2 Sheets—Sheet 1.

C. A. POSTLEY.

GRAIN-BINDER.

No. 172,933. Patented Feb. 1, 1876.

Fig. 1

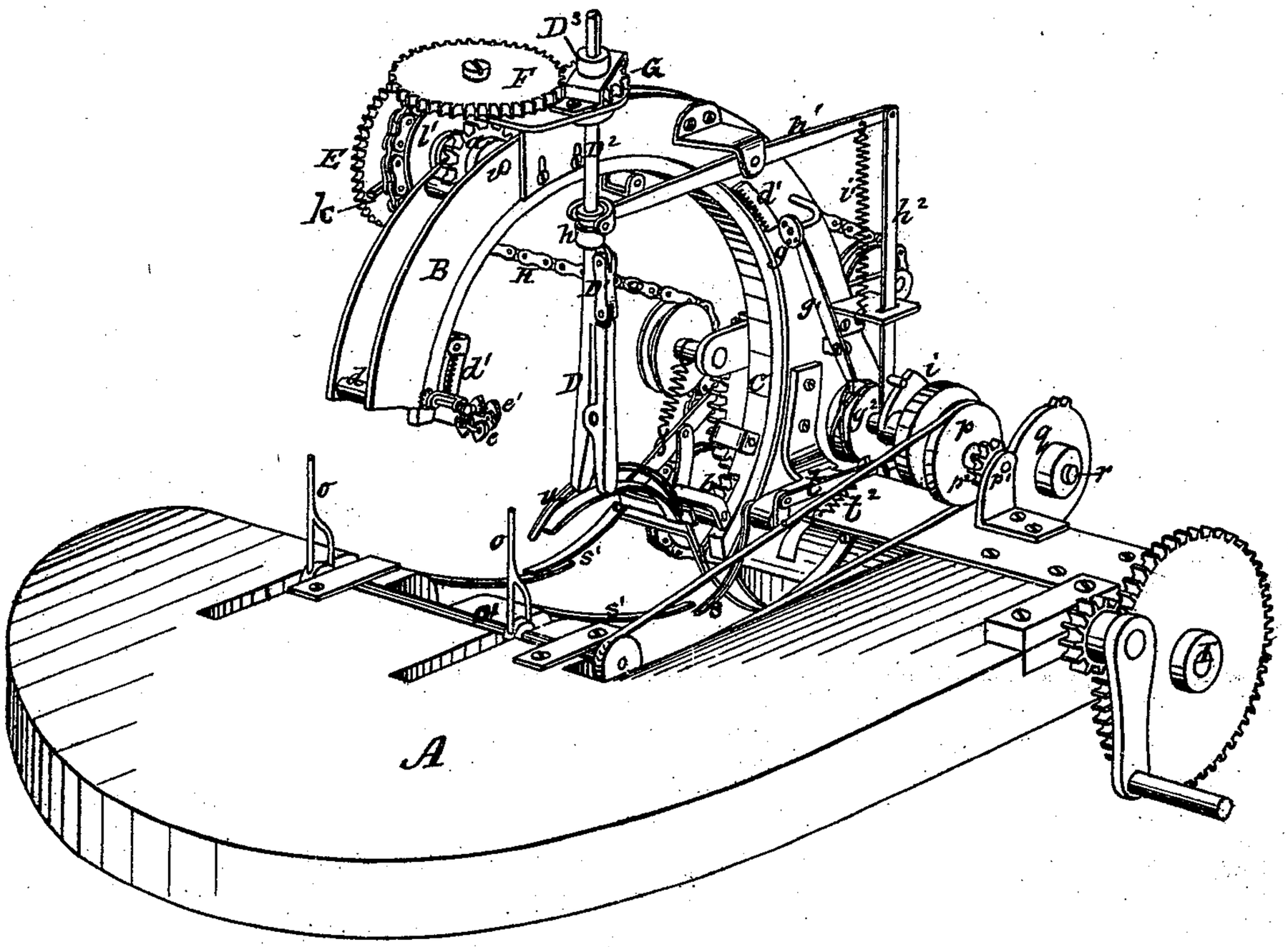
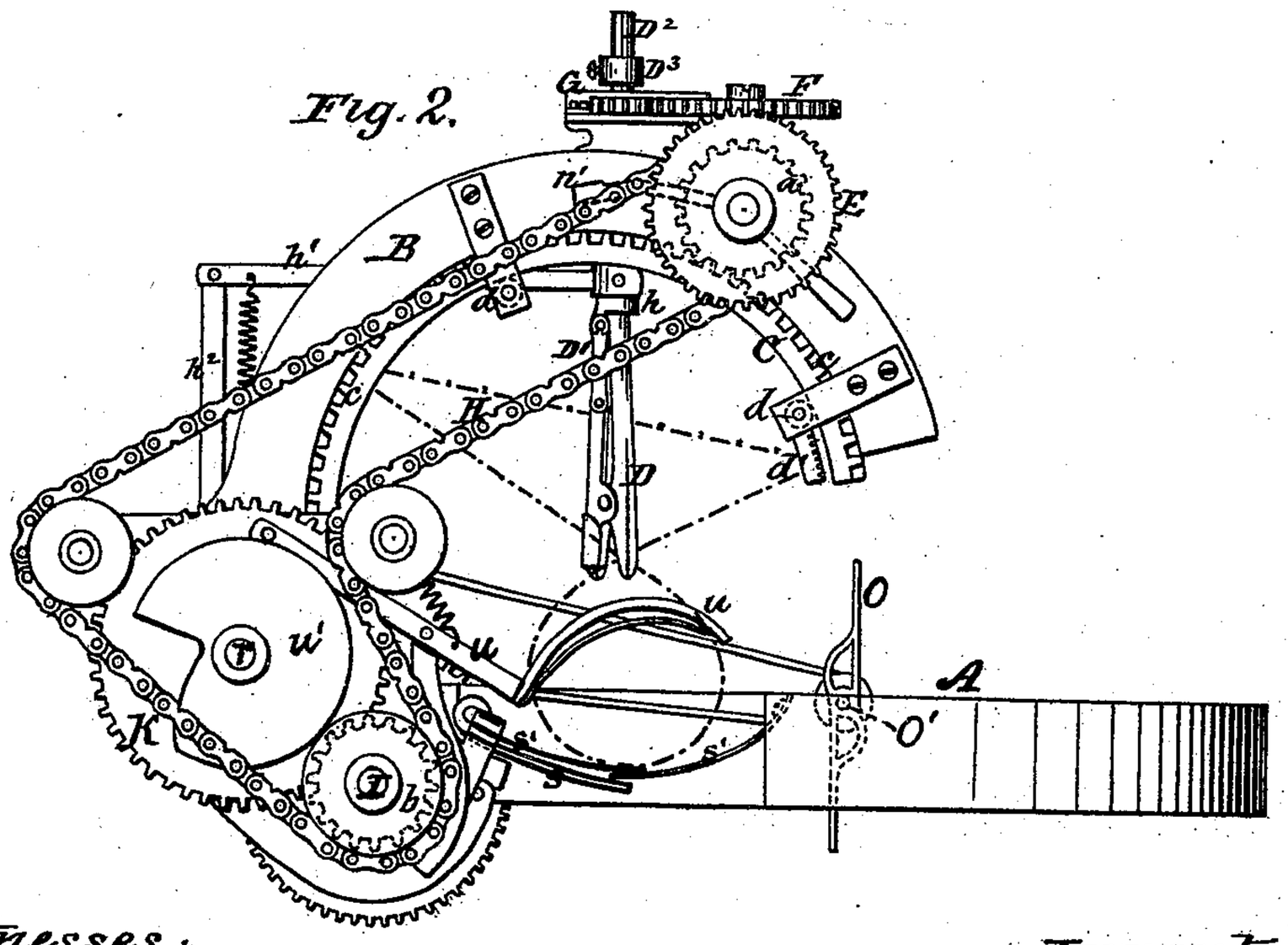


Fig. 2.



