

(No Model.)

2 Sheets—Sheet 1.

J. S. DAVIS.
GRAIN BINDER.

No. 530,886.

Patented Dec. 11, 1894.

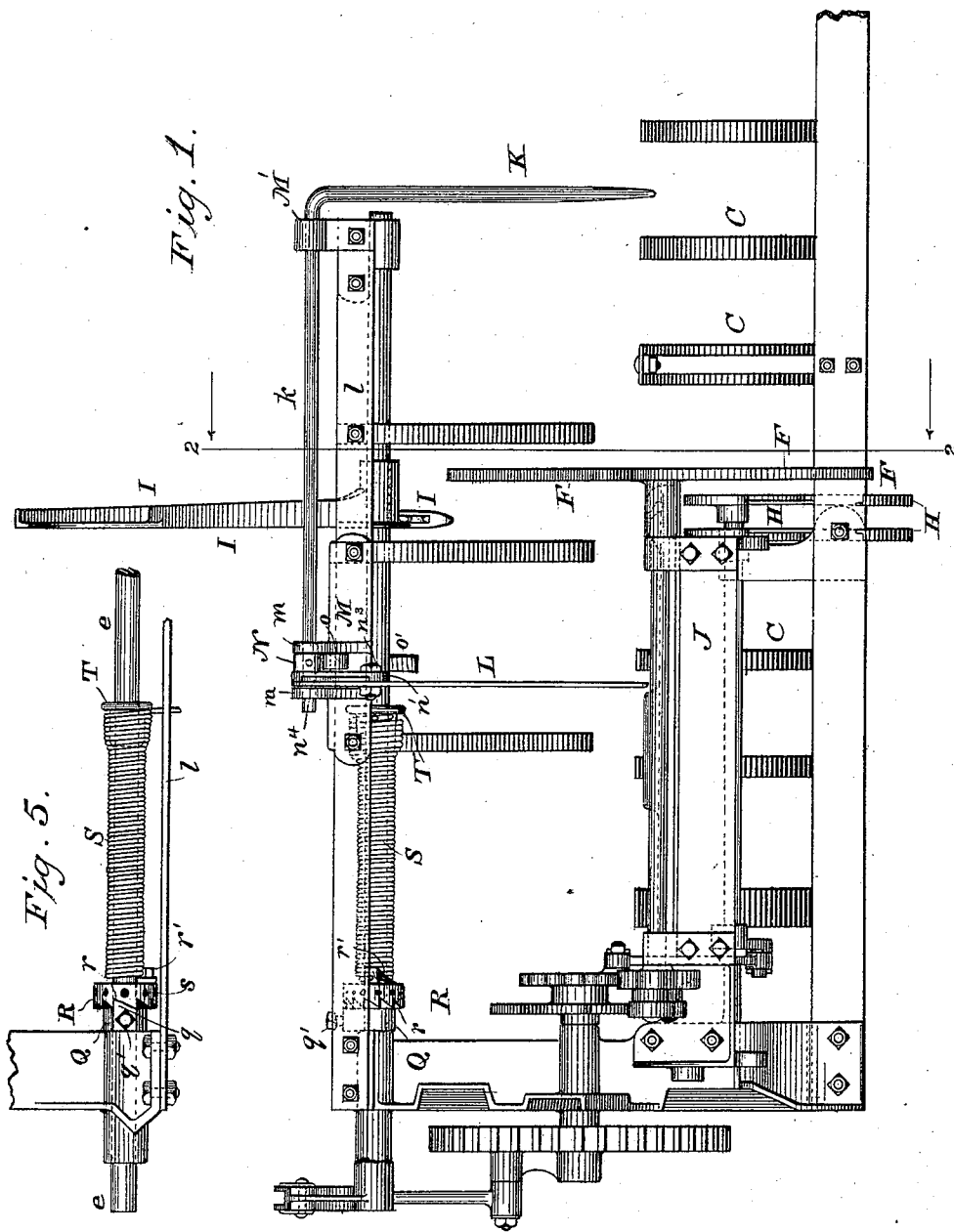


Fig. 5.

Fig. 1.

