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W. N. WHITELEY & W. BAYLEY.

HARVESTER.

No. 381,308. Patented Apr. 17, 1888.

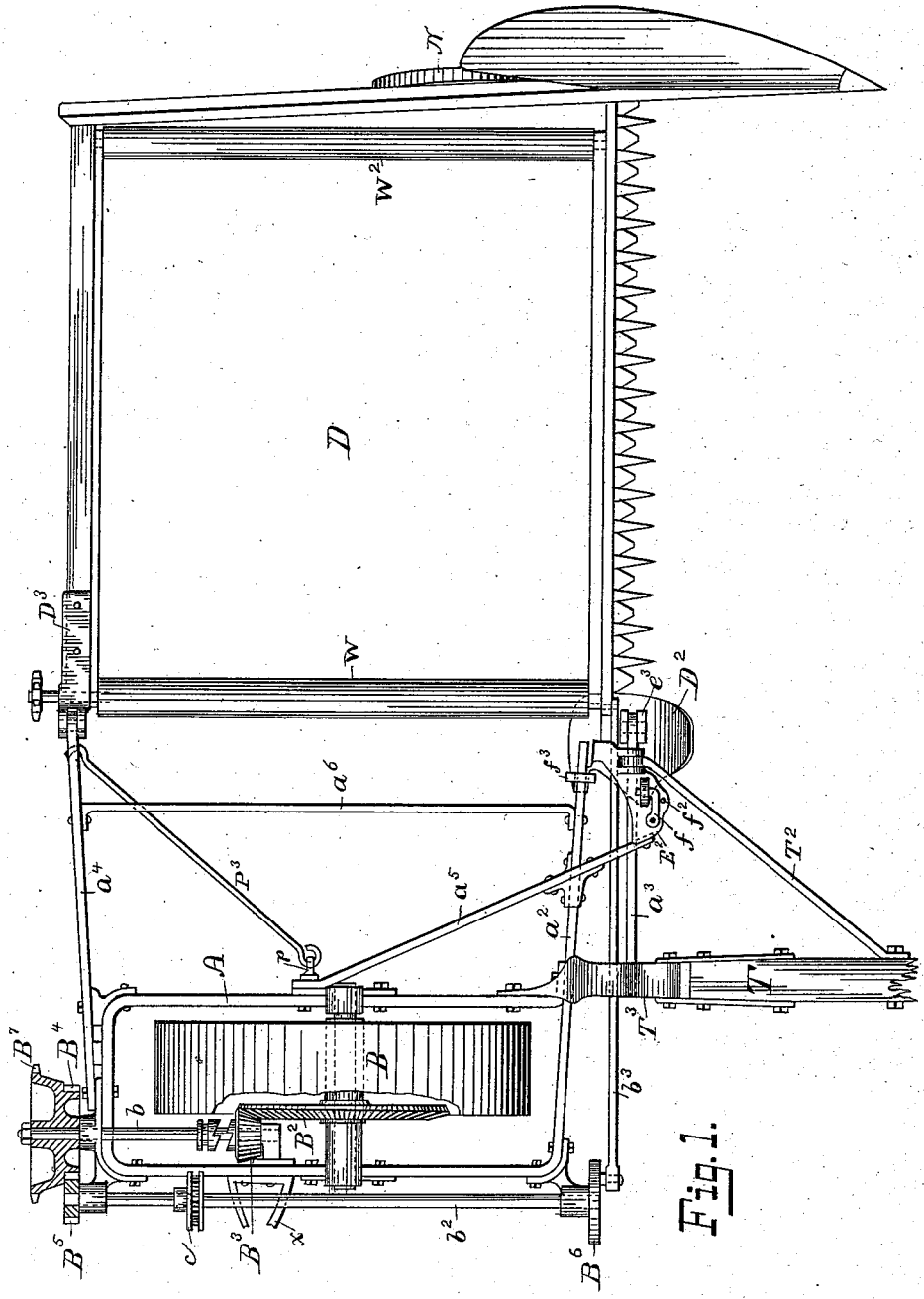


Fig. 1.

Witnesses:
Oscar E. Perrigo.
William F. Bentt.

Inventors:
William N. Whitely.
William Bayley.

