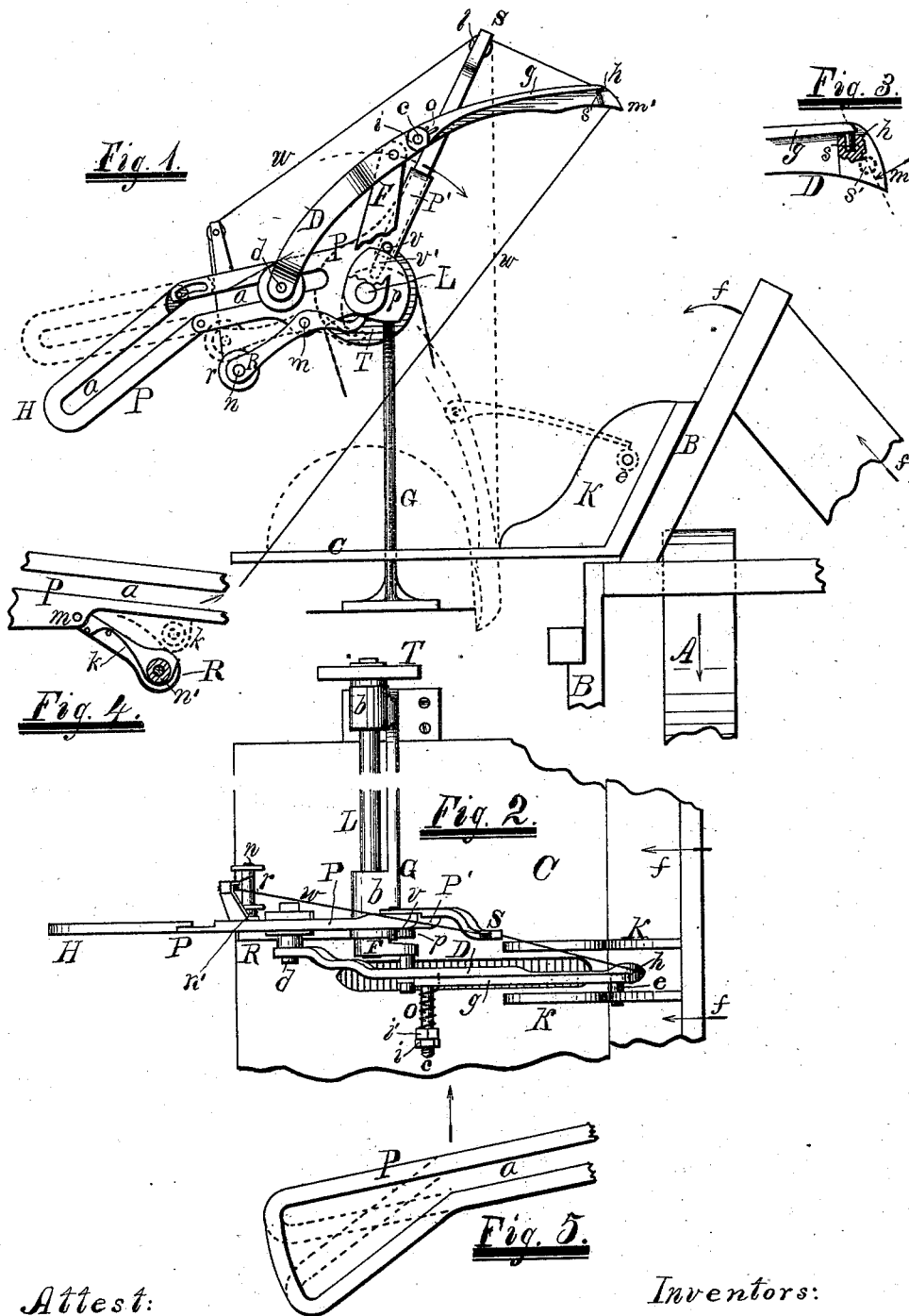


A. ROSS & S. J. PARKER.  
Grain-Binder.

No. 216,532.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **216,532**, dated June 17, 1879; application filed September 28, 1877.