Fig. 6.

Witnesses

J. H. Brines
H. J. Russ

Fig. 7.

Inventor.

John S. Davis

By his Attorney

Wm A Skunk

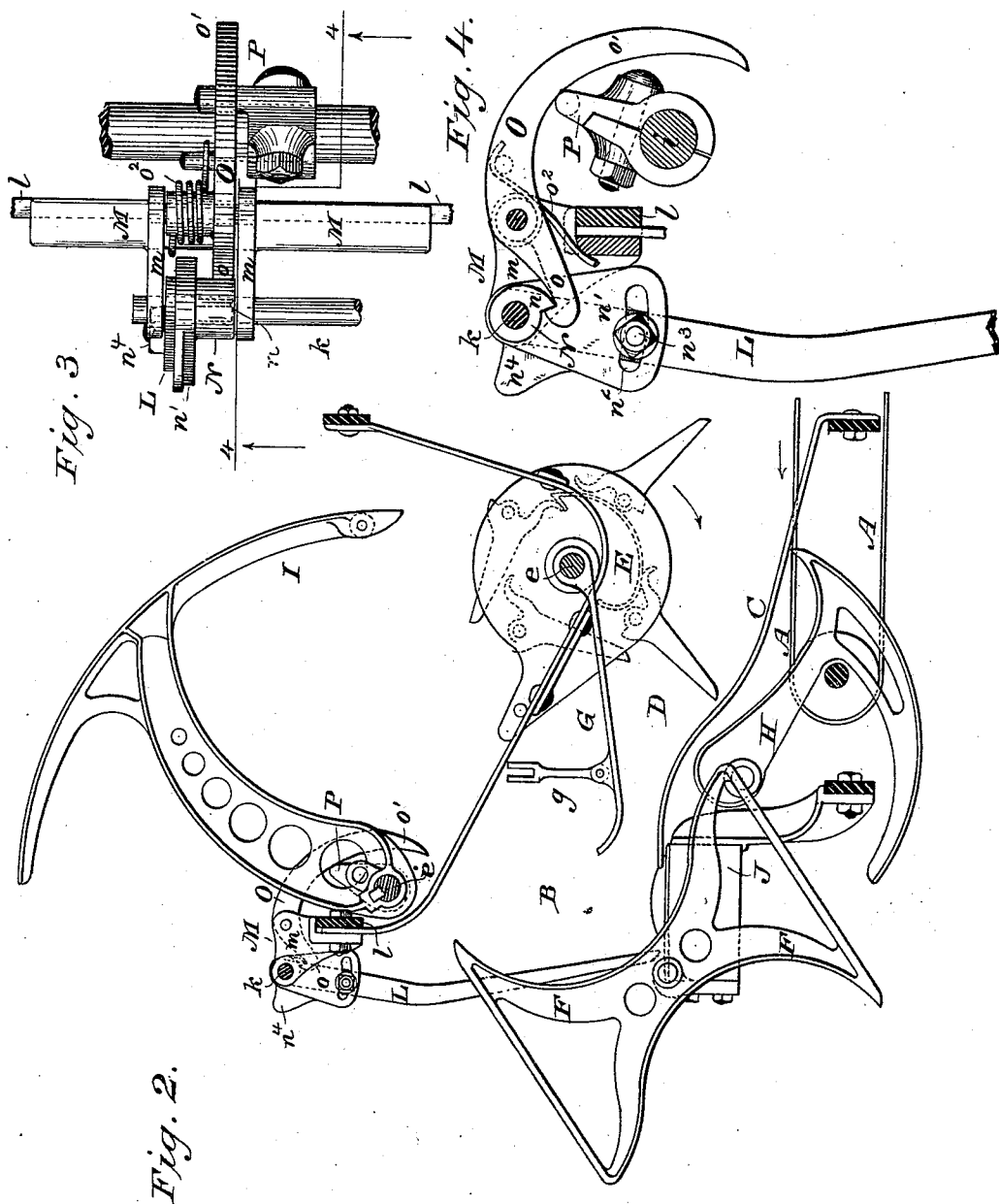
(No Model.)