Witnesses:

E. C. Dieman

Chas. E. Postley.

Inventor:

Charles A. Postley

2 Sheets—Sheet 2.

C. A. POSTLEY.

GRAIN-BINDER.

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Fig. 3.

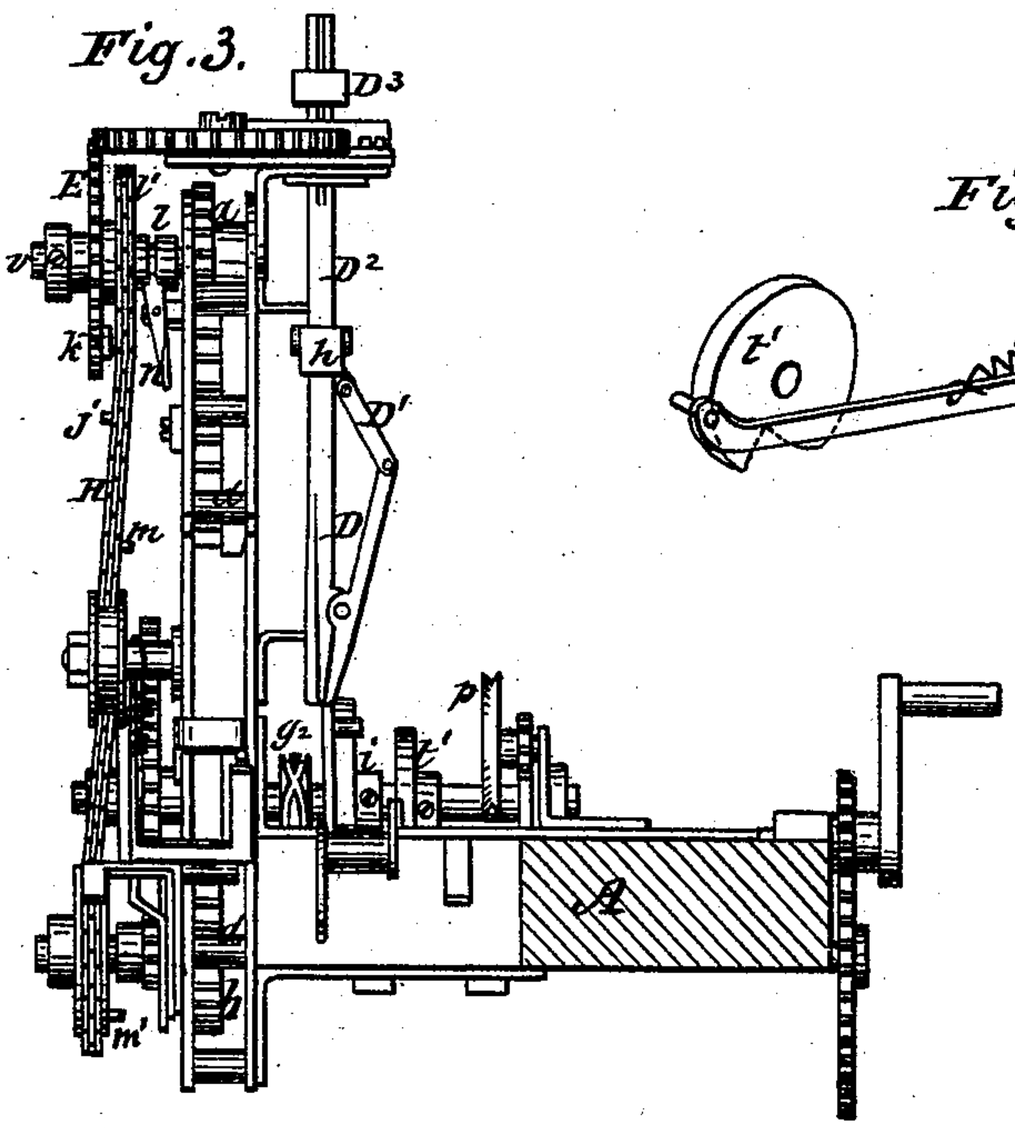


Fig. 5.