*To all whom it may concern:*

Be it known that we, ALEXANDER ROSS and SAMUEL J. PARKER, both of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Grain-Binders, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 shows a front elevation of a portion of a reaper to which our improved binding device is attached. Fig. 2 shows a plan of the same; Fig. 3, an enlarged view of the nose of the binding-arm; Fig. 4, a reverse view of a portion of the spool-lever, and Fig. 5 a modification of the guide-arm.

Our invention relates partially to automatic grain-binding attachments to harvesters in general, and partially to that particular class in which a guide-arm is employed to assist in controlling the movement of the binding-arm; and it consists mainly, first, in jointing the guide-arm of the binding-arm; second, in attaching a straw-separating finger or bar to the binding-arm; third, in the manner of operating said finger; and, fourth, in the manner of hanging and operating the spool or reel for the binding wire or cord; and it may be operated conjunctively with any suitable wire-twisting or twine-tying mechanism.

In the drawings, A, Fig. 1, represents a portion of the driving-wheel, and B a portion of the frame (in front) of a reaper. The cut grain is supposed to be delivered to the binder as indicated by the arrows *f* upon the table C. The fixed vertical standard G, resting upon some suitable portion of the machine, extends upward, then horizontally forward and over the said table, and supports in bearings *b b* the shaft L, to which is keyed the crank F. The binding-arm D is hung near its middle upon the pin of the crank, and at its opposite end is provided with a stud, *d*, and roller turning thereon, which, as the binding-arm is revolved by the crank, moves along the slot *a* of the guide-arm P. The guide arm or piece P is fastened securely to the end of the horizontal portion of the standard G, and motion is given to the binding-arm, &c., by means of a chain leading from some suitable part of the driving mechanism onto the wheel T, as in the ordinary manner.

It has been found in using binding-arms operated in the manner just described that the extreme end H of the slotted guide-arm has necessarily to occupy a relatively low position to enable the point of the binding-arm, when leaving the gavel, to be lifted freely up and away therefrom, and without crowding or rolling the gavel, while the wire is yet held by the upper jaw and liable to be broken by such crowding or rolling, which necessarily takes place when the reverse end of the binding-arm is held well up by the guide P. It is also found that when the end H of the guide-arm is held low, the point of the binding-arm, in its ascent, is caused to move in such a manner as sometimes to "nose under" or lift a quantity of the accumulated grain and throw it outside the wire.

To meet both requirements in the case we provide a guide-arm in which the extreme end H may occupy either position, which we effect by jointing the arm P midway of the slot *a* by a pivot and circular slot. (Clearly shown in Fig. 1.) By this construction the end of the arm is at liberty to move up or down as the successful operation of the binding-arm may require. Ordinarily it will, from gravity, occupy the lower or full-line position, which is desirable, as preventing the crowding of the gavel by the binding-arm, as above described; but should the nose of the binding-arm meet with obstruction in its ascent by catching under the grain the reverse end will lift and allow the straw to slide off the nose.

We also provide the binding-arm with a straw-separating finger or bar, *g*, lying snugly along its side, pivoted upon the stud *c*, and resting at its point upon a ledge, *h*, of the arm. This finger is caused to lightly press upon the ledge *h* by means of a spiral spring, *o*, coiled upon the stud *c*, having one end fastened to said finger and the other to the inner screw-nut, *i'*, as shown in Fig. 2. By turning the nut *i'* to the right or left the coils and tension of the spring may be augmented or diminished, with a corresponding variation in the stress upon the finger *g*. By bringing a second jam-nut, *i*, snugly against the first, locking it in position, the spring *o* may be conveniently held to exert any desired stress upon the finger *g*.

A stud, *e*, with a roller turning thereon, is secured to the bracket *K* in a position to engage and temporarily arrest the point of the finger *g* as the binding-arm moves downward, as shown by dotted lines in Fig. 1, and while thus stayed the finger receives and holds back the accumulating grain from the binding-arm, which moves on with its cleanly-separated gavel. The onward motion of the arm eventually draws the finger off the roller *e*, when the spring *o* causes it to resume its normal position, as shown in full lines. (See Fig. 1.)