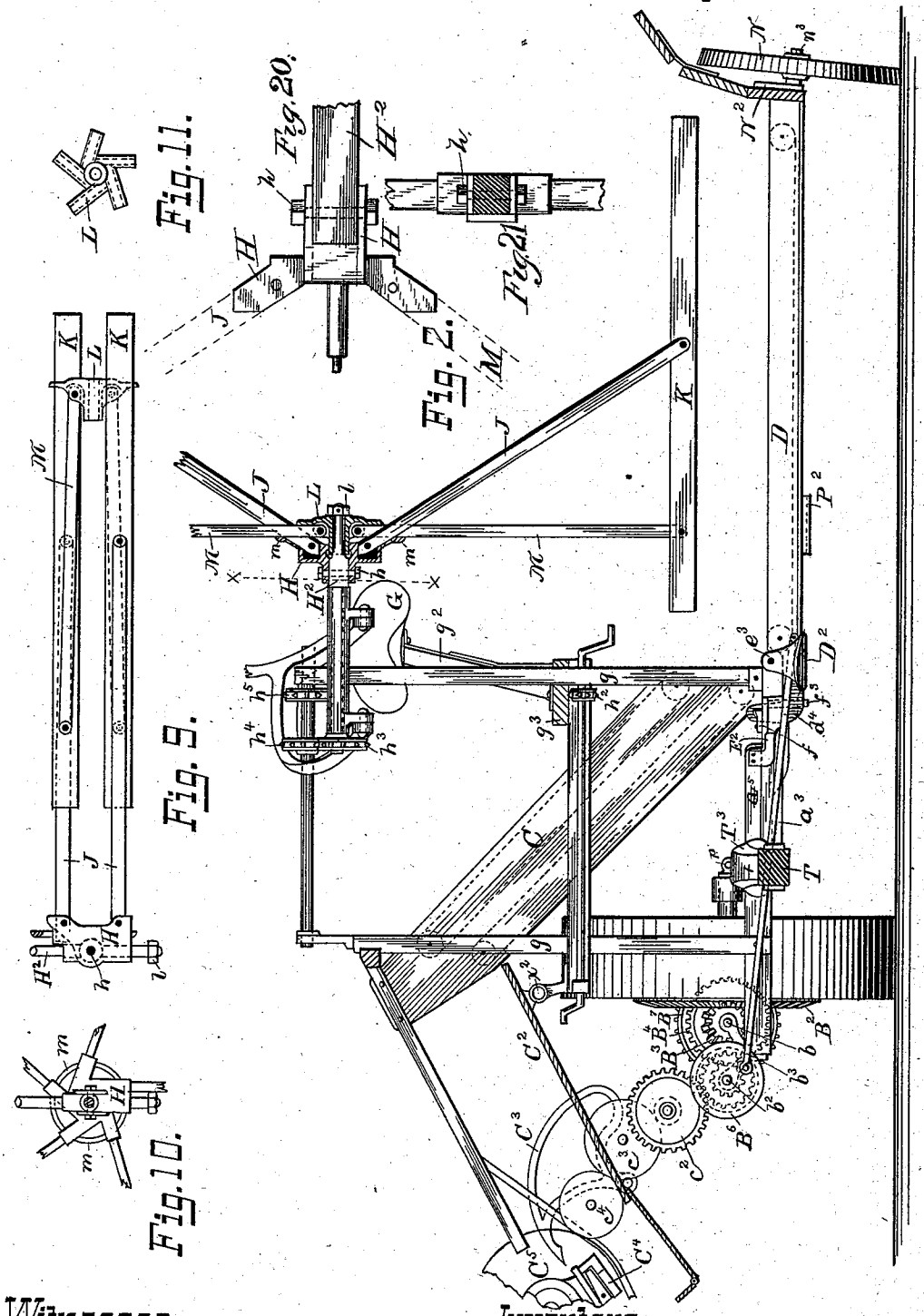
N. PETERS. Photo-Lithographer. Washington, D. C.

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W. N. WHITELEY & W. BAYLEY.

HARVESTER.

No. 381,308. Patented Apr. 17, 1888.



Witnesses:
Oscar A. Perigo.
William F. Bennett

Inventors:
William N. Whiteley.
William Bayley.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 3.

W. N. WHITELEY & W. BAYLEY.

HARVESTER.

No. 381,308. Patented Apr. 17, 1888.

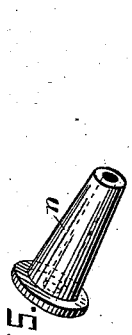


Fig. 15.

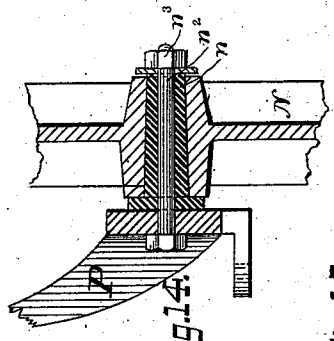


Fig. 14.

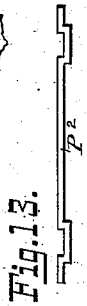


Fig. 13.

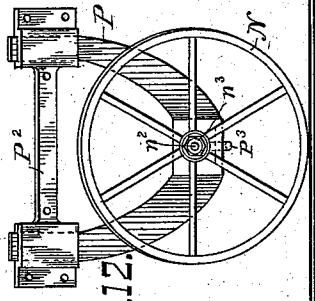


Fig. 12.