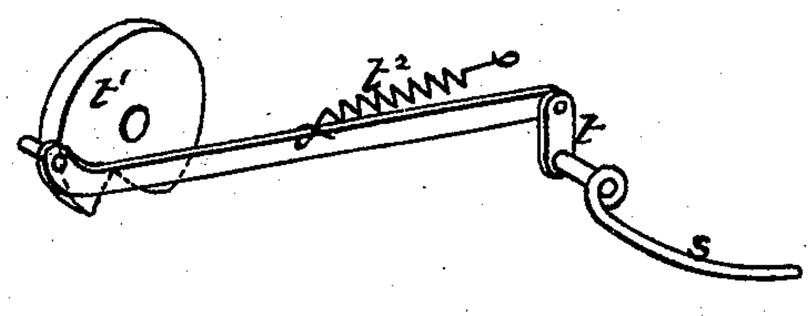


Fig. 4.

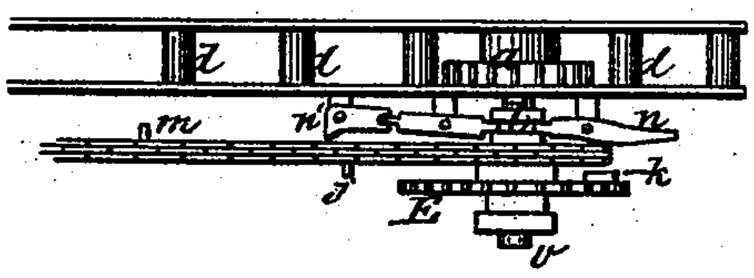
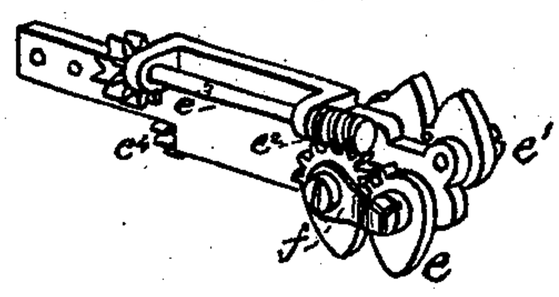


Fig. 6.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES A. POSTLEY, OF AUSTIN, TEXAS.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **172,933**, dated February 1, 1876; application filed December 16, 1875.

To all whom it may concern:

Be it known that I, CHARLES A. POSTLEY, of Austin, in the county of Travis and State of Texas, have invented certain new and useful Improvements in Grain-Binding Machines; and that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents the grain-binding machine in perspective. Fig. 2 represents a side elevation of the same. Fig. 3 represents a front elevation of the same, with a portion of the frame in section. Fig. 4 represents a top view of a portion of the mechanism carrying the clutch and levers, by which it is operated. Fig. 5 represents the arm that supports the gavel, and the mechanism by which it is operated. Fig. 6 represents two pairs of grasping-jaws on a large scale, used to grasp and carry the wire around the gavel.

Similar letters where they occur denote like parts of the machine in all figures.

My invention relates, first, to a rotating segment, which revolves around the gavel, and has an intermittent rotary motion.

My invention further relates to a revolving segment with an intermittent rotary motion, having a projection or attachment, by which a binder is carried around the gavel.

My invention further relates to a revolving segment, rotated periodically by means of gearing and a driving-chain, having a projecting pin acting on a lever of a clutch mechanism, allowing the segment to stop and start again by means of another projecting pin acting on a second clutch-lever.

