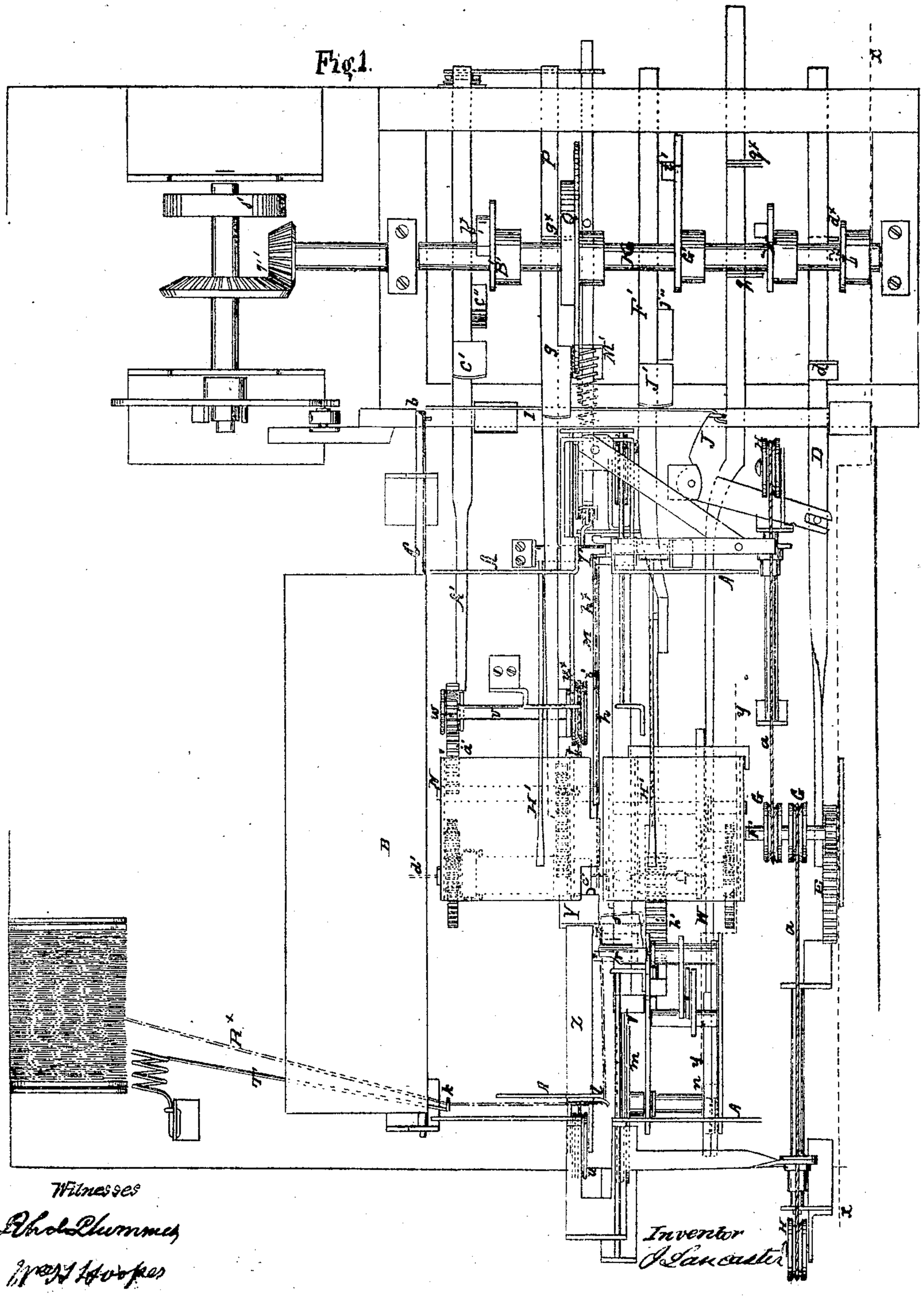
Sheet 1-4 Sheets

I. Lancaster.

Grain Binder.

No 52175 Patented Jan. 23, 1866.

Fig. 1.



