from the inner edge of the cutting-platform, so as to give the elevator but little pitch, and thus cause it to shoot the grain across a nearly flat table or deck, above the wheel, into the binding attachment. This construction was not desirable, as it widened the whole machine, so that it was inconvenient for passing through gates and over bridges, and also in opening the first swath in the field. One of the objects of this construction was to give the elevator such a pitch that the stream of grain when discharged would not have to have its direction of flow changed as much as in the steeper elevator. The grain leaves the elevator with considerable force, and if the elevator is steep the grain strikes against the deflector or hood that covers the top of the elevator, its course is changed, and the force with which it left the elevator has been expended against the hood. It then falls by its weight upon the binder-deck, which must have considerable pitch, or the grain will lie upon it and not slide down and be reached by the packers.

It is the object of my invention to retain the main wheel at its usual height, to decrease the height of the elevator, and still retain the delivery end of the binding attachment at a sufficient height from the ground to enable a separation of the grain when the bundles are delivered to the bundle-carrying attachment, to keep the machine at its usual width, to increase the capacity of the elevator, so that it will freely handle grain of any size and weight, and to so form the delivery end of the elevator that it will shoot the grain across the face of the main wheel and into position to be acted upon by the devices on binding attachment even though the upper end of the elevator should not extend outward beyond the inner edge of the main wheel, and the grain-receiving platform of the binder be much less steep than heretofore found necessary.

My manner of accomplishing the aforesaid objects is illustrated in the accompanying drawings, and will be fully set forth in their description.

Figure 1 is a side view of my improved elevator from the cutting-platform. Both the upper and lower aprons are broken out at their lower rear corners in order to show parts that would otherwise be covered. Fig. 2 is a sectional view of so much of the machine as is nec-

essary to show the elevator and binding attachment. Fig. 3 is an enlarged view of the spring-hanger for the lower roller of the upper-apron frame. Fig. 4 is a sectional view of the top roller of the lower-apron frame and the upper end of the grain-receiving platform or "deck" into which a star or feathering feed-shaft has been placed, while Fig. 5 is a top view of the parts shown in Fig. 4.

The main wheel A, the foundation-frame B, and the binding attachment C are of the usual construction common to the self-binding harvesters known as the "McCormick." From the foundation-frame B is built suitable angle-frames, usually called "A-frames," that support the frame for the upper carrier D and the frame for the lower carrier E of the elevator. It is in the construction of this elevator and in its combination with other features that my invention is principally found. The lower carrier E is of sufficient width to carry long grain, but as the rear side-board F only extends slightly above the upper face of the carrier E grain of extreme length can project to the rear and be carried up without the heads striking and thus being retarded. The rear carrier-guide G for the carrier E is shaped the same as the front guide G′, and is bolted to the side-board F, while guide G′ is bolted to side-board F′. These guides with the side-boards furnish the bearing for the lower roller H, the upper roller H′, and the intermediate roller H^2, and form the frame for the lower carrier E. The roller H^2 is positioned in the upper half of the frame for the carrier E, and preferably in a plane above that of the upper face of the carrier E, if drawn tightly over the rollers H and H′. In frames of the usual type for the lower carrier or apron of the elevator, however tightly stretched the carrier may be, a large quantity of grain will depress the upper face of the carrier, forming a hollow into which the grain tends to run.