My invention further relates to two or more pairs of grasping jaws, attached to a revolving segment, rotating periodically, so that while one pair of jaws is carrying a binding-wire around the gavel, the other pair will grasp another wire and carry it in position ready to be wound around the next gavel.

My invention further relates to a revolving segment having an intermittent rotary motion, and carrying two sets of grasping-jaws, with an oscillating wire-shifter, presenting two wires to the grasping-jaws, so that while one wire is being wound around the gavel, another wire is placed in a suitable position, ready to be grasped by the next set of grasping-jaws.

My invention further relates to the combination of a wire-twisting mechanism, rotated periodically by means of a gearing and a driving-chain, having projection pins acting on the geared mechanism, while the segment remains at rest.

My invention further relates to the combination, with intermittently-rotating segment and its open-sided frame, of a lever, or series of levers, bent so as to form a cradle to receive the cut grain, and a compressing-arm above, to form and retain the gavel in position while the segment, with wire-carrier, encircles it with wire.

My invention further relates to the intermittent revolving levers, that deliver the grain to the cradle, in combination with the mechanism by which they are operated.

My invention further relates to an intermittently-rotating segment, having a motion round the gavel, and revolving in a fixed vertical segmental frame, open at the side, through which the grain is received, and over which open side the segment travels.

My invention further relates to an intermittently-rotating segment, revolving in a fixed vertical segmental frame, open at the side, and having two sets of grasping-jaws, which carry the wire over the open side of frame, and round the gavel.

My invention further relates to a revolving segment in a fixed vertical segmental frame, rotating periodically by means of gearing and an endless chain, having a length greater than the circle traveled by the segment, thus giving time to twist the band, drop the gavel, and receive a new bundle.

My invention further relates to a segment rotating intermittently in a segmental vertical fixed frame, having cogs on its periphery, which mesh with pinions *a* and *b* alternately, for the purpose of stopping and starting segment.

My invention further relates to the use of two separate and distinct wires, each brought into action alternately by a wire-shifter, so

that while one wire is being carried round the gavel, the other is in position to be taken up by the wire-carriers on their subsequent revolution.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawing.

A represents the bed-plate of the machine, to which the binding mechanism is attached, and takes the place of the platform of a grain-reaping machine. B represents a vertical stationary segmental frame, which serves as a guide for the segment C. This segment C has formed on its periphery a circular rack, *c*, the cogs of which mesh alternately with two cog-wheels, *a* and *b*. The segment C, forming more than a half-circle, is always connected with either of the pinions *a* or *b*, and it is retained in position relatively to the segmental frame B by series of rollers *d*, attached to the frame B. This segment C might be made tapering at the points in the form of a crescent, and thus perform the same work. To the forward extremity of the segment C are attached two sets of griping-jaws, *e* and e^1, fastened to a suitable frame, as shown in Fig. 6, each jaw having on the periphery cogs that mesh with one another, one of which, in turn, meshes with worm e^2 on shaft e^3, and is operated by pinion e^4 passing over the stationary racks *d'*, placed at proper distances on the stationary frame B, so that each pinion shall be rotated alternately, first in one direction, to open the griping-jaws, and then in the other, to close them again, by coming in gear first with the outside cogs of one rack, and then with a rack the cogs of which are facing the center of the segment. Only two racks *d'* are shown in the drawings, but four should be used for the proper operation of the machine. Two racks, *d'*, should be attached to frame B at or near the place where frame B is fastened to the platform; but for want of room they are not shown.