Witnesses

Rhod Plummer

Wm H Hoopes

Inventor

I Lancaster

Sheet 2 4 Sheets

I. Lancaster.

Grain Binder.

No. 52175 Patented Jan. 23, 1866.

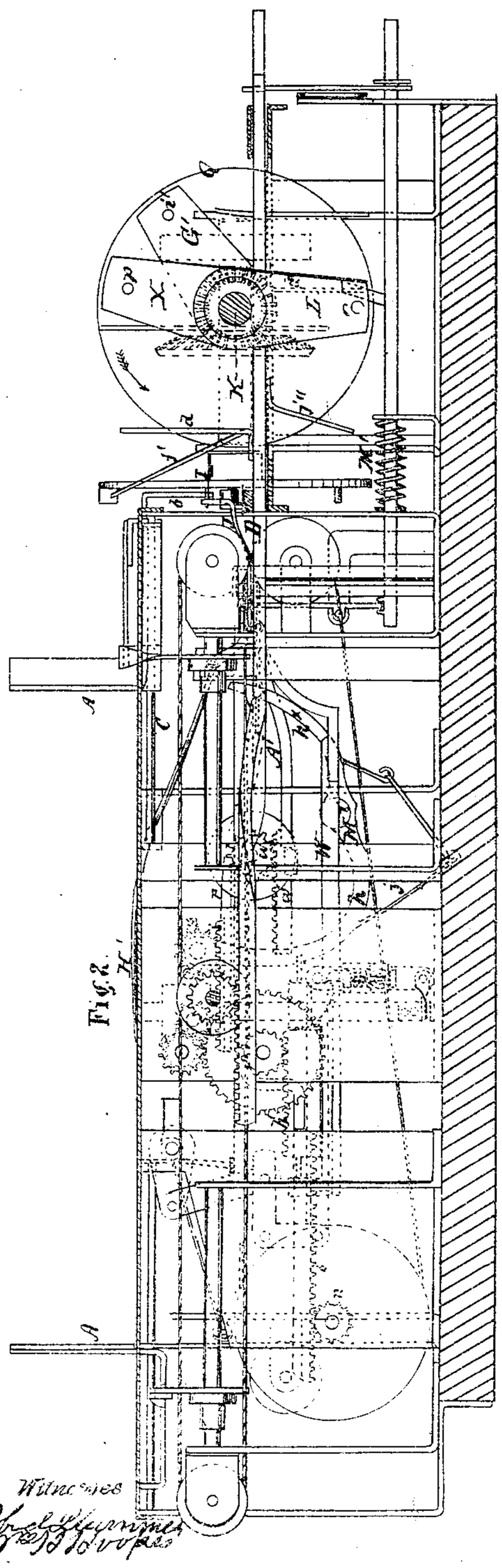


Fig. 2.

