

No. 696,126.

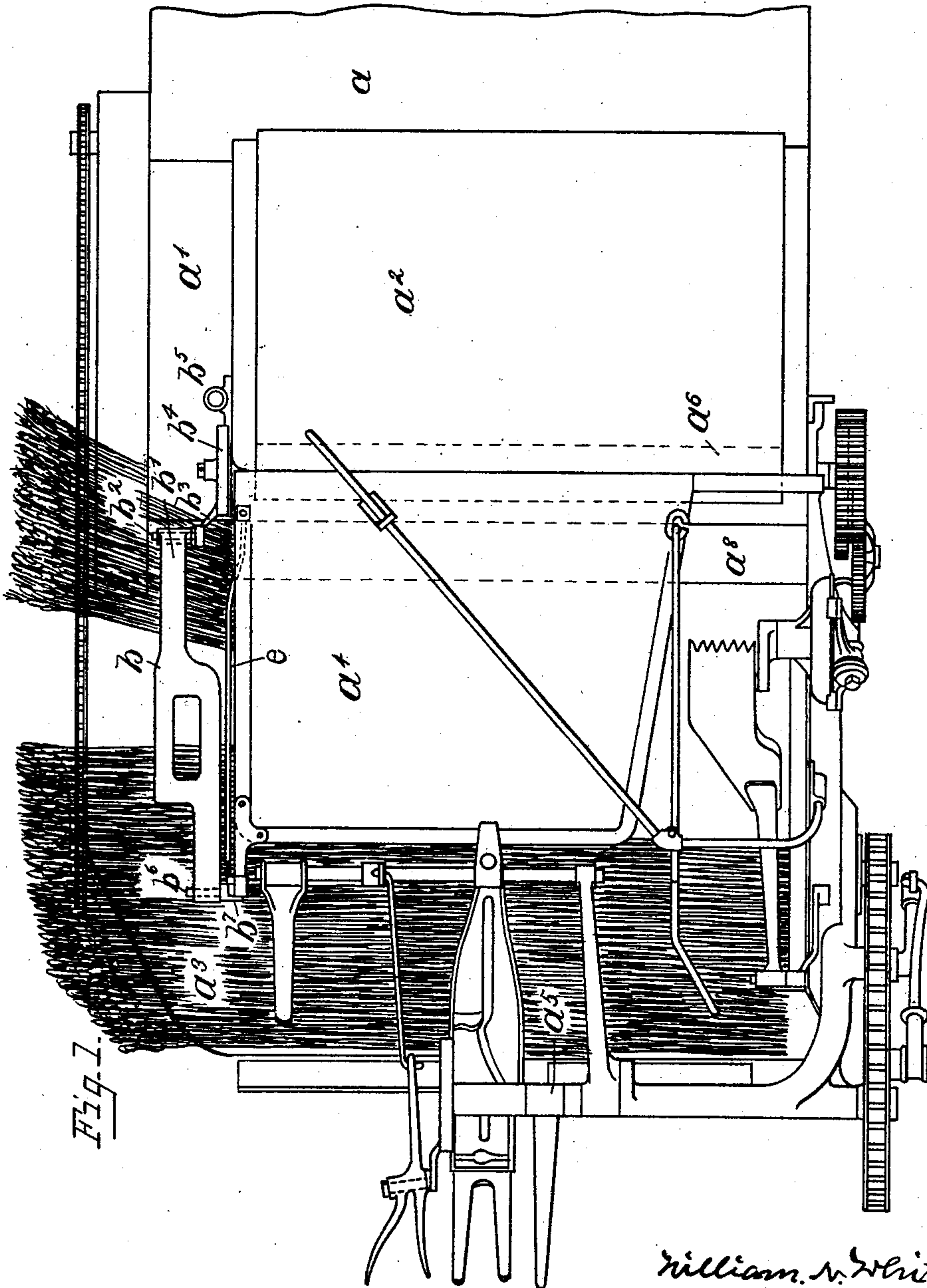
Patented Mar. 25, 1902.

W. N. WHITELY.
GRAIN BINDING HARVESTING MACHINE.

(Application filed Dec. 27, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:
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Fred State

William N. Whitely
INVENTOR.