The cogs of one rack should face outward, while the other should face inward or toward the center. In front of the griping-jaws *e* there is a spring, *f*, for the purpose of throwing off the end of the binding-wire after it is released by the griping-jaws *e*, the wire having been previously grasped by griping-jaws e^1. The griping-jaws *e* carry on their opposite face a cutter or knife-edge, to cut off any surplus wire after it has been secured by said jaws from wire-shifter *g*. The wires used in binding are fed to the machine from two reels, each wire passing through a guide-hole in the oscillating wire-shifter *g*, so as to bring it in line for the griping-jaws *e* to seize in their transit around the stationary frame B. This oscillating motion is produced by the lever g^1, to which the oscillating wire-shifter *g* is attached, having its opposite end following the crossed grooves of the cam g^2. D represents the wire-twisting device, in the form of ordinary nippers, with a cutting-edge held vertically over the place where the wire band is to be twisted. The short arm of the nippers is connected by means of a link, D^1, to a sleeve, *h*, surrounding the long arm D^2 of the nippers. The sleeve *h* is attached to one end of a lever, h^1, pivoted to a bracket on the side of the frame B. The other end of the lever h^1 is actuated by vertical rod h^2, which is elevated by the cam *i* and lowered by the spring *i'*. The nippers D are rotated periodically, so as to twist the binding-wire, by means of the gear-wheel E meshing with the horizontal gear-wheel F, which, in turn, meshes with the pinion G. This latter carries a spline in its center bore, which engages in a key-seat or groove cut in the long arm D^2 of the nippers, so as to allow the latter to be raised or lowered without being disconnected from its driving-pinion G. The gear-wheel E is rotated periodically by means of pin or projection *j*, Fig. 3, on the outside of the driving-chain H, engaging for short periods with the stop *k* on the wheel E. The segment C is also rotated periodically in nearly the same manner. It is rotated from the main shaft I by means of the pinion *b* until all the cogs on its periphery have passed the pinion *b*; then it remains stationary until the pinion *a* is rotated by the sleeve *l* getting into clutch with the pulley *l'* that is rotated continuously by the chain H. The clutch *l* is operated by means of projection *m* on the inside of the chain H acting on the lever *n*, forcing the clutch to form a connection with the chain-pulley, as shown in Fig. 4, and in that manner rotating the pinion *a*, and consequently the segment C, until the motion of the segment is continued by the pinion *b*, during which time the projection *m'* strikes the end of the opposite lever *n'*, and so disconnects the pinion *a* from the continuously-rotating chain-pulley *l'*. The grain that is received on the platform A is brought to the cradle formed for its reception by means of intermittently-revolving levers O, mounted on a shaft, O', which is revolved by means of a belt or band from a pulley, *p*, on a counter-shaft, p^1, carrying a pinion, p^2, the cogs of which mesh with two or more cogs on the wheel *q* on the counter-shaft *r*. This shaft *r* is supported chiefly by the frame B, and receives its motion from a pinion which meshes with the cog-wheel K on the outer end of shaft *r*, said pinion being on the main driving-shaft I. The receptacle or cradle where the grain is received for the purpose of being bound is formed of one or more arms, S, to support the grain, and springs S' can also be added for additional slight support of each end of the gavel.

The arm S is kept in position ready to receive the grain by bell-crank levers *t*, resting against a cam, t^1, that has a short portion of its periphery cut away, so as to allow the spring t^2 to act to lower the supporting-arm S, and permit the gavel to fall to the ground or out of the cradle, under the impulse given by

the upper lever *u* as it is actuated at the proper time by the cam *u'*. The bent lever *u* is provided with a spring on its under side to aid in the compression of different-sized gavels. The lower arm S may be provided in the same manner with a compression-spring.

