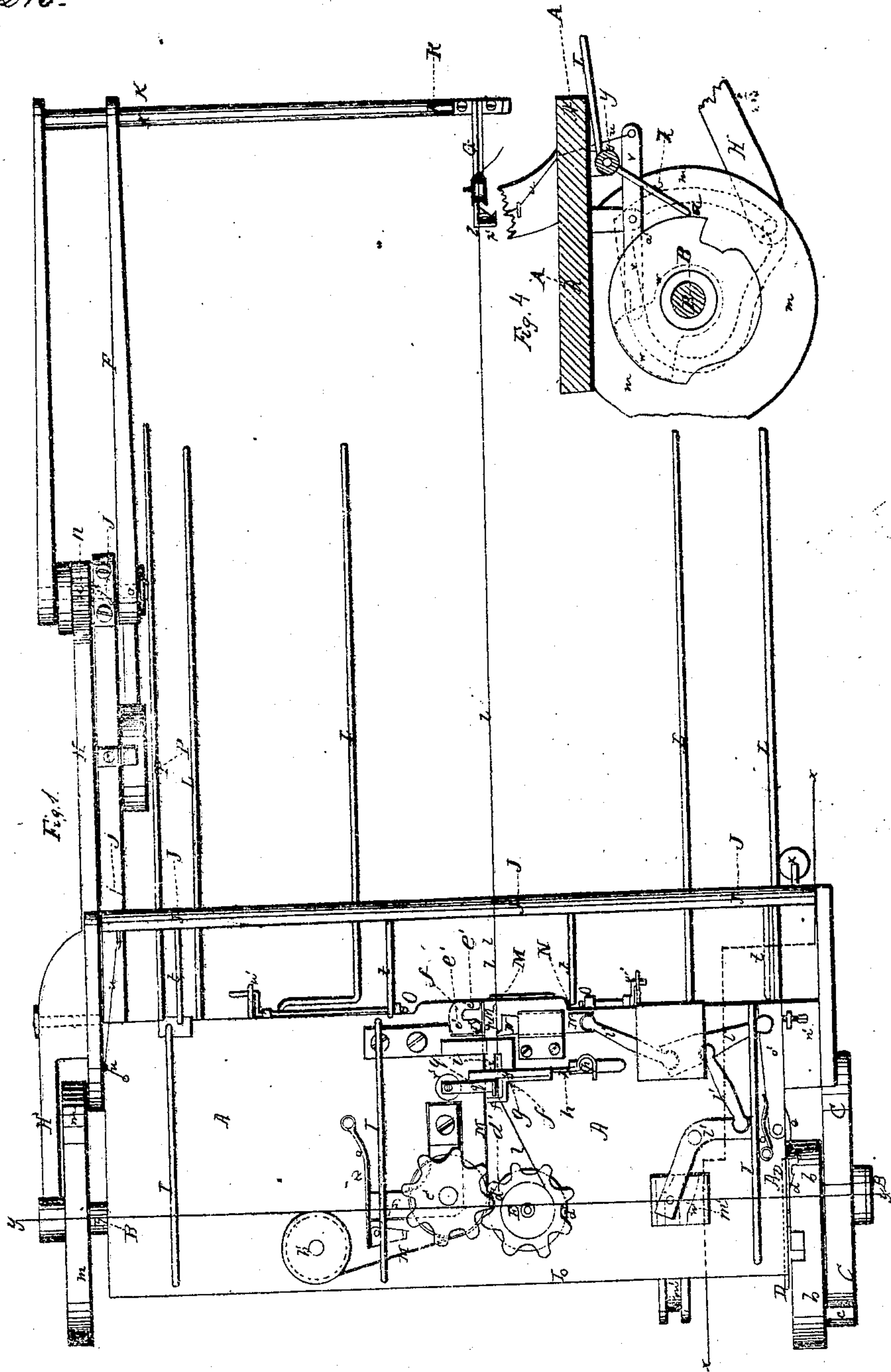


W. W. Snell.

Binding Attachment to Harvesters.

Patented Feb 23. 1869.

No 87215.