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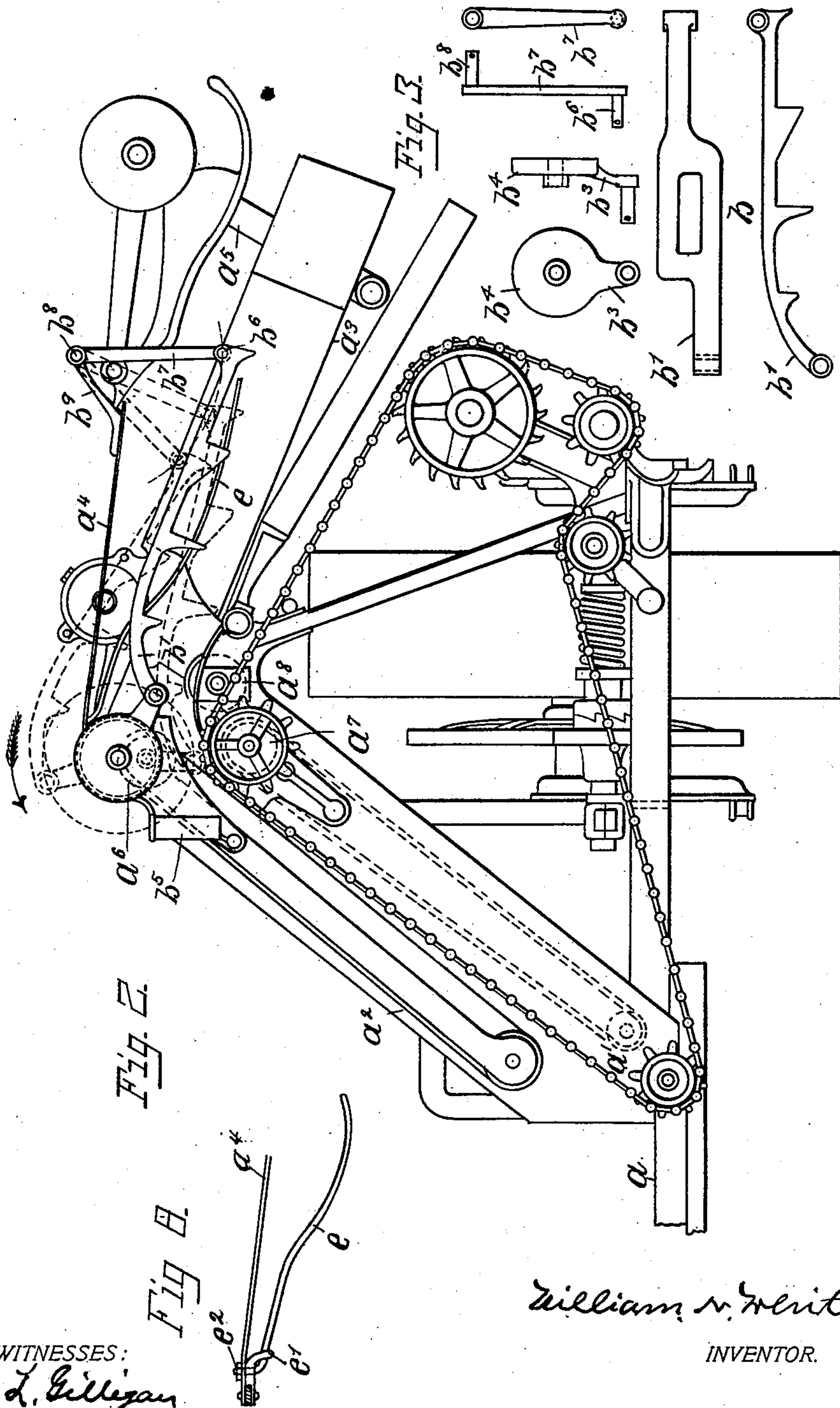
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