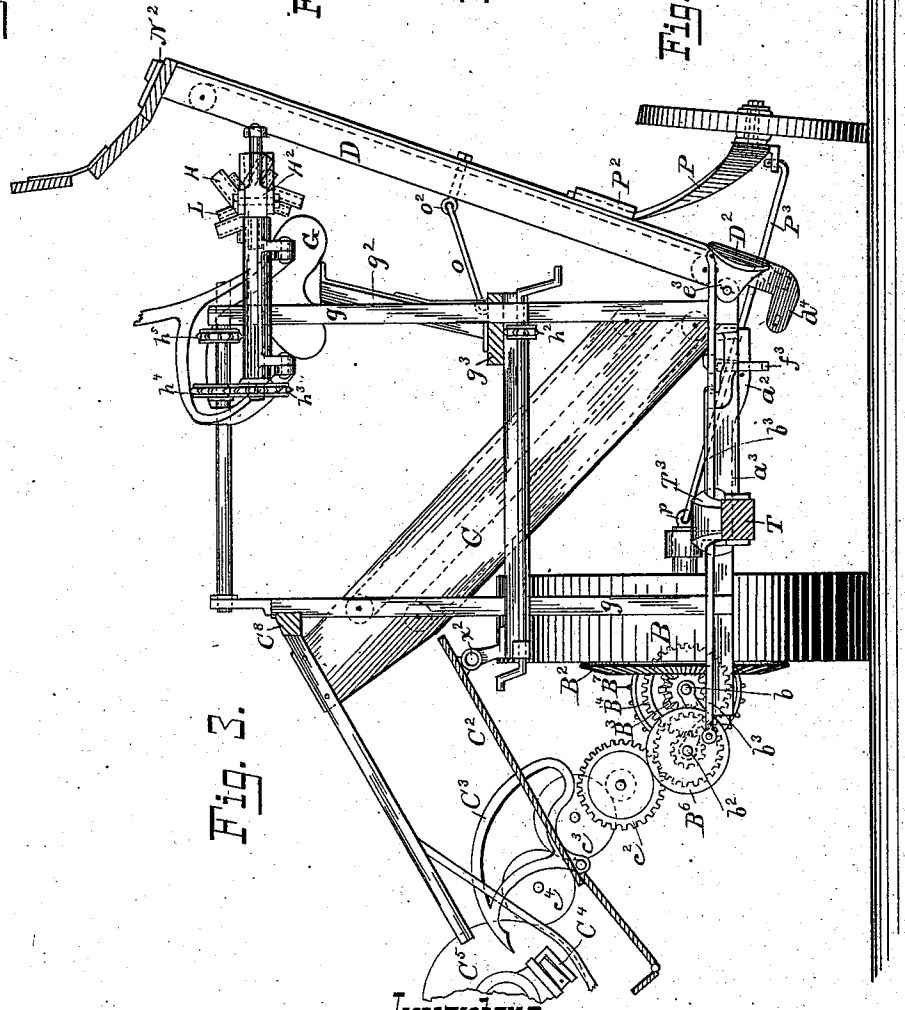


Fig. 3.

Witnesses:
Oscar E. Perrigo
William F. Bevier

Inventors:
William N. Whiteley.
William Bayley.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 4.

W. N. WHITELEY & W. BAYLEY.

HARVESTER.

No. 381,308. Patented Apr. 17, 1888.