WITNESSES

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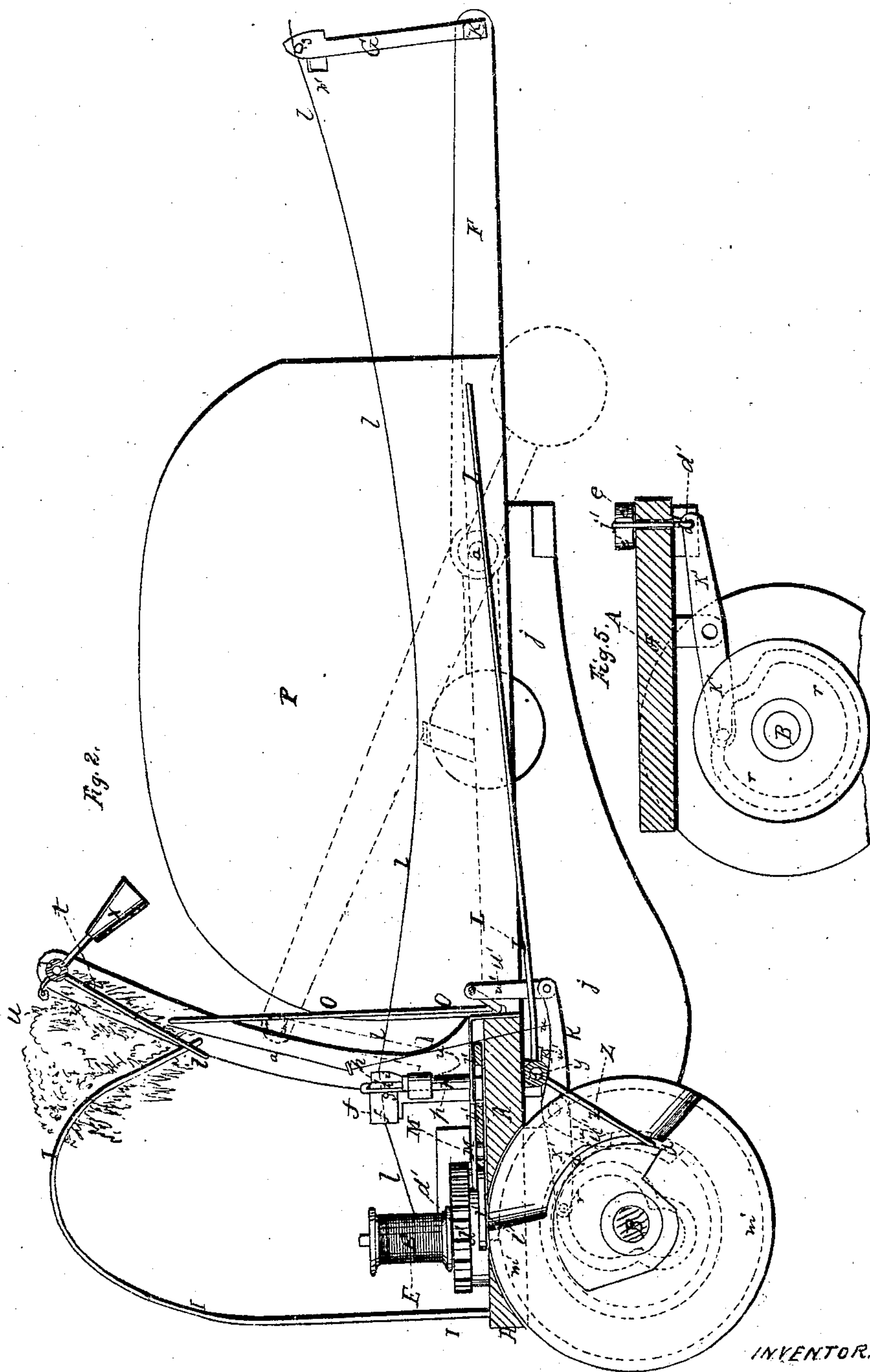
W. W. Snell.

3. Sheets.
Sheet. 2.

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No 87,215.