The carrier-guides will support the ends of the slats and sides of the apron, and the center of the apron will be depressed, forming a hollow into which the grain will flow. Considerable power is required to lift this grain out of the depression and over the roller, but the worst fault is that the grain has gone so far back on the carrier that the binder can only place the bands about the butts. This fault has been especially pronounced in elevators having so-called "open backs." The roller H^2 largely remedies these faults. The guides G and G′ are curved or hollowed out at their lower ends to accommodate heavy grain, but the distance between the rollers H and H^2 is so small that the apron will only be depressed to the guides by the grain and will not sag in the center and thus cause the grain to flow backwardly. The roller H^2 then lifts the grain on the apron, the upper apron having a capacity to yield above it, and the grain is discharged into the binding attachment at a less angle than would otherwise be the case. I consider any positioning of the roller H^2 in which it acts to support the carrier and change the direction of discharge of the stream of grain to fall under my invention. In the position shown in the drawings it serves the added purpose of driving the reel sprocket-wheel I. This construction of the lower frame and positioning of the rollers is equally applicable to an elevator whether an upper endless carrier be used to hold the grain on the lower carrier or any of the many forms of frames, wires, or guards. The third roller in either case performs the offices heretofore set forth, and the direction of the discharge will be changed so long as any device holds the grain upon the apron. I prefer, however, to use an upper endless traveling carrier D, as shown in the drawings, the frame for which is preferably not so wide as the lower carrier E, the best width being one which allows grain of ordinary length to be elevated with the heads on the carrier E projecting beyond the carrier D. When the heads are between the endless carrier, there is a tendency to shell overripe grain. This leaving the rear of the elevator open for the rearward projection of the grain necessitates that the upper-carrier frame be supported in such a manner as to give the grain a free passage-way. A rearwardly upwardly curved support J rises from the foundation-frame B of the harvester and extends forwardly over the apron E, through the front elevator side-board F′ and furnishes a support at its forward end for the reel. This bar J braces the whole elevator and also furnishes a support for the seat K and the reel-controlling levers K′. It will be noticed that the bar J passes between the apron D.

Any grain that may fall inward onto the carrier D is not caught as it will be if the seat-support is outside the apron, but will be carried down by the carrier and presented to the mouth of the elevator. A guide L is attached to the bar J and to the front elevator side-board F′. A similar guide L′ is attached to the bar J at the rear. These apron-guides with the side-boards furnish bearing to the upper roller M. The lower roller M′ of the upper-apron frame is mounted in bearings N, that are loose on vibrating spindles N′. The bearings N are spring-pressed against a cotter or other obstruction on the outer end of the spindles N′, but are free to slip thereon when the stress of the spring is overcome.

The spindles N′ are pivoted in an arm N^2, which is bolted to the bar J. The sweep of the spindles is controlled by stops $n\,n'$ on the bar N^2, which are preferably so located that the carriers D and E cannot strike at their lower ends when the roller M′ is at its lowermost position, and that when at its highest will not bring the spindle of the roller to the height of the plane of the carrier-frame. The stress of the carrier, as well as the weight of

the roller, will thus always tend to keep the roller in its lowest position, and if raised by heavy grain, and the carrier D pressed upwardly, thus shortening it, the roller M′ will be drawn that much harder upon a heavy flow of grain, thus making the elevation more powerful. While the construction of this upper-apron frame is particularly adapted to an elevator whose lower apron has three rollers, as heretofore described, still when used with a lower apron of the usual two-roller type its use is beneficial.

As said before, the guides L and L′ are cut away above the roller H^2, so that the stream of grain lifts the apron B and is discharged onto the binder-deck O with sufficient force to carry it into reach of the packers and needle. Without this change in the angle of the discharge it would expend its force upon the shield or hood P and drop to the deck O, which has not sufficient pitch, (the outer side of the deck being well raised from the ground, to insure a separation of the grain when the bound bundle is discharged,) even with the help of the adjuster Q, to allow the grain to slide into reach of the binding devices. In sidling ground, where the platform of the harvester is lower than the binder, the grain during the binding operation banks against the back of the needle, and has a tendency to slide toward the roller H′ and be carried back by the apron E between the deck O and the roller H′, and thus clog the machine. To avoid this, a transverse bar R, with a nearly vertical face and a curved back is extended across the deck O near the end of the apron E. This bar prevents the grain from coming in contact with the apron. An alternate construction to remedy this fault is illustrated in Fig. 4, and consists of a pin-roller S, driven from the elevators and shielded by an upwardly-curved return portion of the deck O.

The power to operate the different devices is taken from the drive-wheel in any of the well-known ways in common use.