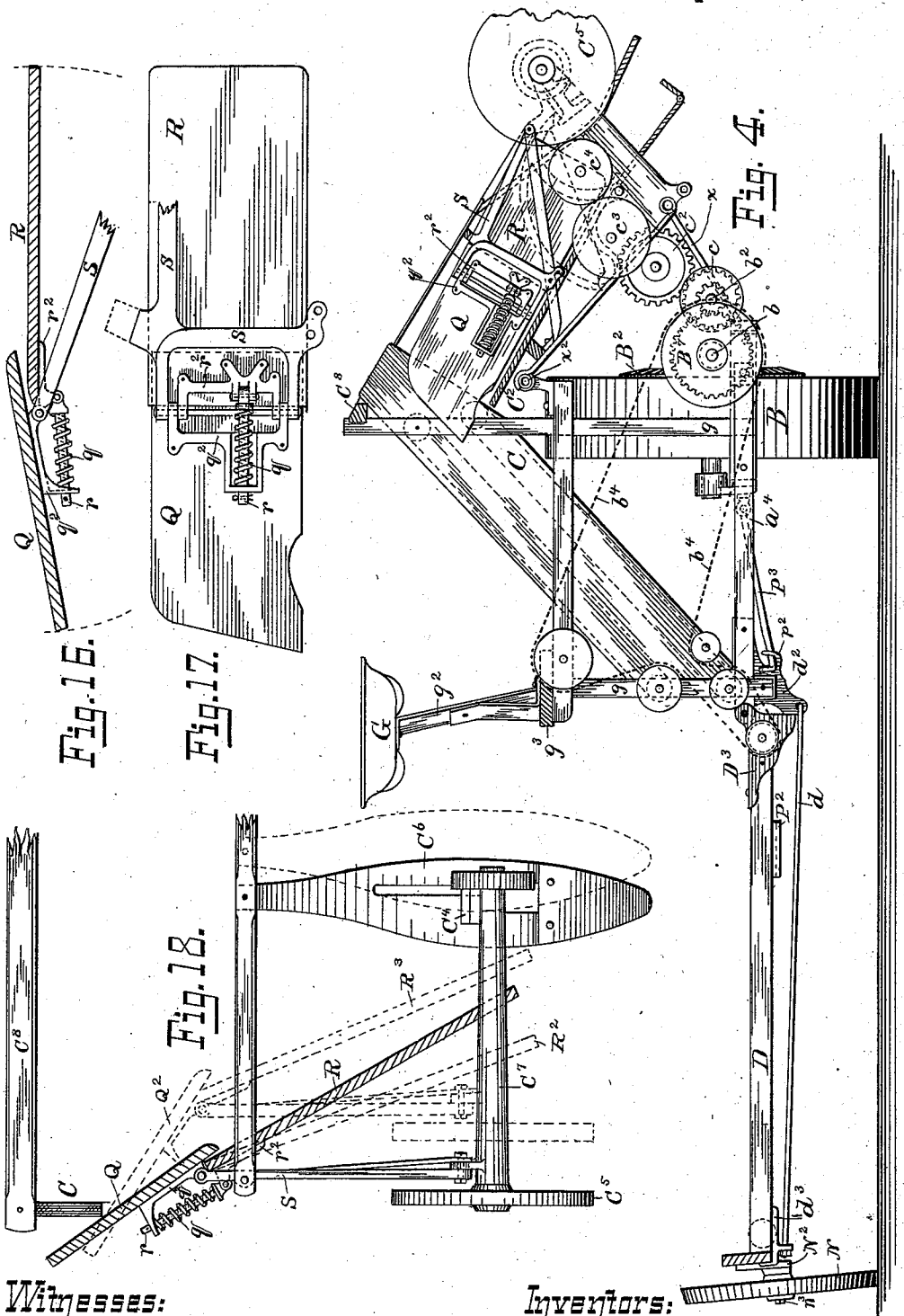


Fig. 16.

Fig. 17.

Fig. 4.

Fig. 18.

Witnesses:
Oscar C. Perrigo
William F. Bentt

Inventors:
William N. Whitely.
William Bayley

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 5.

W. N. WHITELEY & W. BAYLEY.

HARVESTER.

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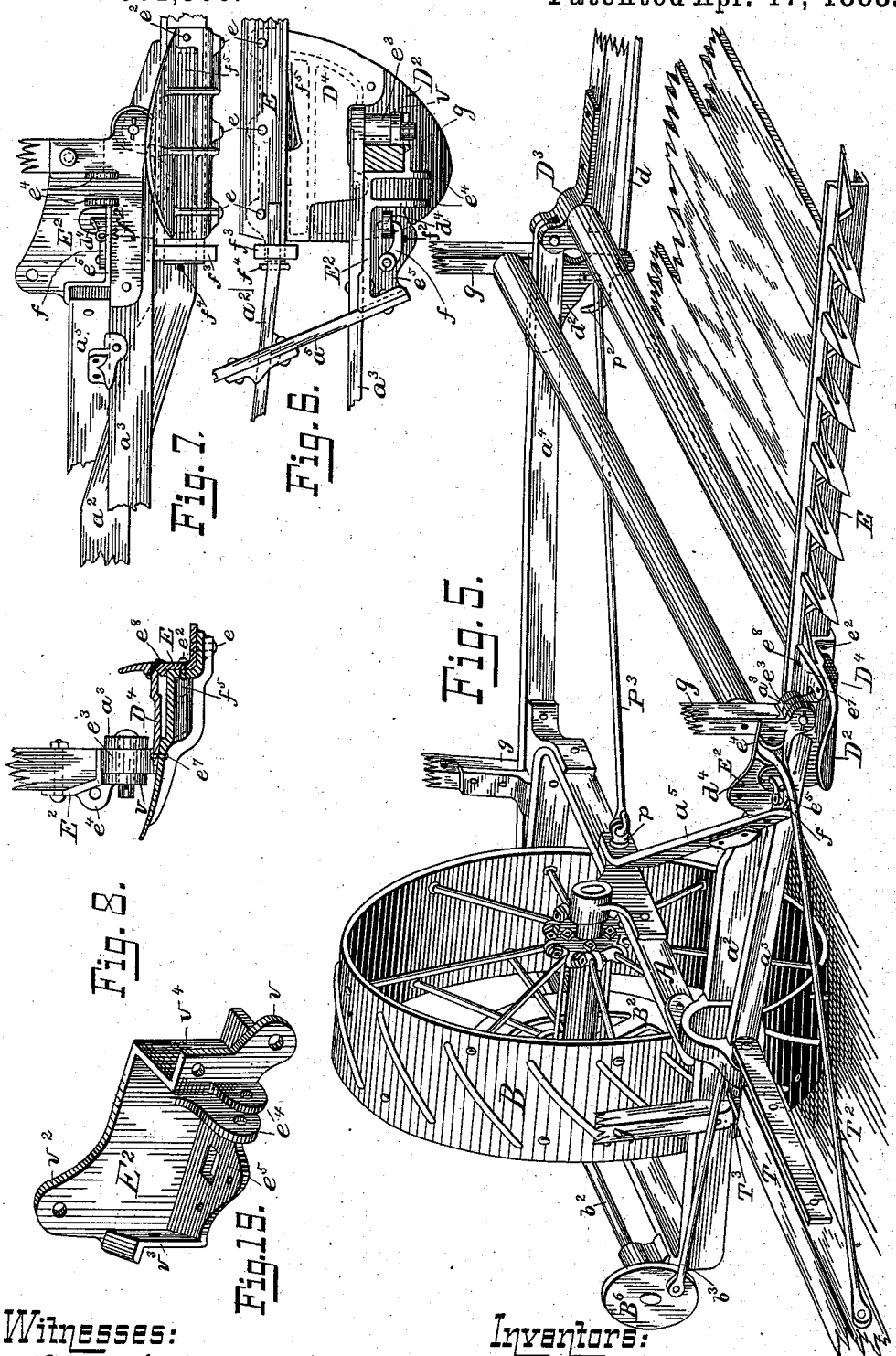


Fig. 7.