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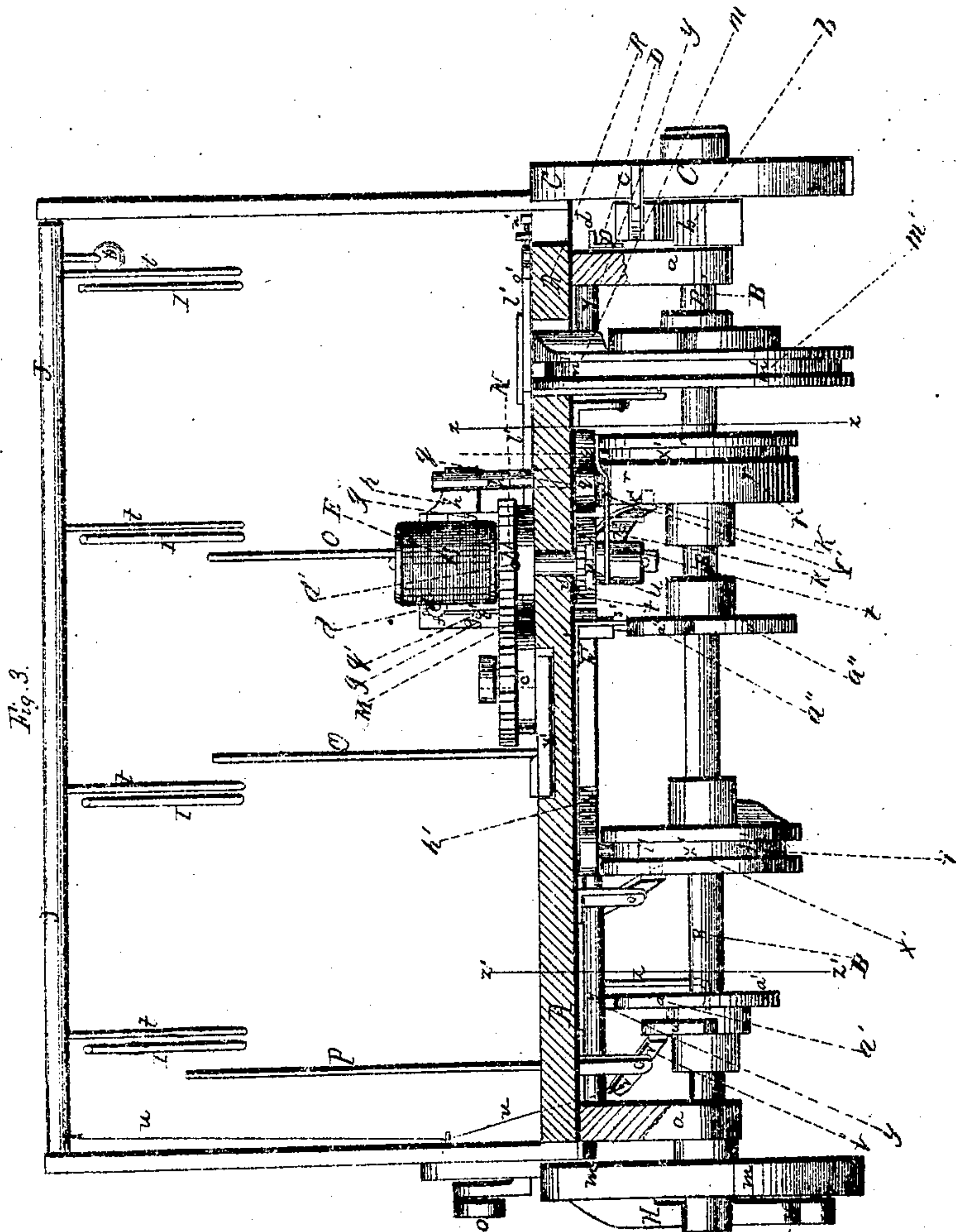