The ledge *h* is provided with a cushion or buffer, *s*, Fig. 3, of india-rubber or other suitable material, to deaden the blow given by the returning finger.

The reel or spool *r*, for holding the binding material, rotates upon the stud *n*, fastened in the lever *R*, which is pivoted at *m* to the guide-arm *P*. The cam *p* upon the shaft *L*, immediately back of the crank, operates the lever as the shaft rotates, raising and lowering the spool, as shown in Fig. 1, moving said spool with or contrary to the draft or pull of the wire or twine caused by the movement of the binding-arm. This motion of the spool is designed to recall the surplus wire or to take up the slack in the same caused by the binding-arm carrying the wire some distance below the lower retaining-jaw at each complete movement. For instance, when the point of the binding-arm, after having encircled a gavel, returns the wire to the lower jaw, the said jaw seizes the wire at some distance away from the point of the arm, and, as the same commences to rise, a loop of superfluous or idle wire would be formed between the said jaw and point were not some means provided to draw back or recall the said surplus.

It is intended in this improvement to so time the cam *p* that it shall cease its pressure upon the end of the lever *R* at the time of or just previous to the upward start of the binding-arm, so that the spool may be left at liberty, with its weight and that of the contained wire, to draw the wire back through the point of the arm and over the various guide-rollers, thus taking the place of and doing away with the necessity of intermediate take-up devices.

The friction-spring *k*, Fig. 4, is arranged to press against a part, *n'*, of the spool, so as to prevent it rotating while descending to draw back the wire or twine, as above described; but when the spool is raised to its upper position by the cam *p* the free end of the spring is brought against the guide-arm *P*, which releases the spool, as shown in dotted position,

and allows it to freely rotate and render the twine or wire as the binding-arm pulls upon the same.

The piece *S* represents a guide for the twine or wire, situated above the binding-arm. This guide-piece may be made to fit and slide upon an extension, *P'*, of the guide-arm *P*, and have a pin, *v*, extending through a slot, *v'*, in the part *P'*, operated upon by the cam *p*, for the purpose of raising and lowering the said guide-piece *S* in a suitable manner, so that it may become an intermediate take-up for the twine or wire.

Fig. 5 represents a modification of the end *H* of the guide-arm *P*, embodying in one solid piece both positions of the part *H*, (shown in Fig. 1,) which might be desirable to use instead of the jointed arm, as above described.

We claim as our invention--

1. In an automatic grain-binder, a jointed or flexible guide, *P*, for the binding-arm, substantially as shown and described.

2. In a grain-binding machine, a binding-arm, *D*, having a straw-separating finger, *g*, pivoted thereto and held to place by a spring, *o*, in combination with a fixed stopping-pin, *e*, attached to or near the grain receptacle or apron *C*, in position to engage and temporarily stop the outer end of said finger at each revolution of the binder-arm, substantially as and for the purpose set forth.

3. A spiral spring, *o*, having one end attached to one of a pair of jam-nuts, *i'* *i*, and the other acting upon the part or piece *g*, for the purpose of moving the same, in combination with said jam-nuts *i'* and *i*, part *g*, and stud *e*, so arranged that by turning the jam-nuts one way or the other the stress of the spring upon the part *g* acted upon may be augmented or diminished, as described.

4. A spool for holding the baud material, in combination with automatic mechanism for moving it positively toward or with the pull on the binding wire or twine as the binding-arm falls to encircle the gavel, substantially as described.

5. The combination of the reel or spool *r*, lever *R*, and cam *p*, substantially as set forth.

6. A reel or spool, *r*, mounted upon a lever, *R*, provided with a friction-spring, *k*, and drum *n'*, in combination with said lever *R*, guide-arm *P*, and cam *p*, substantially as shown, and for the purpose set forth.

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