Fig. 6.

Fig. 5.

Fig. 8.

Fig. 15.

Witnesses:
Oscar A. Perrigo
William F. Bevitt

Inventors:
William N. Whiteley.
William Bayley

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM N. WHITELEY AND WILLIAM BAYLEY, OF SPRINGFIELD, OHIO; SAID BAYLEY ASSIGNOR TO SAID WHITELEY.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 381,308, dated April 17, 1888.

Application filed December 30, 1885. Serial No. 187,138. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM N. WHITELEY and WILLIAM BAYLEY, citizens of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Harvesters, of which the following is a full, clear, and exact description, reference being had to the drawings hereunto annexed and forming a part of this specification.

Our invention relates particularly to that class of harvesters wherein the cut grain falls upon conveying-belts, which deliver it to elevating-belts, which in turn deliver it into a grain-receptacle, from which it may be automatically bound or discharged in gavels.

The objects of our invention are to construct a machine at once light, strong, and rigid, which we do by discarding wood as a material of construction wherever it can be dispensed with and substituting therefor steel, forged or cast; also, to construct a machine capable of being folded into a compact form for transportation upon the road, which we do by jointing the grain-platform to the main frame, by which means it may be folded to a vertical position, or as near that as may be desired, and at the same time the reel may be folded centrally into a small space and afterward, by being jointed to the reel-shaft, it may be folded to the side of the machine, either inside or outside of the platform, as may be most convenient; also, to provide end-boards which shall properly conduct the cut grain from the elevators down across the binding-deck to the grain-receptacle, and capable of adjusting themselves in the proper position when the position of the binding-machine is changed in reference to the position of the elevators to provide for the different lengths of grain. We accomplish this by making the end-boards in two or more parts flexibly jointed to each other and to a frame forming a part of the binding-machine.

The invention relates, also, to certain combinations of parts, hereinafter particularly described, and pointed out in the claims.

We are aware that machines for cutting grass and grain have been constructed with or without platforms in rear of and attached to the cutting apparatus which were capable of being folded to an upright position or of being turned over and resting upon the main frame of the machine.

We are also aware that metallic frames for harvesting-machines have been constructed surrounding the driving and supporting wheel, and that the same is old and well known; but we are not aware that the peculiar construction and mode of operation of metallic frames for supporting the gearing and elevating parts and the manner of attachment to the cutting and conveying apparatus herein described have ever been known or used.

We are also aware that harvesting-machines having carrying-belts both to convey the grain across the platform of the machine and also to elevate the same have been constructed with joints capable of folding the platform part of the machine into an elevated position; but such construction, broadly, we do not claim.

We are also aware that reels have been constructed to fold centrally, somewhat in construction and action like an ordinary umbrella. To this feature we make no claim.

We do not claim, broadly, as our joint invention the combination of the main frame, a grain-platform hinged thereto adapted to be folded by the side of the machine, and a reel the blades of which may be folded into parallel form, said reel being jointed to its shaft.

We are further aware that hinged boards at the end of the grain in the binder-receptacle, having such boards hinged to some part of the harvester itself and swinging over the deck of the binding-receptacle, have been used, and such device, broadly, we do not claim; but we are not aware that the various devices herein shown and claimed, constructed, arranged, and operating as described have ever been known or used before.

In the drawings, which show all the essential parts of a self-binding harvester necessary to clearly illustrate our invention, Figure 1 is a plan of our machine. Fig. 2 is a front elevation showing the platform in position for work. Fig. 3 is a front elevation showing the platform and reel folded for transportation. Fig. 4 is a rear view of our machine, the reel being omitted. Fig. 5 is a perspective view of the

main frame, a portion of the platform, &c., showing their connection with each other. Fig. 6 is a plan of the inner shoe. Fig. 7 is a front elevation of the inner shoe. Fig. 8 is a side elevation of the inner shoe. Fig. 9 is a side elevation of the reel when folded. Fig. 10 is an end elevation of the reel-head. Fig. 11 is an end elevation of the removable head of the reel. Fig. 12 is a side elevation of the grain-wheel. Fig. 13 is an edge view of the holder for the grain-wheel bracket. Fig. 14 is a vertical section through the hub of the grain-wheel. Fig. 15 is a perspective view of the spindle upon which the grain-wheel is journaled. Fig. 16 is a longitudinal section through the jointed end-board. Fig. 17 is a side elevation of the jointed end-board; and Fig. 18 is a top view of a portion of the binder, showing the position of the end-board. Fig. 19 is a perspective view of the bracket supporting the front corner of the elevator. Fig. 20 is a rear side elevation of the pivoted reel-head. Fig. 21 is an elevation of the same on line $x\,x$, the reel shaft being in section.

Similar letters refer to like parts in the several views.

The main frame A is formed of a single bar of flat wrought iron or steel (preferably the latter) bent into a nearly-rectangular form, the ends properly secured, and one end projecting outwardly toward the grain-platform, as shown at a^2, Fig. 1. To the main frame the main driving-wheel B is journaled. The main wheel B has fixed to it the bevel-wheel B^2, engaging the bevel-pinion B^3 on the counter-shaft b, upon which is also fixed the spur-gear B^4, engaging the spur-pinion B^5 on the crank-shaft b^2, which has upon its front end the fly-wheel B^6, having a crank-wrist upon which the pitman b^3 is pivoted, forming the connection with the knife. Upon the spur-gear B^4 is formed the sprocket-wheel B^7, which by means of the chain b^4, applied as shown in Fig. 4, drives the rollers carrying the platform-belt, the elevator-belts, the reel, &c.