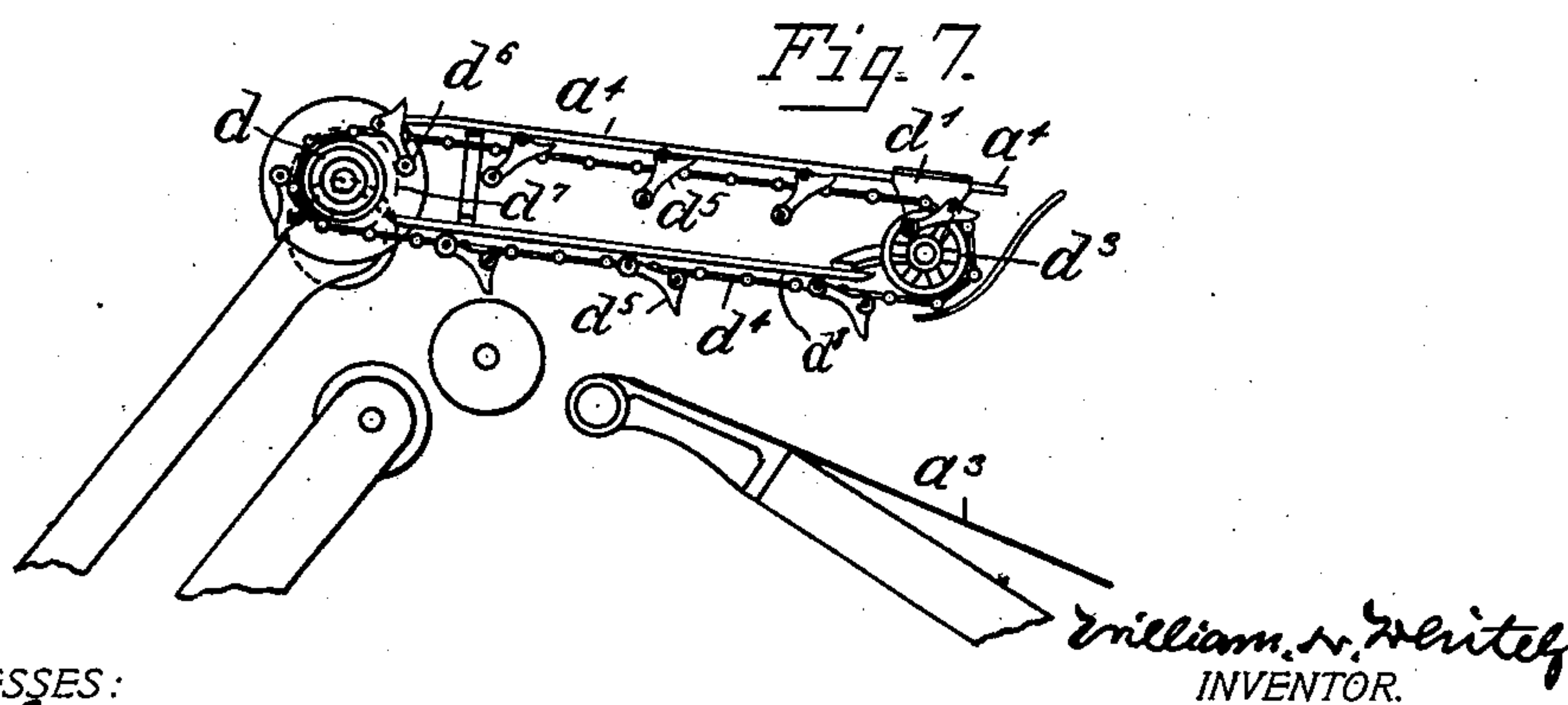
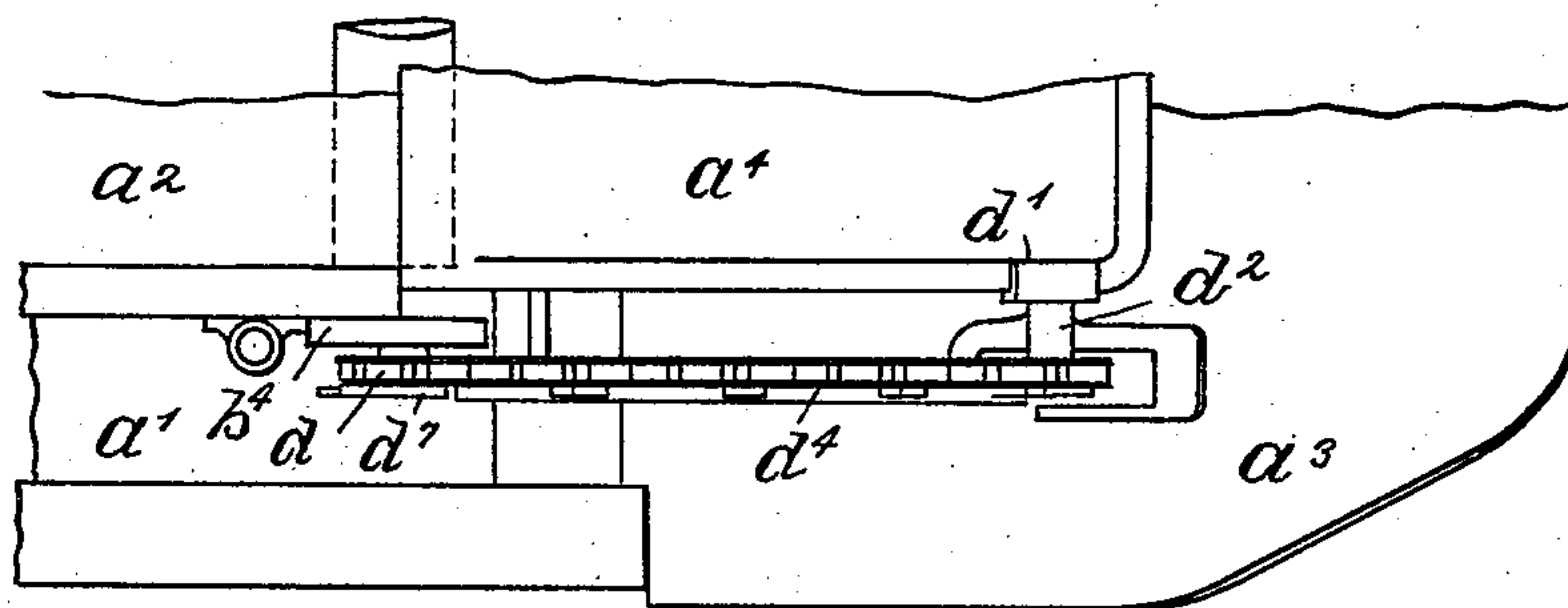
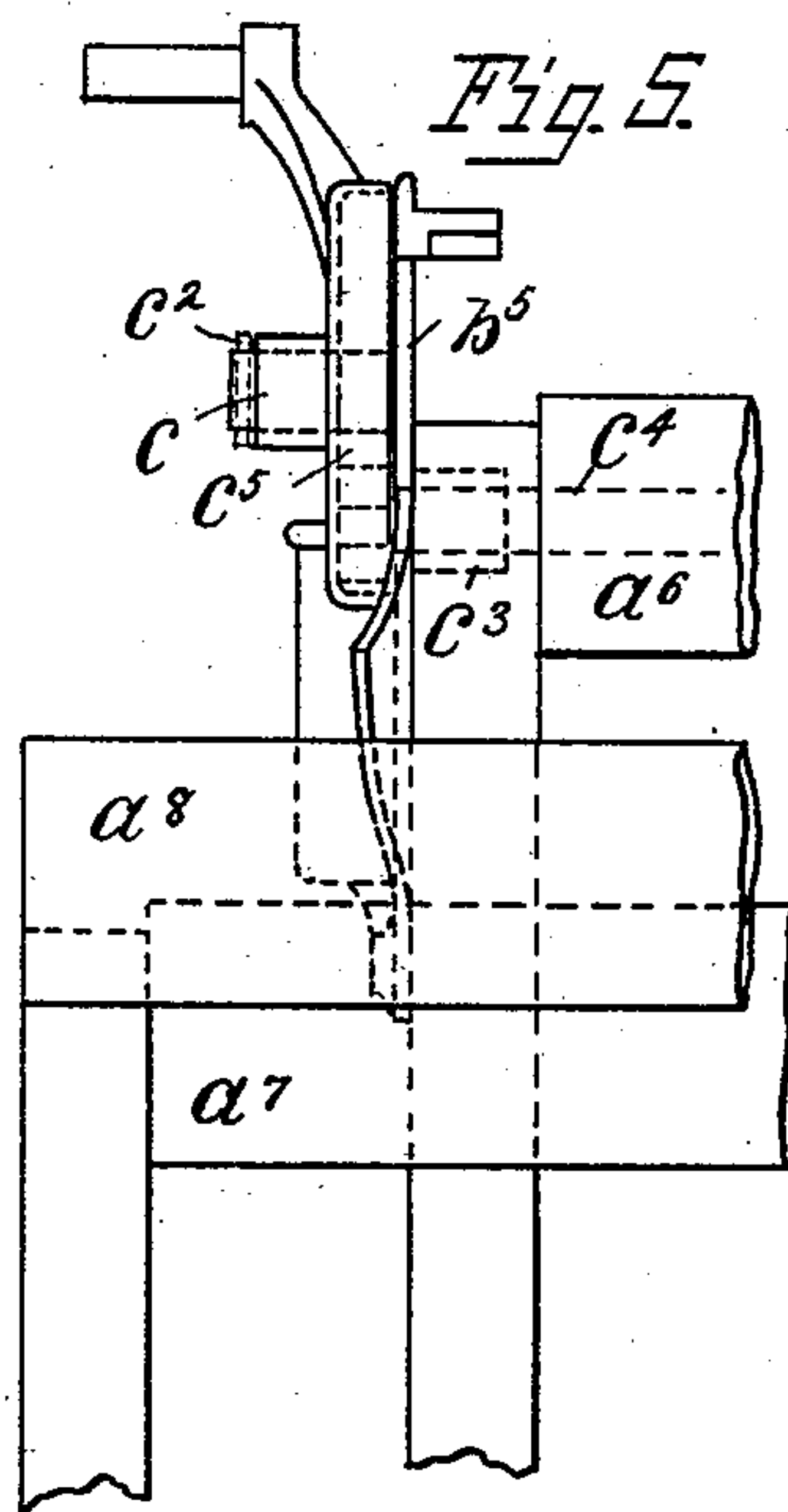
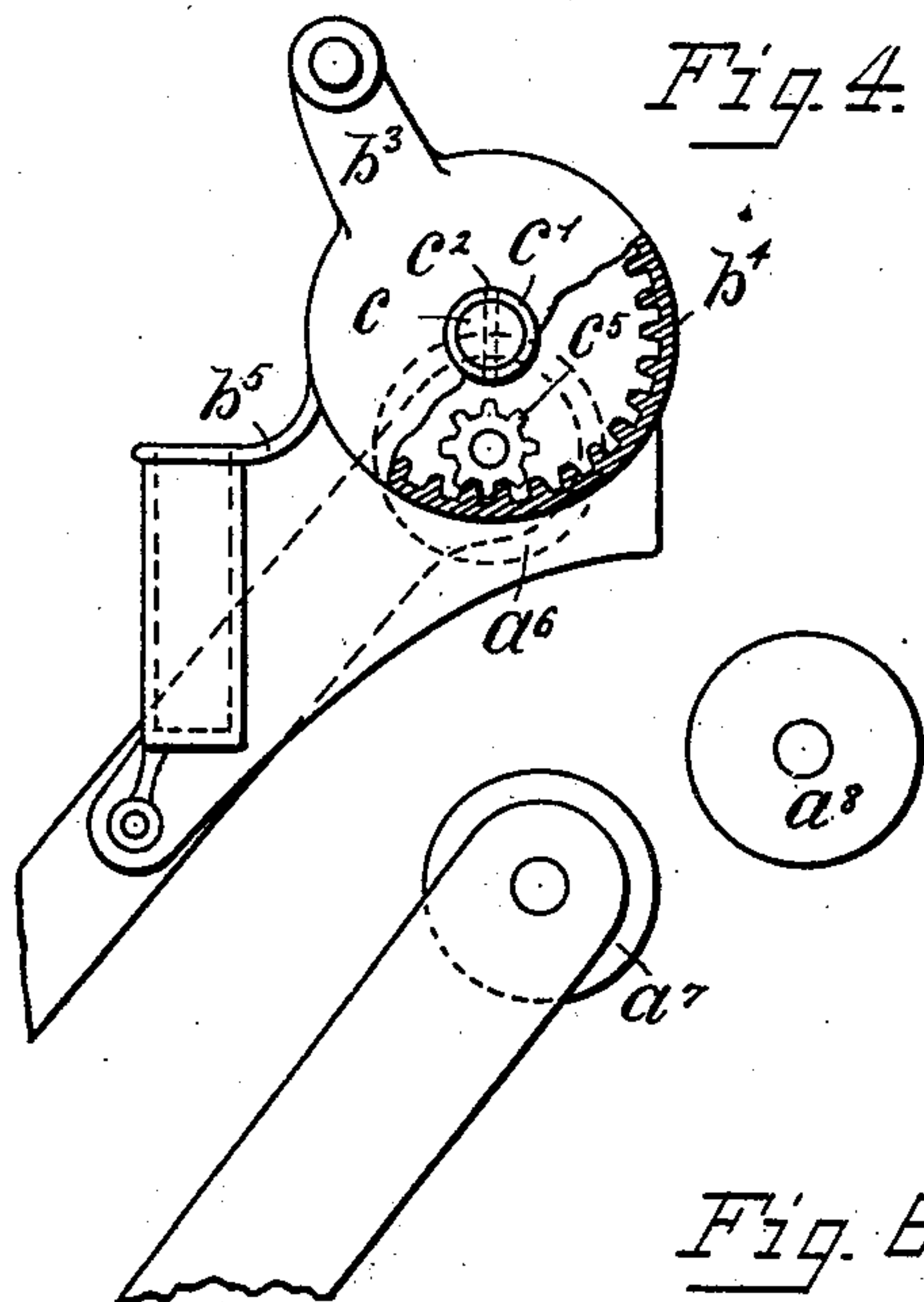
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(Application filed Dec. 27, 1900.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM N. WHITELY, OF SPRINGFIELD, OHIO.