2 Sheets—Sheet 2.

J. S. DAVIS.
GRAIN BINDER.

No. 530,886.

Patented Dec. 11, 1894.



Witnesses

J. H. Russ
H. J. Russ

Inventor

John S. Davis
By his Attorney
Wm. A. Skunk

UNITED STATES PATENT OFFICE.

JOHN S. DAVIS, OF CLEVELAND, OHIO.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 530,886, dated December 11, 1894.

Application filed May 28, 1890. Serial No. 353,417. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. DAVIS, a citizen of the United States, residing at Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to grain binding mechanism of the class in which the grain is gavelled and bound on or substantially on the level of the platform; its general features being like those of the machines shown in many of my earlier patents, but more particularly in my Patents No. 388,642, dated August 28, 1888; No. 392,721, dated November 13, 1888; No. 405,203, dated June 11, 1889; No. 416,577, dated December 3, 1889; No. 419,423, dated January 14, 1890, which show the latest and most improved forms of my machine; and it consists of a retaining or evening device to hold the straws in proper shape, while the gavel is being formed in the binding receptacle; and in certain details of the mechanism thereof as will be hereinafter set forth.

The accompanying drawings show my improvements in the best form now known to me, but there are many other ways of carrying them into effect, and many changes within the skill of a good mechanic might be made in the details to adapt them to other forms of machines without departing from the spirit of my invention, as hereinafter described and claimed.

Figure 1 is a view in elevation of my binding mechanism as seen from the stubble side of the machine. Fig. 2 is a vertical transverse section therethrough on the line 2, 2 of Fig. 1. Fig. 3 is a plan view on an enlarged scale of the retainer locking and tripping device. Fig. 4 is a vertical transverse section of the same on the line 4, 4 of Fig. 3. Fig. 5 is a plan view of the needle shaft and the tension adjusting device of its restraining spring, &c. Figure 6 is a perspective view of the fixed collar, and Fig. 7 a similar view of the ratchet collar of the spring adjusting device.

In the operation of the machine grain which is cut and dropped upon the platform of the

harvester falls upon carrier belts A by which it is moved toward the binding receptacle B, and deposited upon the inclined bars C at the throat or entrance D of the receptacle. Packing devices E (preferably like those shown in my Patents No. 283,866, dated August 28, 1883, or No. 388,642, dated August 28, 1888, though any other suitable form would answer the purpose) urge the grain through the throat and into the receptacle packing it against a double arm F which constitutes the outer wall of the receptacle, and also the bundle ejector. A float G pivoted on the packer shaft e depends into the receptacle and rests upon the gavel the gradual enlargement of which raises the free end of the float and through its link connection g, actuates the tripping mechanism to start the binder into action. The gavel is compressed into small compass by the arms H which swing up across the throat, and force the grain ahead of the needle I, which descends into the receptacle behind the compressor arms H, and places the binding cord within the grasp of knotting mechanism mounted in the casing J such mechanism for instance as is shown by my Patents No. 319,963, dated June 16, 1885, or No. 401,013, dated April 9, 1889, or of any other suitable and desirable kind.

Now in practice I have found that the grain will not always lie straight in the binding receptacle. It may be firmly compressed and held at the waist by the double arm F against which it is compressed, and yet the whole bundle lie askew in the receptacle or the heads may be straight while the butts spread out or vice versa, and as a result of this the bundle is not always of uniform size or bound and discharged in satisfactory shape. To prevent this occasional trouble I have invented a retaining device which has prongs or forks that stand on the outer side of the receptacle about in line with the double arm F, and far enough away at each side of it to hold the heads and butts in line with the outer wall of the receptacle. One only of these prongs may be used if desired, and I have found that the front one which acts upon the butts of the grain to be the most essential, but I prefer to use two to hold in both the heads and butts of the grain, and therefore adapted to act upon