The general arrangement of the elevator C and the binding mechanism is as usual, in the latter C^2 being the binding-deck, C^3 the needle-arm, C^4 the knotter, and C^5 the knotter-wheel, driven by the gears $c\,c^2\,c^3\,c^4$, all as usual, except the gears c and c^2, upon which we reserve the right to make claim in an application for Letters Patent separate and distinct herefrom. The binding-machine is supported at the upper end at x^2 and at the lower end by the brace x, fixed to the main frame, as shown in Figs. 1 and 4.

To the main frame A is fixed the curved tongue-bracket T^3, to which the draft-tongue T is pivoted in the usual manner, and kept at a right angle, or nearly so, with the finger-bar by the tongue-brace T^2.

The grain-platform is attached to the main frame as follows, viz: The end of the bar a^2, forming the front part of the main frame A, projects outward to the inner shoe, forming a point of support therefor. In front of and nearly parallel to the bar a^2 is the front bar, a^3, fixed at one end to the tongue-bracket T^3. Both the bars a^2 and a^3 are securely held and braced by the diagonal brace a^5, fixed at one end to the main frame near the main driving-wheel shaft, while the other end lies across both the bars a^2 and a^3 and is firmly secured thereto. From the rear of the main frame projects the rear bar, a^4, firmly secured to the main frame at one end, projecting outwardly to the grain-platform, and being braced by the rod a^6, secured to it and to the bar a^2 of the main frame, as shown in Fig. 1. The functions of the front bar, a^3, and rear bar, a^4, are to form suitable pivots for the grain-platform D, the front bar, a^3, being pivoted to the top of the inner shoe, D^2, and the rear bar, a^4, pivoted to the rear inner corner of the platform D by the hinge-plate D^3, fixed to the platform, as shown in Fig. 1.

The usual carrying-belt is provided for conveying the grain across the machine from the cutting apparatus to the elevator, the said belt running upon the driving-roller W and outer roller, W^2.

The elevator is provided with the usual belts running upon rollers at the upper and lower ends of the elevator.

When the platform is in position for cutting grain, the rear joint is rendered rigid by the truss-rod d, Figs. 4 and 5, hooked into the bracket d^2, fixed to the rear bar, a^4, the opposite end passing through the bracket d^3, fixed to the platform near its outer end, where the truss-rod is secured by a tension-nut, thus drawing the bracket d^2 in contact with a projection on the hinge-plate D^3, as shown in Fig. 4.

The construction of the inner shoe and its appendages is peculiar and their functions important. Referring to Figs. 6, 7, and 8, it will be seen that the shoe has formed along its back an angular recess, into which is fitted the finger-bar E, (which in this machine is a steel angle-bar,) and is secured by the vertical bolts or rivets $e\,e\,e$ and the horizontal bolt or rivet e^2, while upon its top is the top plate, D^4, whose function is twofold: First, being secured to the shoe by the rivet e^7 and to the finger-bar by the rivet e^8, it forms a strong and efficient brace against twisting strains upon the finger-bar, which, it will be perceived, is now secured practically at four points by the rivets or bolts e, e^2, e^7, and e^8. The second function of the top plate, D^4, is to protect and cover the knife-head, which runs in a pocket or recess formed in the top of the shoe, as shown by dotted lines at f^5, by which means the moving parts are protected from falling grain, dirt, or other clogging matter and a free flow of the grain from the platform-belts up into the elevators secured.

Considerably in front of the finger-bar an upwardly-projecting perforated lug, e^3, is formed upon the inner shoe, and to this the front bar, a^3, is pivoted, the joint being completed by a projecting ear, v, upon the ele-

vator-bracket E^2, a perspective view of which is shown in Fig. 19. This bracket forms the support for the front corner of the elevators and is rigidly connected to the front bar, a^3, and brace-bar a^5 by suitable projections. It has a projecting ear, v^2, by which it is fixed to the side of the elevator, a recess, v^4, wherein is secured the corner-post g at the front inner corner of the elevator, projecting ears e^4, forming the pivot of the tongue-brace T^2, and a horizontal plate, e^5, formed upon it having a vertical hole therein, through which passes the upwardly-projecting lug d^4, formed upon the top of the shoe D^2, which, when the platform is in a horizontal position for cutting grain, is secured by the pivoted hook f, passing through a hole in the lug d^4 immediately over the plate e^5. The hook f is in turn secured by the spring-key f^2, thus rendering the joint of the finger-bar to the inner shoe rigid when the platform is in position for cutting grain, the rear joint being secured by the truss-rod d. The rigidity of the joint of the platform with the main frame is still further secured by the bar a^2, the end of which rests upon a projecting portion of the finger-bar E and is secured thereto by the sliding clevis f^3, sliding upon the bar a^2 and embracing the projecting end of the finger-bar E, and held in that position by the pin f^4. By this construction a point of support is provided both in front and in rear of the knife, and both upon the inner shoe, by which the cutting apparatus is guarded against strain from the points of the fingers meeting an obstacle when they are tilted down or when from any of the usual and numerous causes a twisting strain is brought to bear upon the cutting apparatus, while the whole platform is similarly rendered rigid by the rear joint at the pivot of the rear bar, a^4, and hinge plate D^3, confined by the truss-rod d.