Having now described my invention, what I claim is—

1. In a self-binding harvester, the combination of a lower endless carrier having an auxiliary roller located between the roller at the lower end of the carrier and that at the upper delivery end of the same, and an upper frame carrying an endless carrier that serves to hold the grain on the lower carrier throughout its length, the guides for the upper frame-carrier being adapted to permit the carrier to yield upwardly, and the auxiliary roller in the lower carrier-frame being so situated that the stream of grain as it issues from the delivery end or mouth of the elevator between its two upper end rollers is delivered toward the binder in a direction more nearly horizontal than the general pitch or inclination of said elevator.

2. In a self-binding harvester, the combination of a lower endless carrier having a roller located between the roller at the lower end of the carrier and that at the upper or delivery end, and lying in a plane above that of the opposite end rollers, and an upper frame carrying an endless conveyer that serves to hold the grain on the lower carrier throughout its length, the guides for the upper frame-carrier being adapted to permit said carrier to yield upwardly, whereby the stream of grain as it issues from between the two rollers at the delivery end of the carrier is projected toward the binder in a direction more nearly horizontal than the general pitch or inclination of the elevator.

3. In an elevator for harvesters the combination, substantially as hereinbefore set forth, of a lower endless apron-carrier having a third roller located between the end rollers in a plane above the latter, and an upper endless apron-carrier confining the grain on the lower carrier throughout its length and giving it a direction of movement conforming to the pitch of the lower carrier.

4. In an elevator for harvesters, the combination substantially as hereinbefore set forth, of a lower endless carrier, an upper overlying carrier, the lower roller of which is mounted on pivoted arms whose movement is limited so that the axis of the roller cannot be lifted to the plane of the upper face of the carrier.

5. In an elevator for harvesters, the combination substantially as hereinbefore set forth with a lower endless carrier, of an upper carrier, the side guides of which are broken to form a vibrating support for the lower roller at its receiving end, and stops to limit the rise and fall of the roller.

6. The combination substantially as hereinbefore set forth, of a lower endless carrier, an upper carrier the lower roller of which is loosely mounted on pivoted arms, springs tending to keep the carrier tightly stretched and the roller to the limit of its downward movement, and stops to limit the rise and fall of the roller.

7. The combination to form an elevator, of an endless carrier having a third roller near its discharge end, an upper endless carrier overlying the lower carrier, the frame-guides for which are cut away over the third roller of the under carrier, substantially as and for the purpose specified.

8. The combination to form an elevator, of an endless carrier, having a third roller between the end ones, an upper endless carrier overlying the lower, and having its carrier-guides cut away and its receiving-roller mounted on pivoted arms, and stops to limit the movement of the roller, substantially as and for the purpose specified.

9. The combination to form an elevator, an endless carrier having a third roller located intermediate the end rollers, an upper endless carrier overlying the lower, and having its carrier-guides cut away, its receiving-roller mounted on pivoted arms whose movement is limited by stops, and springs acting on the

receiving-roller, substantially as and for the purpose specified.

10. In an elevator for harvesters, the lower roller of the upper endless carrier mounted in boxes that slide on pivoted arms, the boxes being held in position by springs carried on the arms, and stops to limit the rise and fall of the arms, substantially as and for the purpose specified.

11. In an elevator for harvesters, an overhanging upper endless carrier, a supporting-bar passing between it and furnishing a support for its frame, and pivoted arms upon which the lower roller is mounted extending from the supporting-bar, substantially as and for the purpose specified.

12. In an elevator for harvesters having the lower carrier of greater width than the upper, a supporting-bar passing from the front of the machine between the plies of the upper carrier and extending rearwardly beyond the lower carrier, downwardly and inwardly to the frame of the machine, whereby the upper carrier is supported without overhanging projections and has an unobstructed upper surface.

13. In an elevator for harvesters, an overhanging endless carrier, a supporting-bar passing between its plies, the rear framework of the upper carrier being attached to it, whereby the upper carrier is supported without overhanging projections and has an unobstructed upper surface.

WILLIAM R. BAKER.

Witnesses:
LEWIS B. LOTT,
W. C. HALE.