To bind grain with this machine, the end of wire being fast in the outside griping-jaws *e* of the wire-carrier, which is attached to the upper extremity of the segment C, and at rest near the upper extremity of the segmental frame B, the machine being put in motion, the intermittent dumping-levers *o* will turn the grain collected on the platform A into the binding-cradle at the moment when the upper lever *u* is raised by the depression in the cam *u'*, assisted by spring on lever *u*, Fig. 2; then the supporting-arms S and upper levers *u* will compress and hold the grain in form by means of the cams t^1 and *u'* on the counter-shaft *r*. At the same time a pin or projection, *m*, on the driving-chain H will press against the outer end of the lever *n*, Fig. 4, connected with the clutch *l* on the upper shaft *v*, causing the clutch to form a connection with the chain-pulley *l'*, and thus put the segment in motion. The segment, with the wire in wire-carrier, will start in a circle around the gavel. When it passes under the gavel the wire, by its action, will be transferred from the outer griping-jaws *e* to the inner griping-jaws e^1, thus compressing the spring *f* on the outside of the griping-jaws *e*. At the same time the small pinion e^4, that actuates the griping-jaws e^1, will pass under a stationary rack, *d'*, and close the jaws e^1 on the wire, when the segment, in its continued rotation, will bring the pinion on the worm-shaft of griping-jaws *e* over a rack, *d'*, and open them, and the end of the wire will be thrown out of the way by the spring *f*, thus leaving the outer griping-jaws *e* free for the next wire. The segment progressing in a circle, the wire is held by the inner griping-jaws e^1. When the outer griping-jaws *e* arrive opposite the wire-shifter *g* the next wire will be held, by the shifter *g*, in line with the outer griping-jaws *e*, at which time the driving pinion of the jaws *e* passes over one of the racks *d'*, causing the jaws to close on the wire. At the same time the cutting-edge on the jaws *e* will cut off any surplus wire. Then the segment C progresses with two wires, one of which is already around the gavel, and the other is in line above it, as shown by dotted lines in Fig. 2. The segment C having arrived nearly at the starting-point, the first wire will have passed entirely around the gavel and formed a cross at the center of the circle, and, while the segment is advanced around the circle by the gear-wheel *b* on the main driving-shaft I, a catch, *m'*, on the inside of chain H will strike the end of the lever *n'*, and disconnect the clutch *l* from the chain-wheel *l'*, thus making the segment independent from the chain-wheel *l'*; and on the arrival of the segment at the starting-point it will become disconnected from the lower driving gear-wheel *b*, and come to a rest. The chain H is of a length greater than the circle traveled by the segment, and by this means time is allowed while the segment is at rest for twisting the band, discharging the gavel, and refilling the cradle.

On the crossing of the wire around the gavel the twister D will descend and clasp the wire at the cross. This is accomplished by means of a cam, *i*, on the counter-shaft *r*, acting upon the vertical connecting-rod h^2 and lever h^1.

The twister continues to descend until arrested by the stop D^3, attached to the long arm D^2 of the twister, and even then the link D^1 will continue to descend and cause the jaws of the twister to close, so as to cut the wire and hold it firmly. At the same time the small driving-pinion on the shaft, connected with the griping-jaws e^1, will pass over a rack, *d'*, near the end of the segmental frame B, causing them to open and release the end of the wire that has been passed around the gavel. During that time, also, the projection or catch *j* on the outside of the chain H will press against the stop *k* on the inner face of the wheel E, and carry it around, and as the wheels E F and pinion G are geared together, and the latter pinion is connected to the long arm D^2 of the twister by a spline, it will give a full and firm twist to the wire. As soon as the twist on the wire is completed, the cam *i* on the shaft *r* releases the pressure on the twister, which is then drawn up from the gavel by means of the spring *i'*. In the meantime the lower arm S, under the cradle, is released by the cam *t*, that operates it, and it drops away from under the gavel, which passes to the ground or out of the cradle, the springs S' of the cradle receding to let it pass, and then returning to their first position. The upper or compression lever *u* is held down an instant, so that the pressure will help to displace the gavel, after which it is raised by spring attached and cam *u'*, ready to act on a new bundle of grain. The spring under the upper lever *u* will enable it to compress irregular size gavels. A similar spring can be placed on the lower lever S, if necessary.

On the wire being cut by the twister D and free from the gavel, a spring will draw the surplus wire back to the guide in the shifter *g*. At the same time the wire will be placed in line with the outer griping-jaws *e* on their subsequent revolution, and the second wire will be thrown out of line by the shifter *g* as it is operated by the lever g^1, guided by the groove in the periphery of the cam g^2. By crossing the wire at the center of the segment I avoid the unreeling of more wire than is required to form the band.