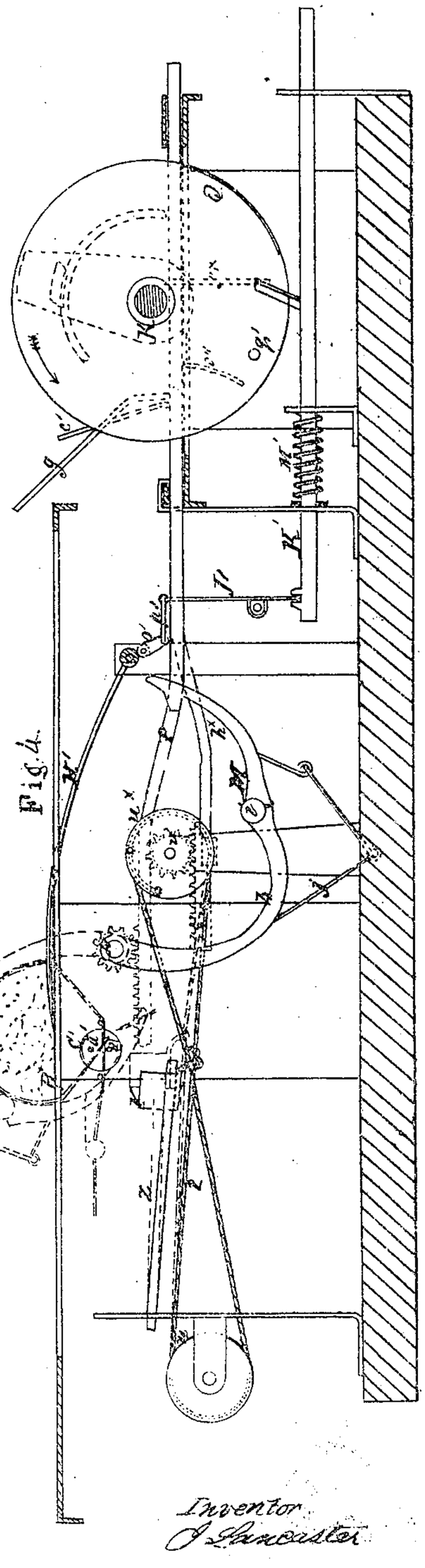


Fig. 4.

Witnesses
[illegible]

Inventor
I. Lancaster

Sheet 3 - 4 Sheets.

I. Lancaster.

Grain Binder.

No. 52175 Patented Jan. 23, 1866.

Fig. 3.

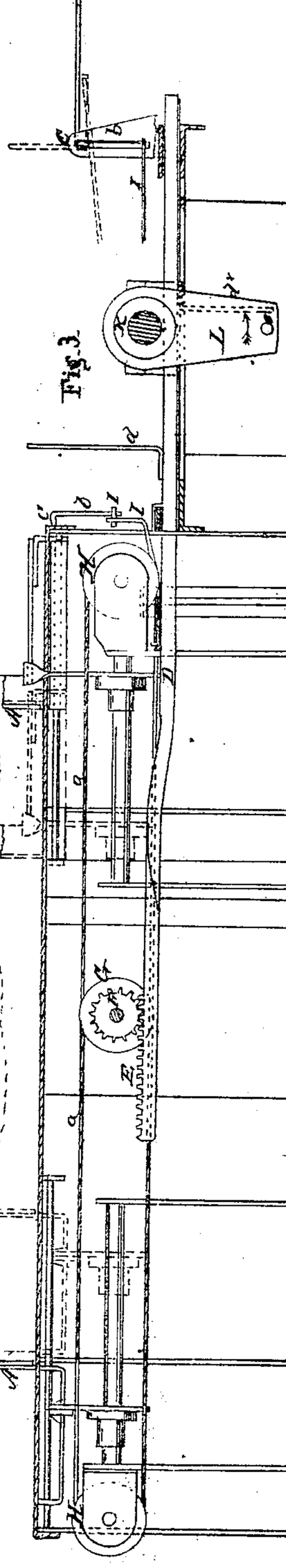


Fig. 5.