GRAIN-BINDING HARVESTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 696,126, dated March 25, 1902.

Application filed December 27, 1900. Serial No. 41,294. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. WHITELY, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Grain-Binding Harvesting-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in grain-binding harvesting-machines and to that class known as "open-end elevator" grain-binding machines. In this class of machines, in which the upper-elevator belt is much narrower than the length of the grain to be elevated and having no assistance further than the elevator-belts, the grain lodges at the apex of the elevator-belts and grain-binder deck at the rear of the machine, and especially so in long fluffy grain, which will accumulate in large masses at the above points and sometimes to such an extent as to entirely stop the operations of the machine, and while the machine is in operation small quantities of grain constantly fall off behind. The butts of the cut grain are also retarded on the horizontal grain-conveying belt by contacting with the uncut standing grain, causing the butts of the grain to hang back in passing up the elevator to the binder-deck.

The object of my improvement is to provide a grain-forwarding mechanism which will remedy this defect. To accomplish this, I prefer to employ a many-toothed arm member orbitally reciprocating over the grain-passage on the lower-elevator belt and grain-binder deck operated at its forward end by a crank driven from the rearward end of the upper-elevator roller-shaft by suitable speed-reduced mechanism to rotate slower than said roller-shaft, its opposite end being pivotally connected to the binder-deck cover portion of the elevator. If the crank for the grain-forwarder was connected directly to the rear end of the upper-elevator roller-shaft, it would rotate entirely too fast. I therefore use a speed-reducing gear located between said ele-