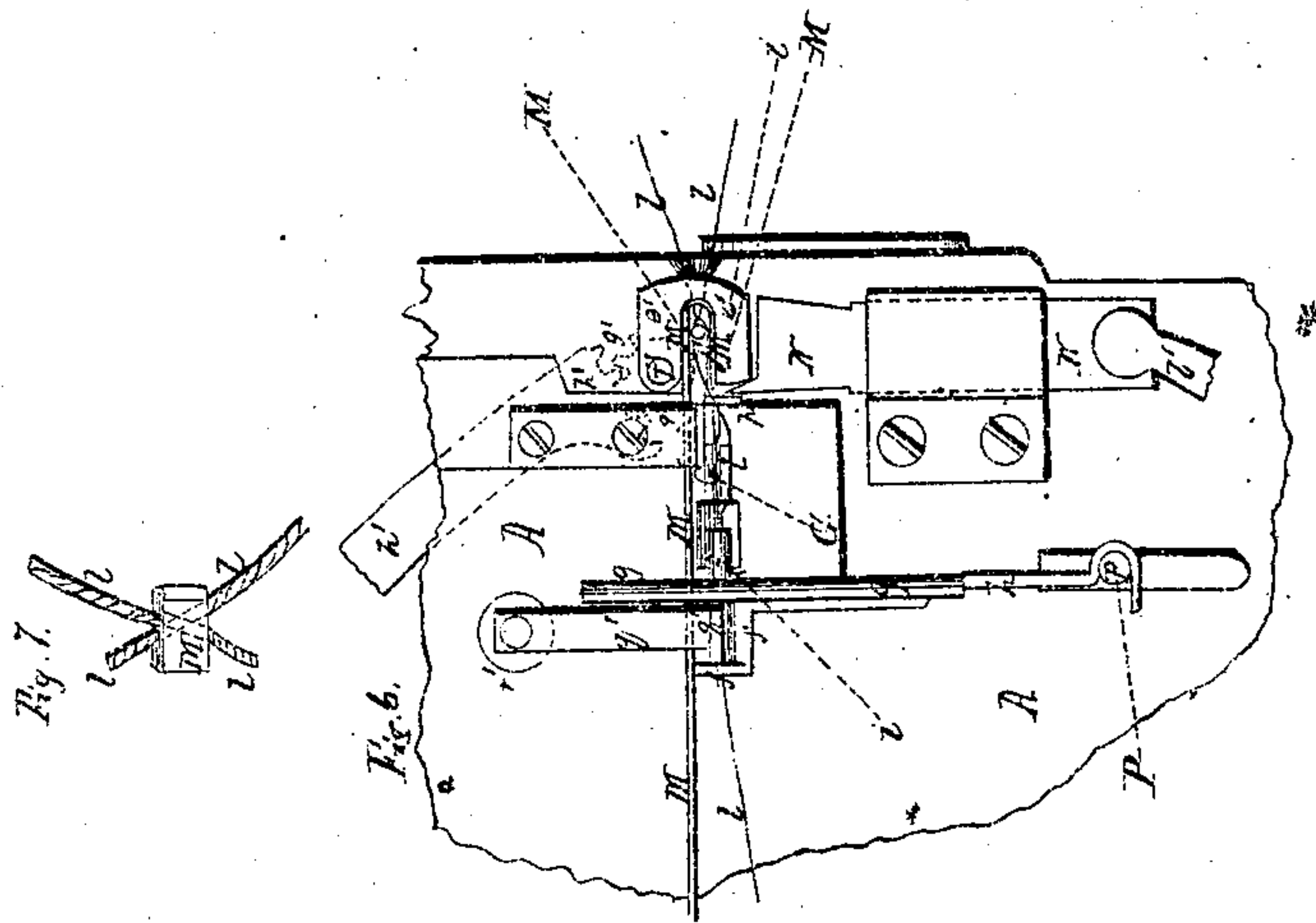
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UNITED STATES PATENT OFFICE.