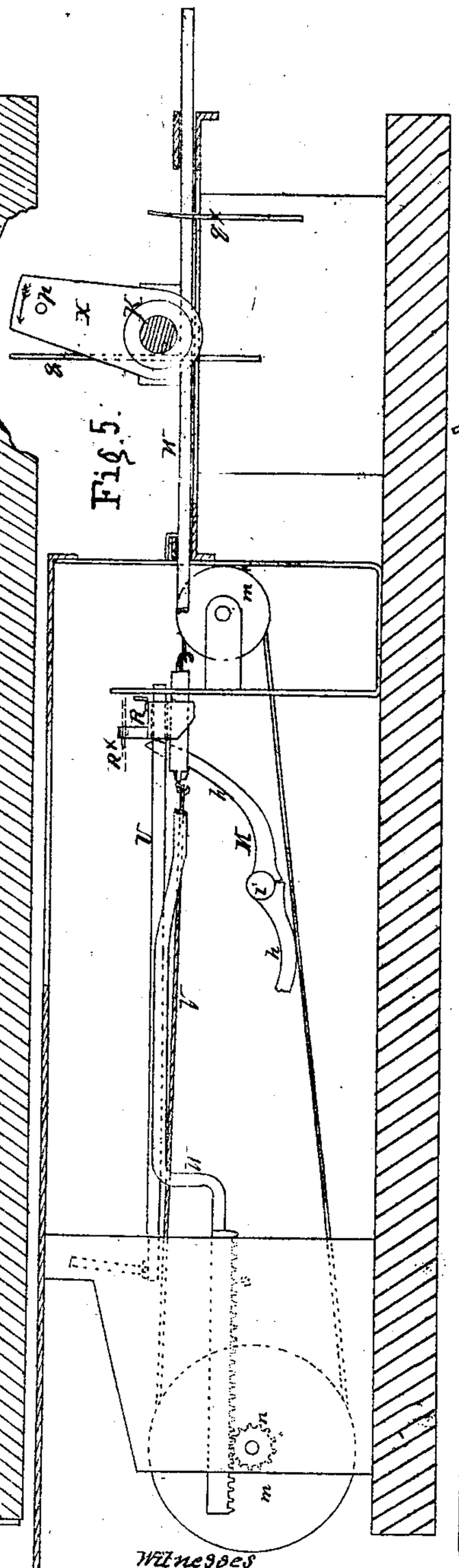
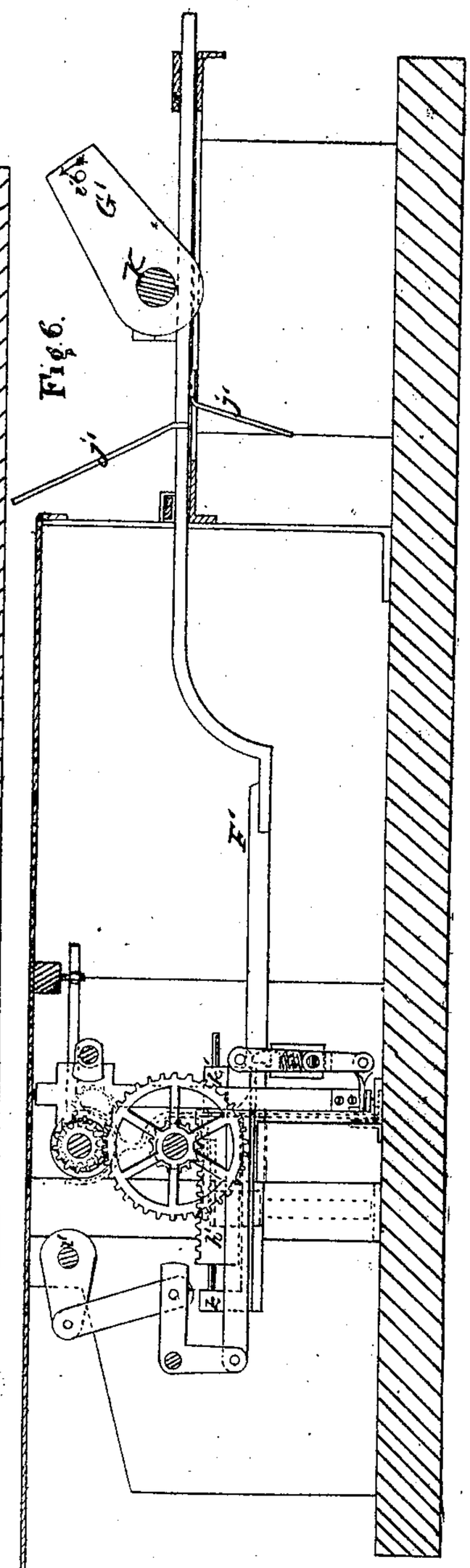


Fig. 6.



Witnesses

R. Ford Plummer

Wm. H. Hoopes

Inventor.

I. Lancaster.

Sheet 4 -4 Sheets

I. Lancaster.

Grain Binder.

No 52175 Patented Jan. 23, 1866.

Fig. 10

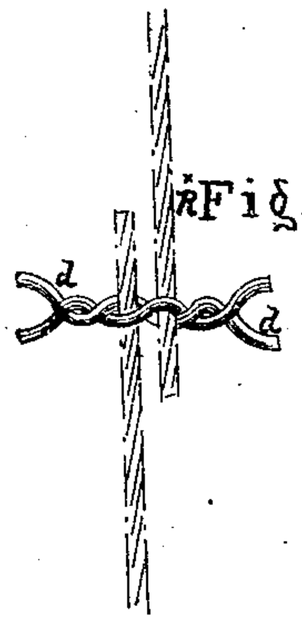


Fig. 7.