vator roller-shaft and the toothed arm member of the grain-forwarder, which in this case is an internal-toothed speed-reducing wheel driven by a pinion secured to the rearward end of the above-named elevator roller-shaft and operates the crank of the grain-forwarder member in the desired direction. While I have shown an internal-toothed gear driven from a pinion secured to the rearward end of the upper-elevator roller-shaft to reduce the speed of the grain-forwarding mechanism referred to, it is obvious that any other well-known speed-reducing mechanism may be employed for this purpose, such as an endless chain driven by a sprocket-wheel upon the rearward end of the upper roller-shaft for the upper-elevator belt, the chain connecting with another sprocket-wheel secured to the binder-deck cover portion of the elevator-framing to operate the grain-forwarding mechanism from said sprocket-wheel to move the grain from the upper rearward ends of the elevator-belts and grain-binder deck to the binder mechanism. I have found in use that the internal-toothed drive-gear, driven by a pinion connected to and driven from the rearward end of the upper-elevator roller-shaft, operating a many-toothed arm member orbitally-moving reciprocating grain-forwarding mechanism pivotally connected by a swinging link at one end to the binder-deck cover portion of the elevator of the machine and moving straight or obliquely over the grain-binder deck toward the binder mechanism, produces good results. I also employ a similar mechanism to operate on the butts of the grain to take the grain from the throat of the elevator near the butt-ends thereof and forcibly move the grain binderward over the grain-binder deck to the binder mechanism.

My improved grain-forwarder mechanism is composed of the following parts: a grain-moving device supported upon the upper rearward part of the elevator, a speed-reducing gear-wheel to operate said grain-mover journally connected to a single-piece metallic plate on the rearward upper portion of the elevator and driven by a pinion connected with the rearward end of the upper roller-shaft for the upper-elevator belt, a single-piece metallic plate rigidly secured to the

rearward end of the upper-elevator portion of the machine and to which the speed-reduced driving gear-wheel is journally connected, a driving-pinon connected to the rearward end of the upper roller-shaft for the upper-elevator belt to impart motion to said speed-reducing gear-wheel, a grain-depressor pivotally connected to the binder-deck cover portion of the elevator under which the grain is forced by the toothed grain-mover, all of said parts coacting together for the purpose of positively and forcibly moving the grain from the apex of the elevator-belts and binder-deck to the binder mechanism.

Referring to the drawings, similar letters of reference indicate like parts in the several views, in which—

Figure 1 is a plan view of a portion of an open-end grain-binding harvesting-machine, showing the grain-forwarding mechanism and its connections to the machine. In this construction the toothed arm member is not adjustable horizontally, but operates in one position over the path of the heads of the grain. Fig. 2 is a rear elevation of same, showing the toothed arm member in different positions of its movement over the grain. Fig. 3 is a detail of an internal gear, cranked driving-wheels, vibrating swinging link, and toothed arm member of the grain-forwarding mechanism. Fig. 4 is a detail showing construction of crank internal speed-reducing gear driven by the pinion on the rear end of the top roller-shaft of the upper elevator. Fig. 5 is an elevation of the above, showing how the intermeshing gear is secured to the stud-plate on the upper rear end of the upper elevator. Fig. 6 is a plan view of a modification comprising a chain grain-forwarder mechanism driven from the internal speed-reducing gear and driving-pinion located on the rear end of the upper roller-shaft of the upper elevator. Fig. 7 is an elevation of same, showing a series of drop-fingers on the link belt or sprocket-chain. Fig. 8 is a detail view of the grain-depressor, showing its construction and manner of connecting it to the binder-deck cover portion of the elevator.

In Fig. 1, a is a portion of the horizontal grain-conveying belt; a' , the lower-elevator belt; a^2 , the upper-elevator belt; a^3 , the binder-deck; a^4 , binder-deck cover portion of the elevator; a^5 , the grain-binding mechanism; a^6 , the upper-elevator roller; Fig. 2, a^7 , lower-elevator roller, and a^8 is the stripping-roller.

At the rear of the upper elevator and over the binder-deck cover portion of the elevator is located the many-toothed orbitally-reciprocating toothed arm member b of the grain-forwarding mechanism, Fig. 1, its forward end b' adapted to fit over and upon the crank-pin b^2 of the crank-arm b^3 , formed on and made a part of the internal-toothed speed-reducing gear-wheel member b^4 , supported upon the single-piece metallic plate b^5 , located on the rearward upper portion of the elevator.

The rearward end of the toothed arm member b , Figs. 2, 3, is pivotally journaled on the pin b^6 of the vibrating swinging link b^7 . The upper end of said link b^7 is pivotally journaled on the stud b^8 , said stud pivotally connected to its link support b^9 , rigidly secured to the binder-deck cover portion of the elevator a^4 .