WILLIAM W. SNELL, OF BRUSHFORD, MINNESOTA.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No 87,215, dated February 23, 1869.

To all whom it may concern:

Be it known that I, WILLIAM W. SNELL, of Brushford, in the county of Fillmore and State of Minnesota, have invented a new and improved Binding Attachment to Harvesters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, represents a plan or top view of my improved binding attachment to harvesters. Fig. 2, Sheet 2, is a vertical transverse section of the same taken on the plane of the line *x x*, Fig. 1. Fig. 3, Sheet 3, is a vertical longitudinal section of the same taken on the plane of the line *y y*, Fig. 1. Fig. 4, Sheet 1, is a detail vertical transverse section of the same taken on the plane of the line *z' z'*, Fig. 3. Fig. 5, Sheet 2, is a detail vertical transverse section of the same taken on the plane of the line *z z*, Fig. 3. Fig. 6, Sheet 3, is a detail plan view on an enlarged scale of the tying apparatus. Fig. 7, Sheet 3, is a detail plan view of the tie made by my improved machine.

Similar letters of reference indicate corresponding parts.

This invention relates to a new binding attachment, which is more particularly intended to be applied to the "Marsh" harvester, but which may as well be used on any of the other harvesters now in use.

It is arranged to operate entirely automatically, and will adjust itself to suitable size of bundles, as they may be desired.

The grain, carried by an endless apron, falls upon arms, arranged to catch the same, the string for binding lying between the arms.

When the driver sees that a sufficient quantity of grain for a bundle is gathered on the aforesaid arms, he throws the instrument into gear. Thereby an arm holding one end of the string is caused to swing so as to carry the string around the bundle, crossing the ends at a given point.

A flat sheet-metal band or flattened wire is then automatically bent around the crossed ends of the string and is compressed and separated from the coil whence it comes, leaving the string firmly clasped.

The arm which held one end of the string, on returning to its original extended position, cuts the string so as to separate that portion which is tied around the bundle, and takes the end of the remaining string to place it ready for the reception of a second bundle.

While the binding process is going on the grain brought forward on the apron is intercepted by a series of swinging wires to prevent it from coming in the way of the newly-formed bundle.

As soon as the string has been cut the bundle is dropped, and the grain accumulated in the mean time upon the aforesaid swinging wires is dropped upon the newly-laid string, to be formed into a new bundle.

The string is allowed to give or yield to the grain on it until when the swinging arm is within a few inches of its destination, when it is firmly clamped so as to be drawn tight around the bundle.

My invention consists in the construction of the whole apparatus and of the various parts composing it, and also in the form of tie which is produced by the application of the aforesaid metallic clamp.

A, in the drawing, represents the platform of my binding attachment.

The same is arranged in any suitable manner on the frame of the "Marsh" or any other suitable harvester, and carries, in downward-projecting ears *a a*, a horizontal longitudinal shaft, B, by which all the machinery pertaining to the apparatus is driven.

On one end of the shaft B is hung a loose wheel, C, which has a notched or toothed edge, and which is, by means of a belt or suitable gearing, connected with the driving mechanism of the harvester.

From the shaft B projects a crank, *b*, to the end of which an L-shaped bar, *c*, is pivoted. One arm of said bar *c* is resting on the edge of the wheel C, and is pressed upon the same by a spring concealed under its other arm.

The wheel is thus connected with the crank *b*, and will, when turned, revolve the shaft.

To one of the ears *a*, however, is pivoted a lever, D, with a wedge-shaped notched flange, *d*, as indicated in Fig. 1.

When the vertical arm of *c* comes in contact with this wedge it is thrown against the crank, so that the other arm is lifted off the

wheel to let the same revolve without affecting the shaft B.

The lever D is, by a spring, *e*, always held in such a position as to throw and retain the wheel out of gear.

When the driver wants the wheel to be in gear, he has to depress the projecting end of the lever D, carrying thereby its flange *d* away from the lever *c* and allowing the spring arranged near the latter to throw the horizontal arm upon the wheel.

The wheel C will then be in gear with the shaft B during one revolution, after which the wedge *d* will again throw it out of gear; and the binding apparatus can therefore never be in operation without the will of the driver.

During one revolution of the shaft B the whole binding process for one bundle will be completed and the preparations for the next bundle made.

The string for binding the bundle is on a spool, E, which is fitted loosely upon any suitable pin that may project from the bed-plate A.

It is drawn through a hole in a plate, *f*, that projects from a stationary plate, *g*, which rises from the bed A, as shown in Figs. 1 and 2.

h is a plate dovetailed into or arranged sliding on the plate *g* on the outer face of the same.

From its face projects a vertical plate, *i*, which is wedge shaped, being pointed at its lower end.

The string is from the plate *f* drawn through a slot in *g*, and then through an aperture formed through the wedge *i*.

F is a lever pivoted to an arm, *j*, that projects forward from the frame A.

The lever F carries at its outer end a cross-bar, *k*, from the end of which an arm, G, projects toward the plate A.

The arm G is in line with the direction of the string as the same passes through the plates *f g i*, as shown in Fig. 1, in which the string is represented by a red line, *l*.

H is a lever pivoted to the frame A and having a pin that fits into an eccentric groove on a cam, *m*, that is mounted on the shaft B, the groove and pin being indicated by blue dotted lines in Fig. 4.

The other end of the lever H is provided with a toothed segment that meshes into a pinion, *n*, mounted on the pivot *o* of the lever F.