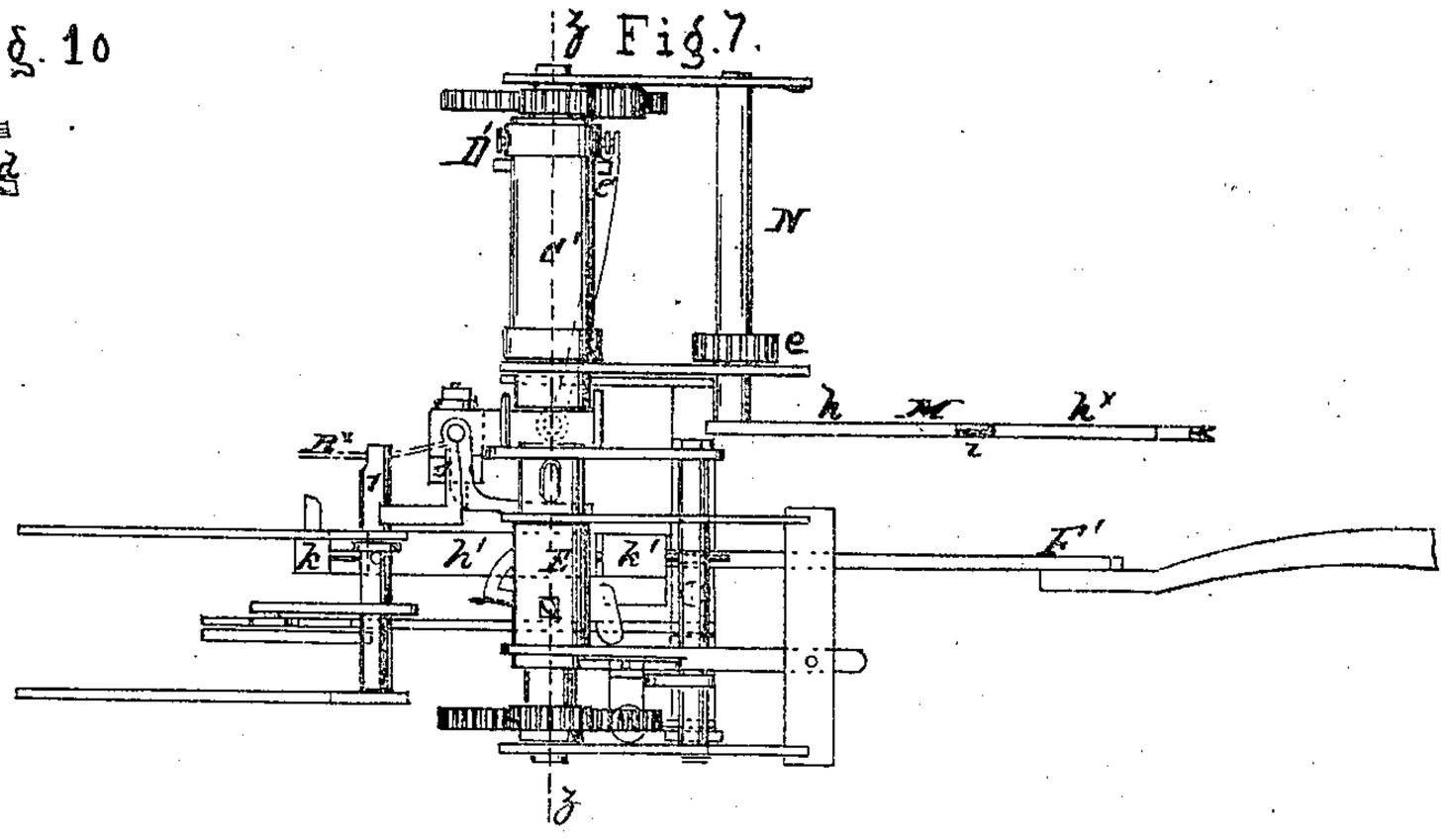


Fig. 8.