The speed of the driving-shaft I is four and a half turns to one turn of the segment, while the counter-shaft *r* makes five turns to one of the segment, thus allowing the segment to re-

main stationary a sufficient length of time for the twister to act on the band for the gavel to be discharged, and for the cradle to be refilled, when, by the action of the chain on the clutch mechanism, the segment is started on its subsequent circle.

By increasing the length of chain and size of chain-pulleys, and decreasing the speed of the counter-shaft *r*, any length of time required for twisting the band, discharging the gavel, and refilling the cradle, can be had while the segment is at rest.

The segment revolves between rollers *d*, supported by the frame B. By a simple change in the arrangements of the cams and the wire-carrier, the segment can be revolved in the opposite direction, and perform the same operation; or, if it should be preferred to use three wires in succession, it could be accomplished by a simple modification of the guiding-shifter.

Having thus fully described the construction and operation of the machine, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The rotating segment, having an intermittent rotary motion, substantially as shown and described.

2. A rotating segment having a projection or an attachment affixed, by which a binder is carried around the gavel, substantially as and for the purpose described.

3. The combination, with an intermittently-rotating segment, C, of the endless driving-chain H, having pins *m* and *m'*, and the clutch mechanism and the connected gearing, whereby the segment is started in its rotation.

4. The two pairs of grasping-jaws *e* and e^1, with spring *f* and cutting knife-edge, in combination with worm e^2, shaft e^3, and pinion e^4, substantially as and for the purposes described.

5. The combination of two pairs of grasping-jaws, *e* and e^1, attached to a rotating segment, and operated by means of stationary racks *d'*, arranged and located upon frame B, so that the jaws *e* and e^1 are opened and closed alternately when in proper position to grasp or release the binding-wire, substantially as and for the purpose described.

6. The oscillating wire-shifter *g*, presenting two wires to the grasping-jaws, each one alternately, substantially as shown, and for the purpose described.

7. The wire-twisting mechanism D, rotated periodically by means of gearing, in combination with the chain H, having projecting pin *j*, that rotates said twisting mechanism, substantially as and for the purpose described.

8. The combination, with an intermittently-rotating segment, C, and its open-side frame B, of a lever or series of levers, S, and a compression-arm, *u*, to hold and compress the gavel while being encircled with the binder.

9. The intermittently-revolving levers O on shaft O', in combination with geared mechanism that operates them, substantially as and for the purpose described.

10. An intermittently-rotating segment, C, having a motion round the gavel, in combination with a fixed vertical segmental frame, B, into and through the open side of which the grain is received, and over which open side the segment C travels to encircle the grain with the binder.

11. The combination, with a fixed vertical segmental frame, B, and the intermittently-rotating segment C, traveling therein, of the wire-grasping jaws *e* and e^1, which travel over the open side of the frame, and carry the binder around a gavel received into the circle from its broken side.

12. The combination, with an intermittently-rotating segment, C, and a fixed segmental frame, within which it travels, of an endless driving-chain, H, for said segment C, having a length greater than the circle traveled by the segment, whereby time is given to twist the wire, discharge the gavel, and receive the fresh bundle.

13. The combination, with an intermittently-rotating segment, C, having cogs on its periphery, of the pinions *a* and *b*, within the fixed segmental frame B, and with which the cogged segment C meshes and leaves alternately, and so stops the rotation of the segment at the point of making the twist.

14. In a grain-binder in which the wire is carried by a segment, C, having two grasping-jaws, *e* and e^1, as described, the combination therewith of mechanism for alternately presenting separate and distinct wires, so that while one wire is being carried around the gavel another is in position to be seized as the segment next passes in its orbit.

CHARLES A. POSTLEY.

Witnesses:
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CHARS. E. POSTLEY.