When the shaft B is revolved, the lever H is oscillated, and imparts its motion to the lever F, which receives thereby almost a half-revolution.

The arm G of the lever F is formed of two spring-plates, which have their rounded outer edges beveled, as shown in Fig. 1.

When the apparatus is not in gear the lever F is stretched away from the plate A, as shown by black lines in Fig. 2, but by the aforesaid action of the lever H it is, when the shaft is in gear with the driving-wheel C,

swung toward A, as indicated by red lines in Fig. 2.

As above specified, the arm G is in line with the wedge *i*, and it would, while the lever F is thus swung downward, strike *i* if the latter was not drawn out of the way.

But the plate *h* to which it (*i*) is attached, is fastened to a pin, *p*, that projects from a lever, *q*, which is pivoted to the under side of the plate A, and which is operated by means of another projecting pin connected with a cam-groove or track formed in or on the edge of a cam, *r*, mounted on the shaft B.

By the motion of this lever *q* the plate *h* is drawn to one side as soon as the arm G approaches it, so as to bring the plate *i* out of the way.

While the end of G is then under the wedge *i*, the plate *h* is again moved back so that *i* will be over the end of G.

When the lever F is swung back to its original extended position, the ends of the spring-plates G are, as they come in contact with the wedge *i*, spread apart to pass on opposite sides of the wedge.

A pin, *s*, projecting from the inner face of one of the said spring-plates, passes close to the edge of the wedge *i* and takes up the end of the string *l* that projects from said wedge.

After having passed the wedge, the plates G close and clamp the end of the string between them and pull it along, while the lever F returns to its original position.

The string is thereby pulled out and held in readiness to receive a bundle, as shown by black lines in Fig. 2 and also in Fig. 1.

The grain is, on an apron or otherwise, carried from the harvester to the binder, and is from the former thrown upon curved wires I I that project from the platform A.

By means of other wires, *t t*, that project from a rock-shaft, J, which has its bearings in arms projecting from A, the grain is prevented from falling off the wires I, and it is kept as in a trough, as indicated in Fig. 2.

The rock-shaft J has a crank which is, by means of a string, *u*, connected with a swinging lever, *v*, that is operated by a cam, *w*, on B, as indicated in Fig. 3.

When the shaft B is thrown into gear the lever *v* is moved so as to pull the string *u* to swing the shaft J, and thereby keep the wires *t* against the wires I, but when the cam *w* does not act on *v*, a weight, *x*, will swing the shaft J so as to draw the wires *t* up, and thereby release the grain and let it drop down.

The grain-trough will only be formed while the bundle is being tied; otherwise the grain is always free to slip off the rounded wires I.

When the machine is not in gear, the grain will fall upon horizontal wires L L that project in front of the plate A from rock-shafts *y*, that have their bearings in the under side of the plate A.

From each rock-shaft *y* projects an arm, Z, that plays in the eccentric groove of a cam, *a*¹,

mounted on the shaft B, as is clearly shown in Fig. 2.

When the grain is thus deposited upon the wires L and upon the string *l*, the lever F is swung up and carries the string *l* around the grain, bringing the end of the string across the other part of it, as in Fig. 6.

While the string is thus crossed, that is, while the bundle is being formed, the trough *t* I is formed to prevent further grain from falling upon the wires L.

M is a narrow sheet-metal band wound upon a roller, *b'*, and fitted between two feed-rollers, *c'* *d'*, and brought then to the front edge of the plate A, with its end close to the crossing of the string *l*.

e' is a hook resting on the plate A, near to the front end of the band M, and pivoted to said plate by means of a pin, *f'*.

On the under side of A is, on the pin *f'*, mounted a toothed segment, *g'*, that gears into a lever, *h'*, pivoted to the under side of A and playing in the groove formed in the edge of a cam, *i'*.

When the ends of the string are crossed, the hook *e'* is by its connection with the shaft B swung around, so as to bend the end of the band M around the crossed part of the string *l*.

To give a support to this motion and to obtain the requisite pressure, a pin, *j'*, which projects from a lever, *k'*, that works in an eccentric groove formed in the face of the cam *r*, as indicated in Fig. 3, is caused to project above A as soon as the string-ends *l* are crossed.