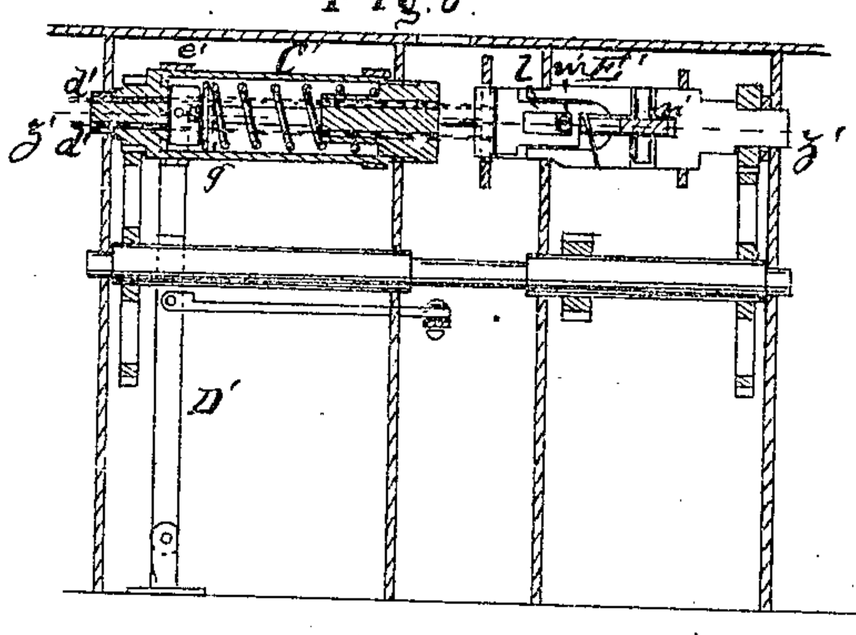
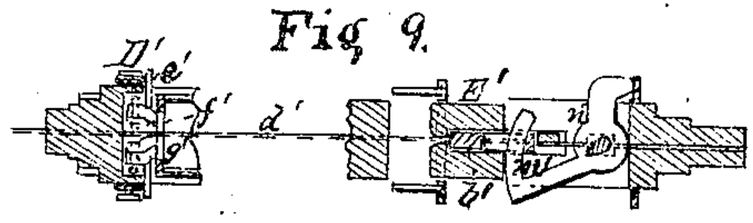


Fig. 9.



Witnesses.
Robt Plummer
Wm H. Hopes

Inventor
I. Lancaster

UNITED STATES PATENT OFFICE.

I. LANCASTER, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **52,175**, dated January 23, 1866.

To all whom it may concern:

Be it known that I, I. LANCASTER, of Baltimore, Baltimore county, and State of Maryland, have invented a new and Improved Device for Binding Grain; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1, Sheet No. 1, is a plan or top view of my invention; Fig. 2, Sheet No. 2, a side sectional view of the same, taken in the line *x x*, Fig. 1; Fig. 3, a detached side view of certain working parts pertaining to the same, and which operate what I term the "gatherers;" Fig. 4, Sheet No. 3, a detached side view of certain working parts which operate the band-carrier and adjust the band around the sheaf; Fig. 5, a detached side view of certain working parts which operate the cord-carrier; Fig. 6, Sheet No. 4, a detached side view of certain working parts which operate the wire-twisters. This view may be considered as a section taken in the line *y y*, Fig. 1. Fig. 7, a plan or top view of the principal parts shown in Fig. 6; Fig. 8, a vertical section of Figs. 6 and 7, taken in the line *z z*, Fig. 7; Fig. 9, a horizontal section of Figs. 6, 7, and 8, taken in the line *z' z'*, Fig. 8; Fig. 10, an enlarged view of the knot or means for securing the band or cord on the sheaf.

Similar letters of reference indicate corresponding parts.

This invention relates to a new and improved device for binding grain, and is designed for an automatic attachment for reapers, to operate in conjunction therewith, and gather up the cut grain as it is presented to the device and bind it into sheaves, which are cast from the reaper as they are bound.