Figs. 4, 5 show more clearly the construction of the internal-toothed gear-wheel driving mechanism. The single-piece metallic plate b^5 is rigidly secured to the rearward upper portion of the elevator and is provided with a stud c , adapted to fit into the hub c' on the internal-toothed gear-wheel b^4 , said gear-wheel secured to the stud c by the pin c^2 . The single-piece metallic plate b^5 has formed thereon a projecting box c^3 , which supports and forms a bearing for the rear end of the upper-elevator roller-shaft c^4 . To the rearward end of the upper roller-shaft c^4 of the upper elevator is rigidly secured driving-pinion c^5 , which rotates with said roller-shaft and imparts reduced motion to the speed-reducing gear-wheel b^4 , which operates the many-toothed orbitally-reciprocating grain-forwarder member.

In Fig. 2 the grain-forwarder mechanism is shown in three positions of its movement, showing the toothed arm member operating over and above the path of the grain in its forward movement and downward and into the grain in its rearward movement, clearing the elevators and binder-deck and moving the grain to the binding mechanism.

In Figs. 6, 7 I have shown how a chain or belt grain-forwarder may be driven from the above-described mechanism. The internal speed-reducing gear-wheel b^4 is provided with a sprocket-wheel d , secured to its hub. To the lower part of the binder-deck cover portion a^4 of the elevator is rigidly secured a bracket d' , having a projecting stud d^2 formed thereon, which journally supports a second sprocket-wheel d^3 , these sprocket-wheels connected by a link belt or sprocket-chain d^4 , having a series of drop-fingers d^5 , and in their travel a roller d^6 contacts with a flange d^7 , formed on the side of the sprocket-wheel d , which places the fingers in proper position to enter the grain and move it binderward under the strip d^8 , clearing the elevator and binder-deck.

Referring to Fig. 8, e is a grain-depressor pivotally secured to the binder-deck cover portion of the elevator a^4 by a clip e' and nut e^2 , said grain-depressor member coacting with the orbitally-reciprocating toothed arm member of the grain-forwarder mechanism, said arm operating over and into the path of the grain, forcibly moving the grain over the binder-deck and under said grain-depressor member to the binding mechanism.

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

1. In a grain-binding harvester, in combi-

nation, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the binder-deck, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover over the path of the heads of the grain, one member of said grain-forwarding mechanism consisting of a toothed grain-moving device operated from the rearward end of the upper roller-shaft of the upper-elevator belt to move the grain from the upper rearward end of the elevator-belts and binder-deck toward the binder mechanism.

2. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck and connected to the upper ends of the front and rear portions of the upper-elevator framing, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover over the path of the heads of the grain from the elevator to the binder mechanism, said grain-forwarding mechanism wholly supported by the rearward upper overhanging portion of the grain-elevator frame and binder-deck cover.

3. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the upper and lower elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck and connected to the upper ends of the front and rear portions of the elevator-framing, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of an orbitally-reciprocating arm having teeth, operated from the rearward end of the upper roller-shaft for the upper-elevator belt to move over the path of the grain in one portion of its orbit and into and with the grain in its return movement to move the grain from the rearward upper end of the elevator-belts and binder-deck toward the binder mechanism.

4. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck and connected to the upper ends of the front and rear portions of the upper-elevator framing, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of an intermediate speed-reduced gear-wheel connected with and driven from the rearward end of the upper roller-shaft for the upper-elevator belt, and another member consisting of a grain-moving device located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain to move the grain gently from the rearward upper end of the elevator and binder-deck toward the binder mechanism.

5. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck and connected to the upper ends of the front and rear portions of the upper-elevator framing, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a gear-wheel located on the rearward end of the upper roller-shaft of the upper-elevator belt and fixedly connected thereto, and an internal-toothed-gear cranked wheel larger in diameter than said gear-wheel and intermeshing therewith to reduce the speed of said internal-toothed-gear cranked wheel slower than said roller-shaft, and another member consisting of a toothed grain-moving member pivotally connected to said internal-toothed-gear cranked wheel and caused to descend into the grain near the elevator and move the grain gently from the rearward end of said elevator over the binder-deck toward the binding mechanism.

6. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rear-

ward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck and connected to the upper ends of the front and rear portions of the upper-elevator framing, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a vertically orbitally reciprocating arm, having teeth on its under side, and another member consisting of a cranked internal-toothed gear-wheel journaled upon the upper-elevator framing in rear of the upper-elevator belt, and a toothed gear-wheel smaller in diameter than said cranked internal-toothed gear-wheel located on the rearward end of the upper roller-shaft for the upper-elevator belt and intermeshing with said cranked internal-toothed gear-wheel causing said cranked internal-toothed gear-wheel to rotate slower than said roller-shaft, said reciprocating toothed arm member pivotally connected at its grainward end to said cranked internal-toothed gear-wheel and linked at its stubbleward end to the binder-deck cover and acting in its reciprocations to move the grain gently from the upper rearward end of the elevator over the binder-deck toward the binder mechanism.

7. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck and connected to the upper ends of the front and rear portions of the upper-elevator framing, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a rotary speed-reducing device connected with and driven by the upper roller-shaft of the upper-elevator member, the roller-shaft and speed-reducing device both turning in the same direction, but the speed-reducing device slower than said roller-shaft, and another member consisting of a toothed arm member connected to said speed-reducing device and operated by its rotary motion to move said toothed arm member over the path of the heads of the grain in one portion of its orbit and into and with the grain in its return movement to compress said grain upon the lower-elevator belt and binder-deck, said grain-forwarding mechanism cooperating with said elevator-belts to move the grain toward the binder mechanism.

8. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder

mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a rotary crank located in rear of the upper-elevator belt and journaled upon the upper-elevator framing and geared to the rearward end of the upper roller-shaft of the upper elevator, another member thereof consisting of an orbitally vertically reciprocating toothed arm, its grainward end operated by said rotary crank, said crank driving mechanism imparting a vertically, reciprocating motion to move said arm, causing the teeth of said arm to descend into the grain near the upper rearward end of said elevator, compressing the grain downward upon the binder-deck in its passage to the binder mechanism.

9. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a vertically-reciprocating arm, having downwardly-projecting teeth, and another member consisting of a driving-crank member located in rear of the upper-elevator belt and geared to the rearward end of the upper roller-shaft of the upper elevator and pivotally connected to the grainward end of said toothed arm member to vertically reciprocate said toothed arm member in one portion of its orbit over and above the path of the heads of the grain causing it to descend into the grain in its return movement forcibly moving the grain over the binder-deck to the binder mechanism.

10. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck, a grain-forwarding mechanism located rearward of the upper-elevator belt and

binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a rotary-moving driving-crank located in rear of the upper-elevator belt and journaled upon the upper-elevator framing and geared to a pinion secured to the rearward end of the upper roller-shaft of the upper elevator, another member thereof consisting of a vertically-reciprocating arm, having downwardly-projecting teeth, its stubbleward end pivotally connected with the grain-binder-deck cover, its grainward end pivotally connected to said driving crank member, an internal-toothed-gear cranked wheel located on a single-piece metallic plate secured to the rearward upper portion of the elevator-framing, said gear intermeshing with said driving-pinion located on the rearward end of the upper roller-shaft of the upper elevator, said internal-toothed-gear cranked wheel larger in diameter than said pinion imparting a slower speed to said driving-crank wheel than that of said roller-shaft, said toothed-arm member acting with said upper-elevator-belt and lower-elevator belt portions to compress the grain at the meeting ends of said belts and toothed arm member in the vertical reciprocations of said toothed arm member to clear the grain from the upper ends of the elevator-belts and move the grain toward the binder mechanism.

11. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the binder-deck, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a vertically-reciprocating orbitally-moving arm, having downwardly-projecting teeth, located over the path of the heads of the grain, said arm pivotally connected at its stubbleward end with said grain-binder-deck cover, another member thereof consisting of a rotary crank located in rear of the upper-elevator belt and journaled upon the upper-elevator frame and geared to the rearward end of the upper roller-shaft of the upper ele-

vator and pivotally connected to the grainward end of said toothed arm member imparting a vertically-reciprocating motion to said arm member to cause it to descend into said grain-path in its movements to move the grain binderward and hold the grain from accidental rearward movement out of its proper course.

12. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a grain-passage between the lower and upper elevator belts open rearward that grain longer than the width of said belts may extend rearward from the opening between said belts and pass freely to the binder-deck, a binder-deck cover located over the grain-binder deck, a grain-forwarding mechanism located rearward of the upper-elevator belt and binder-deck cover and over the path of the heads of the grain, one member thereof consisting of a vertically-reciprocating arm, having teeth on its under side to penetrate the grain at different points in the downward movement of said reciprocating arm and compress and hold the grain from scattering while being moved by said arm from the rearward upper ends of said elevator-belts to the binder mechanism.

13. In a grain-binding harvester, in combination, a horizontal grain-conveying belt, a pair of grain-elevator belts, a grain-binder mechanism, a binder-deck intermediate between the elevator and binder mechanism, a binder-deck cover located over the grain-binder deck, a grain-forwarding mechanism, one member thereof consisting of a vertically-reciprocating orbitally-moving toothed arm located at the rearward upper end of the elevator and binder-deck cover and over the path of the heads of the grain, another member thereof consisting of a single-piece metallic plate secured to the rearward upper portion of the elevator-framing, forming a support for the rearward end of the upper roller-shaft of the upper elevator and internal-toothed cranked-gear-wheel driving mechanism substantially in the manner shown and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM N. WHITELEY.

Witnesses:

JOHN L. GILLIGAN,
FRED STATE.