Around this pin and around the crossed ends of *l* is bent the end of the band M, in the manner shown in Fig. 6.

When the tie has thus been made, a cutter, N, which is by means of toggle-levers *l' l'* connected with a cam-groove in the edge of a cam, *m'*, on B, is moved forward to cut off the end of the band M.

The motion of the knife N can be regulated by means of a set-screw, *n'*, which is arranged with its end against the swinging support *o'* of the toggles.

The tie is thus finished and the lever F is again swung up.

During this motion a knife, *p'*, projecting from the arm G, cuts the string of the new bundle off the main part of the string *l*, and separates thus the bundle to allow it to drop.

At the same time the arm G grasps anew the ends of the string *l* to stretch it for another bundle.

The wires L, which were in a horizontal, or nearly such, position when the grain fell upon them, are inclined downward by the action of the cams *a*¹ as soon as the string has been cut to discharge the finished bundle.

The string *l* is left slack, to allow it to be adjusted to the size of the bundle, until the end of the arm G is nearly opposite the wedge *i*, but then the string is clamped against the plate *f* by means of an elbow-lever, *q'*, which is, by means of a rod, *r'*, and lever *s'*, connected with a cam, *a*², on the shaft B.

The string remains thus stretched while the tie is being made.

The band M is, as aforesaid, passed between the feed-rollers *c'* and *d'*, of which one is provided with a ratchet-wheel, *t'*, which does, by means of a pawl, *w'*, fitted on a rod or arm, *v*, that is connected with the lever *q*, receive intermittent rotary motion so quick that it will give the necessary feed to the band.

O O are wire rods pivoted to the front of the plate A, and standing during almost the whole operation in an upright position.

They are by means of levers *w'*, which work in eccentric grooves *x'* of cams on the shaft B, so fastened that they may, while the string is being laid around the grain, be brought down to compress the bundle so that it will occupy the smallest possible space.

All the manipulations of hand-binding are thus produced in this machine, and the bundle and tie are made entirely perfect and satisfactory.

The form of tie is well illustrated in Fig. 7, and is certainly very simple and strong.

One of the rollers *c'* *d'* is fixed upon sliding bearings *y'*, and is by a spring, *z'*, pressed against the other roller, as shown, so that the band M is well held between them.

When a new band is to be put in, the sliding roller can easily be moved back to facilitate the process.

P is a guard-plate arranged on the framework to keep the grain away from the lever F.

I claim as new, and desire to secure by Letters Patent—

1. The grain-tie herein set forth, consisting of the metal band M, which is laid around the crossed ends of the string *l*, substantially as herein shown and described.

2. A grain-binder in which the end of the string to be used for binding is automatically grasped by a swinging arm, substantially as set forth.

3. The trough formed by the curved wires I and the swinging wires *t*, which prevents the grain accumulating on the machine during the binding process from interfering with the said process, as set forth.

4. The spring-jaws G G, having the pin *s*, in combination with the perforated wedge *i*, through which the thread *l* is drawn, substantially as herein shown and described, for the purpose of letting the jaws take hold of the string, as specified.

5. The perforated wedge *i*, when attached to a sliding plate, *h*, so that it can be automatically withdrawn when the spring-jaws G move downward, as set forth.

6. The thread-clamp *q'*, or its equivalent, when arranged in combination with a grain-binder to tighten the string while the same is being put around the grain, as set forth.

7. The swinging hook *e'*, applied to bend the end of the band M around the crossed portion of the string *l*, substantially as herein shown and described.

8. The pin *j'*, in combination with the swing-

ing hook *e'*, substantially as herein shown and described, the said pin being up and down adjustable, as set forth.

9. The cutter *N*, when operating substantially as described, in combination with the swinging hook *e'* and pin *f'*, substantially as herein shown and described.

10. The application of the screw *n'* for adjusting the stroke of the knife *N*, as specified.

11. The swinging lever *H*, having the segment for operating the lever *F*, which carries

the pinion *n*, substantially as herein shown and described..

12. Attaching the cutter *p'* to the arm *G* or the swinging lever *F*, for the purpose of automatically cutting the string, as set forth.

The above specification of my invention signed by me this 5th day of October, 1868.

WM. W. SNELL.

Witnesses:

FRANK BLOCKLEY,
ALEX. F. ROBERTS.