The characteristic feature of the invention consists in devices for applying and securing the bands on the sheaves. These bands are composed of a cord constructed of any suitable fibrous material, and of sufficient strength to sustain a weight or a tensional strain or pull, say, of fifteen (15) pounds. These cords or bands are placed around the sheaves, the ends of the former lapped and secured firmly together by twisted wires; hence the bands, when secured or bound on the sheaves, are composed in the whole of cord and wire.

The first operation consists in gathering the grain after the rake has deposited the gavel on the platform, at the rear of the sickle. These gatherers consist of upright sliding plates A, arranged in pairs, so as to move simultaneously toward and from each other, and besides these plates a wing, B, arranged so as to work on journals, or it may be attached to a shaft, C. (See Fig. 1.) These gatherers—to wit, the sliding plates A and wing B—are operated simultaneously, the two pairs of wings A approaching each other and the wing B at the same time, so as to compact the gavel, the plates A operating on the sides of the gavel, and the wing B on the end or butts of the grain.

These gatherers are operated by the following means: D is a sliding bar, provided with a rack, E, which gears into a pinion on a shaft, F, the latter having two pulleys, G G, upon it, around which and pulleys H H, on uprights in the framing of the device, cords or belts *a a* pass, to which cords or belts the slides A are attached.

The wing B is operated by having its shaft C bent at one end to form a crank, *b*, and this crank is connected by a rod, I, with a lever, J, which is connected with the bar D. (See Figs. 1, 2, and 3.) This bar D has a reciprocating motion given it from a shaft, K, from which motion is communicated to all the operating parts. The shaft K has an arm, L, upon it, from which a pin, *c*, projects horizontally, and, as the shaft K rotates, acts alternately against arms *d* $d^{\times}$, one of which, *d*, is attached vertically to the upper side of D, and the other, $d^{\times}$, depending from its under side. (See Figs. 2 and 3.)

These gatherers compact the gavel of grain in such a manner that it will be in a proper condition to receive the band and form a well-proportioned sheaf.

I would remark that I design to have the wing B corrugated or grooved on its face side—the side which is brought in contact with and acts upon the grain—in order that it may catch against the butts of the grain, so that the latter may be brought all even with each other as the two pairs of plates A approach each, and compact with it.

The second operation consists in placing the band or cord around the sheaf. This is effected by means of a curved arm, which I term a "band-carrier." The band-carrier is attached to a shaft, N, having a pinion, *e*, upon it, into which a rack, *f*, on a reciprocating bar, P, gears. This bar P is operated from the shaft K by means of a cam, Q, which acts against two projections, *g* $g^{\times}$, on the shaft. (See Fig. 4.)

The band-carrier is of curved form, and is composed of two parts, *h* $h^{\times}$, connected by joint *i*, said parts being kept distended by means of a spring, *j*, as shown in Fig. 4. The bands are formed from a cord, $R^{\times}$, of any suitable fibrous substance, and the cord is wound upon a spool, S, which is placed on a horizontal shaft, and arranged in any proper manner, so that it cannot turn casually, but only as fast as the cord requires to be unwound for actual use.

The cord $R^{\times}$ passes through an eye, *k*, at the end of a tension-spring, T, and thence through a guide, *l*, to the cord-carrier R, which works on a horizontal bar or guide, V, and is operated by means of an endless band, Y, which passes around pulleys *m* *m'*, the shaft of one of which, *m*, has a pinion, *n*, upon it, which gears with a rack, *o*, on a reciprocating bar, W, motion to which is given from the shaft K by means of an arm, X, provided with a pin, *p*, which acts against projections *g* $g^{\times}$ on said bar. (See Fig. 5.)

The cord $R^{\times}$ also passes through an eye in a shaft, P, which is provided with an arm, *s*, for adjusting the cord in the band-carrier each time the latter reaches a position at one end of its movement. The cord-carrier therefore, each time it moves backward or toward the shaft K, carries the cord with it, so that the end of the arm or band-carrier M will catch it as it rises, and carry the cord over the sheaf, as shown in Fig. 4.