It will be noticed that the inner shoe and the joint within or upon it are constructed in such a manner as to connect the cutting apparatus and platform to the main frame or to a fixed part thereof in advance of the cutter-bar and to permit the free flow of the grain across the machine and up into the elevators.

The joint is arranged nearly in line with the center of the inner roller of the conveying-belt and considerably in advance of the front end of said roller. When the cutting apparatus and platform are folded, this hinge or joint supports the front inner corner of the same in a practical and efficient manner; but when the platform is lowered down to a horizontal position two additional connections are made, one directly with the finger-bar or some extended part thereof and another with the inner shoe considerably in front of the finger-bar, thus forming a rigid and reliable connection between the main part of the machine and the cutting apparatus.

The reel, elevator, driver's seat, &c., are supported upon four uprights, $g\ g\ g\ g$, in the usual manner, the driver's seat G, secured to the seat-spring g^2, being fixed to the seat-board g^3. The reel is of the folding type, closing up somewhat like an umbrella. The reel-head H is jointed to the reel-shaft H^2 by the bolt h, by which means it may be folded back to the side of the machine when the platform is to be folded. Pivoted within the reel-head H are the arms J, whose outer ends are also pivoted to the reel-blades K. The arms J are held in an extended position by the removable head L being forced against their front sides. To the removable head L the braces M are pivoted, their outer ends being also pivoted to the reel-blades. The removable head L is fitted upon the reel-shaft H^2 and secured thereon by the nut l, as shown. The braces M are forced back against the ribs m, which are a part of the head H and extending between the arms of said head, as shown in Fig. 10.

We usually construct the reel with five arms, as shown in Figs. 10 and 11, but in Figs. 2 and 9 only two arms are shown directly opposite each other, for convenience of illustration and to avoid complication of the drawings. The reel is driven in the usual manner by chains upon the sprocket-wheels $h^2\ h^3\ h^4\ h^5$, and the usual provision made for its vertical adjustment.

When the reel is to be folded, the nut l is removed and the removable head L slipped off the reel-shaft H^2, thus relieving the pivots of the arms and braces. The head L is then drawn outward in prolongation of the reel-shaft, the arms and braces folding centrally, as shown in Fig. 9. The reel-head H being pivoted to the reel-shaft at h and the said joint being rendered rigid by placing the removable head L upon the reel-shaft H^2 and forcing it against the arms J by the nut l, it follows that by removing the head L from the reel-shaft the pivoted joint of the head H with the reel-shaft H^2 is relieved and the reel may be placed back to the side of the machine, the end of the reel-shaft H^2 swinging around into a recess formed for that purpose in the head H between two of the arms, as shown in Fig. 10.

The grain wheel N is pivoted to the usual bracket, N^2, by means of a removable conical wrist or spindle, n, placed against the bracket, and a bolt, n^2, passing through the bracket and wrist and secured outside of the wheel by a nut, n^3, as shown, by which means it is very readily attached to or detached from any bracket of simple construction.

When it is desired to fold the platform for transportation, it is accomplished thus: The pin f^4 is removed and the sliding clevis f^3 withdrawn, the spring-key f^2 taken out, and the hook f swung around out of the hole in the lug d^4, thus relieving the front joint. The tension-nut on the truss-rod d at the bracket d^3 is loosened and the truss-rod unhooked from the bracket d^2, thus relieving the rear joint. The nut n^3 is now removed from the bolt n^2, and the bolt n^2, spindle n, and grain-wheel N detached from the bracket N^2. The platform

is now folded up and secured in its elevated position by the rod *o*, which is pivoted in an eyebolt in the seat-board g^3 at one end and an eyebolt, o^2, passing through the platform at the other, as shown in Fig. 3.

In folding the platform the chain b^4, which operates the belt-rollers, &c., is not materially disturbed, as the sprocket-wheel on the roller at the inner end of the platform is located very close to the pivot upon which the platform turns, and when the latter is elevated the sprocket-wheel describes a small arc of a circle, rotating slightly in the chain, but neither tightening nor loosening it to any material extent. The grain-wheel N is now attached to the bracket P by means of the bolt n^2 and spindle *n*, as shown in Fig. 14, and the bracket P slipped into its place in the bracket-holder P^2, which is fixed to the bottom of the platform, after which the brace P^3, which is pivoted to the eyebolt *p* on the main frame, is unhooked from the hook p^2 and its free end hooked into a vertically-perforated projection formed on the bracket P and secured by the usual spring key or pin in the manner shown in Fig. 3, the grain-wheel thus becoming a carrying-wheel located near the inner shoe and in such a position as to properly carry and balance the weight of the platform and cutting apparatus.

We prefer to fold the reel to the side of the machine before the platform is folded up; but the platform may be folded first close to the machine and the reel folded outside of it, if so desired.