either or both ends of any kind or length of grain likely to be encountered in harvesting. These prongs are pivotally mounted above the receptacle and locked in their retaining position during the gaveling operation, but are unlocked and left free to swing out of the path of the bound bundle when it is ejected from the machine. The prongs K L are carried by a rock shaft *k* which is mounted in suitable bearing brackets M M' secured to the upper rail *l* of the binder frame. The prong K is preferably formed by bending the piece of round iron which composes the shaft as shown. The front bracket M has two ears or lugs *m*, the shaft *k* passing through both and supporting between them the prong L, and a metal block or sleeve N having a hooked lug or catch *n* and a quadrant flange *n'* slotted as at *n''* formed with it. This sleeve is rigidly secured to the shaft while the prong L is loosely fitted upon it and clamped to the flange *n'* by the bolt *n'''*, so that its position may be adjusted in or out of the receptacle as desired. A dog O also pivoted between the ears of the bracket M is hooked at one end to engage the hook *n* on the sleeve while its other end is extended to form a tail *o'*, which lies in the path of a lug or wiper P on the needleshaft and is so shaped on its under side that the wiper tilts or rocks the dog on its pivot to disengage the hooks *n*, *o*, when the needle descends into the binding receptacle, and thus unlock the retainer prongs and permit them to swing out of the way when a bundle is being ejected.

The preponderating weight of the tail might be sufficient to hold the hooks into engagement under favorable conditions, but it might be shaken loose and it does not act quickly enough to insure engagement when the prongs fall back after a bundle has passed out beneath them, so I reinforce it with a spring *o''* which accelerates the movement of the dog and guards against accidental disengagement of the hooks. The wiper P, I prefer to make in two parts as shown and clamp them on the needle shaft by a bolt or any other suitable means. A projecting lug *n''* is formed at any convenient place on the sleeve to act as a bumper in preventing the retainer from being thrown so far up and over its center that it would not fall back by gravity. This lug strikes on the hub of the dog O but it might be located otherwise than as shown in the drawings and strike some other place, and still be equally as effective.

In operation the retainer prongs are rigidly locked against the outward pressure of the gavel until the hooks *n*, *o* are disengaged by the wiper when the needle is nearly at its lowest position in the receptacle. The needle remains in this position until the bundle is bound and discharged when it returns to its normal position (shown in Fig. 2) the wiper

releasing the dog O and permitting it to again engage the retainer catch.

In my Patent No. 416,577, dated December 3, 1889, I showed a needle restraining spring wound around the needle shaft, one of its ends engaging a stud pin on the needle, while the other end took under the upper rail "A⁵" of the binder frame. I have found in practice that the varying conditions of the machines require a nice adjustment of this spring to suit the peculiarities of each machine, and I also found that the first coils at that end of the spring which took under and were restrained by the binder frame pressed so hard upon the needle shaft as to cut or wear deeply into it.

To provide for adjusting the tension of the spring I mount upon the needle shaft a collar Q having a projection *q* and secure it to the shaft by a set screw *q'*, and also a loose collar R having notches *r* upon its face, which are engaged by the projection *q* of the other collar. The loose collar has a projection *r'* which is engaged by one end of the spring S and is provided with a series of holes *s* into which a punch or any suitable instrument may be inserted to turn the collar and wind up the spring.

At the opposite or fixed end of the spring S I make the last few coils of a diameter enough larger than would fit the shaft to permit the insertion between them and the shaft of a thimble or sleeve T which takes the heavy side pressure of the last coil and prevents its cutting into the shaft.

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

1. The combination of the arm F, at the waist of the bundle mounted on a shaft located on one side of the binding receptacle, the rock shaft having retainer prongs located on the opposite side of the receptacle, the hooked sleeve N, secured on said shaft, the dog O, engaging the hook on the sleeve having the tail which extends over the needle shaft, and a lug or wiper on the needle shaft to trip the dog substantially as set forth.

2. The combination of the binding receptacle, the trip float, the retainer forming the outer wall of the receptacle consisting of a rock shaft with prongs and a hooked sleeve and the dog O by means of which the retainer is locked, the slotted quadrant on the sleeve to permit of adjusting the prongs of the retainer relatively to the receptacle as set forth.

In testimony whereof I hereunto set my hand, this 26th day of May, 1890, at Cleveland, Ohio.

JOHN S. DAVIS.

In presence of—

L. A. STRATTON,
A. E. SUMNER.