When the band-carrier is thus thrown over the sheaf it is acted upon by what I term a "sheaf-presser," Y. This sheaf-presser works upon a guide-bar, Z, and it is operated by a cord, *t*, which passes over pulleys *u* $u^{\times}$, one of which, *u*, is on a shaft, *v*, having a pinion, *w*, upon it, into which a rack, *a'*, on a reciprocating bar, A', gears, said bar being operated from the shaft K by means of an arm, B, thereon, provided with a lateral projection, *b'*, which acts against projections *c'* *c''*.

The sheaf-presser Y performs an important function, to wit: it presses against the outer part $h^{\times}$ of the band-carrier M, and forces the cord between wires *d'* *d'*, as shown in Fig. 4. These wires *d'* *d'* pass through a horizontal cylinder, C', which has a transverse position relatively with the band-carrier, and the wire I design to have wound upon proper reels.

The wires *d'* *d'* are thrown across the band by means of a lever, D', the upper end of which is connected to a collar, *e'*, on the cylinder C', said collar *e'* being connected to a pair of jaws, *f'*, which grasp the wires as they are thrown forward in consequence of passing into a collar, *g'*. (See Fig. 9.)

This movement of the wires *d'* *d'* causes them to be thrown into a slot in a horizontal cylinder, E', which is in line with the cylinder C'. These two cylinders C' E' are rotated in reverse directions by means of suitable gearing, operated by a rack, *h'*, on a reciprocating bar, F', which is moved from the shaft K by means of an arm, G', provided with a pin, *i'*, which acts against projections *j'* $j'^{\times}$ on said bar. (See Fig. 6.)

The rack *h'* is not rigidly attached to bar F, the latter being allowed to strike freely in it a certain distance, in order to admit of two hubs, K' $K^{\times}$, on the bar actuating one, K', the shaft *r*, on which the arm *s* is secured for adjusting the cord in the carrier, said arm cutting off the cord as it does so. The other hub, $K^{\times}$, actuates a series of levers which move the lever D'.

The rotating of the two cylinders C' E' twists the wires *d'* *d'* around the lapped ends of the band, as will be fully understood by referring to Fig. 10, and secures the band firmly around the sheaf.

The slot in the end of the horizontal cylinder E' is opened in this instance by means of a slide, *l'*, actuated by a curved arm, *m'*, on a lever, *n'*, motion to which is given from the bar F' through the medium of any suitable means.

The bound sheaf is cast from the platform by means of two arms, H' H', which are attached to a shaft, I'. This shaft has an arm, *o'*, extending down from it, and said arm is connected by a link, *p'*, with a lever, J', the lower end of which is connected with a reciprocating bar, K', which is operated in one direction, so that the arms H will suddenly rise to throw the sheaf off from the platform by means of a pin, *g'*, on the cam Q on shaft K, the arms H' H' being thrown down on the platform by means of a spring, M'. (See Fig. 4.)

I would remark that I do not confine myself to the precise arrangement of the detail parts of the invention herein described. The slot in the end of cylinder E', for instance, for holding the ends of the wires, may be opened and closed by different means. In fact, most of the parts, so far as the detail of construction is concerned, may be modified in various ways, which would suggest themselves to a mechanic.

The shaft K may be driven, by means of bevel-gears *r'* and spur-gears *s'*, from the axle of the machine, and the several reciprocating bars, which are operated from the shaft K, may all be disconnected therefrom, or thrown out of the reach of the cams and arms thereon, and connected therewith by means of a sliding bar, N', which may be adjusted automatically.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The band-carrier M, constructed of two parts, connected by a joint, in connection with the cord-carrier R, arranged to operate in the manner substantially as and for the purpose set forth.

2. The sheaf-presser Y, in connection with the band-carrier M and the wire-twisting apparatus, consisting of the rotating cylinders C′ E′, all arranged to operate in the manner substantially as and for the purpose specified.

3. The sliding plates A and wing B, comprising the gatherers, arranged to operate substantially as described, and for the purpose set forth.

4. The sheaf-dischargers H′ H′, arranged to operate in the manner substantially as described.

5. The reciprocating bars D P W A′ F′, arranged as herein described, to communicate motion to the various operating parts from a single driving-shaft, K.

Witnesses: I. LANCASTER.

RHD. PLUMMER,

WM. H. HOOPES.