Our improved end-boards may be used either as head or butt boards, but are herein shown applied as a head-board, and consist of two boards, Q and R, pivoted together and to a frame, S, which forms a part of the binding-machine frame. The boards Q R are kept extended each in prolongation of the other, and returned to that position when forced out of such relation to each other by the spiral spring *q* upon the rod *r*, which is pivoted to the hinge-plate r^2 on the board R and passes through a perforated projection on the hinge-plate q^2 on the board Q. The position of these boards Q R in relation to the elevators and the binding-machine is clearly shown in Fig. 18, in which C is the upper end of the elevator-side, C^8 the cross-rail, C^7 the binder-frame, C^4 the knotter, and C^6 the knotter breast-plate, the boards Q R being pivoted to the frame S, which forms a part of the frame of the binding mechanism and moves with it when the latter is moved to the right or left upon the harvester to accommodate the varying lengths of grain, the board Q resting against the side-board of the elevator, as shown, and the board R swinging back, as shown by dotted lines at R^2, as the grain presses against it, and being restored to its position by the spiral spring *q* as soon as the pressure is removed. When the binding-machine is moved to the right—*i. e.*, to accommodate shorter grain—the parts take the position shown by dotted lines, the board Q swinging back to the position Q^2 and the board R to the position R^3, the board R always retaining its flexibility, holding the grain in the proper position to be bound, yielding to the pressure when it is too severe, and always returning to its original position as soon as the pressure is removed, and accommodating itself to all lengths of grain and all positions which the binding machine may have in reference to the elevators. We prefer to construct our end-boards of two parts—*i. e.*, two boards pivoted to each other; but they may be constructed in three parts suitably pivoted to each other and to the binding-frame without materially altering their essential features.

Having thus fully described the construction, operation, and uses of our invention, we claim—

1. In a harvester, the combination of the main frame, the cutting apparatus and platform hinged to the main frame or extended parts thereof by two hinge-joints, a grain-wheel, N, and a truss rod, *d*, extending from a bracket carried by the main frame near one of the hinge-joints to near the outer edge of the platform, where it is secured thereto, said truss-rod operating to render the connection between the main frame and the platform rigid when the machine is in operation, as set forth.

2. A harvester-frame surrounding the main driving-wheel, composed of a single bar of wrought metal bent into a nearly-rectangular form and properly secured together, one end projecting toward the grain end of the machine and forming one point of support for the inner shoe, and in front of said bar another bar one end of which is fixed to the front of said frame or to some fixed part thereof, while its inner end projects to the inner shoe and is pivoted thereto, both of said bars being braced and supported by another bar extending from about the middle of the inside bar of the main frame to and across said projecting bars and fixed thereto, substantially as and for the purposes shown and described.

3. In a harvester, the combination of the main frame, a folding platform and cutting apparatus, and a reel having a jointed shaft, whereby it may be folded into line with the machine to reduce its width, said reel having jointed and folding supporting-arms and blades, a fixed part for limiting the extension of the reel, and a removable head pivoted to the arms and adapted to abut against the arms and hold them extended, substantially as set forth.

4. A harvester-reel constructed with the arms pivoted to a head at their inner ends and to the blades at their outer ends, a removable head, the arms being sustained in an extended position by said removable head being forced against them, and pivoted braces, also extending to the reel-blades and pivoted thereto, the said head being removable for the purpose of

folding the reel centrally into a small diameter, substantially in the manner and for the purposes shown and described.

5. A harvester-reel having a fixed head and constructed with the arms pivoted to said fixed head at their inner ends and to the reel-blades at their outer ends, a removable head, the arms being held in an extended position by the abutment against them of said removable head, and braces pivoted in said removable head and whose outer ends are pivoted to the reel-blades, the said head being removable for the purpose of folding the reel centrally, in combination with a reel-shaft pivoted to the reel-head or some fixed part thereof for the purpose of folding the reel to the side of the machine, substantially in the manner shown and described.

6. In a self-binding harvester, an end-board formed of two or more boards flexibly pivoted or jointed to each other and to a part of the binder-frame, the said joints or hinges being controlled by a spring, substantially in the manner and for the purposes shown and described.

7. In a grain-binding harvester, the combination of the binding mechanism, the belt which delivers the cut grain to the binding devices, a hinged end-board consisting of the part Q, carried by the binder-frame, and the part R, hinged to part Q, and a spring interposed between parts Q and R and tending to keep them extended, substantially as set forth.

8. In a grain-binding harvester, the combination of the binding mechanism, the belt which delivers the cut grain to the binding devices, a board, Q, hinged to an extension of the binder-frame, and a board, R, hinged to board Q, the board Q bearing near its free end against some part of the frame for the delivery-belt, substantially as set forth.

9. In a harvester, the combination of the inner shoe having along its back an angular recess, an angular finger-bar fitted in said recess, where it is bolted, and top plate, D^4, riveted both to the finger-bar, as at e^8, and to the shoe, as at e^7, whereby it serves both to brace the finger-bar and to cover the knife-head, substantially as set forth.

10. A harvester-reel constructed with the arms pivoted to a head at their inner ends and to the blades at their outer ends, a removable head adapted to abut against and secure the arms when extended, pivoted braces extending between the blades and the removable head and pivoted in the latter, and a screw-fastening for compressing the removable head against the arms.

WILLIAM N. WHITELEY.
WILLIAM BAYLEY.

Witnesses:
OSCAR E. PERRIGO,
WILLIAM F. BEVITT.