

(No Model.)

2 Sheets—Sheet 1.

B. M. WATKIN.

MACHINE FOR MAKING TWINE FROM STRAW.

No. 438,745.

Patented Oct. 21, 1890.

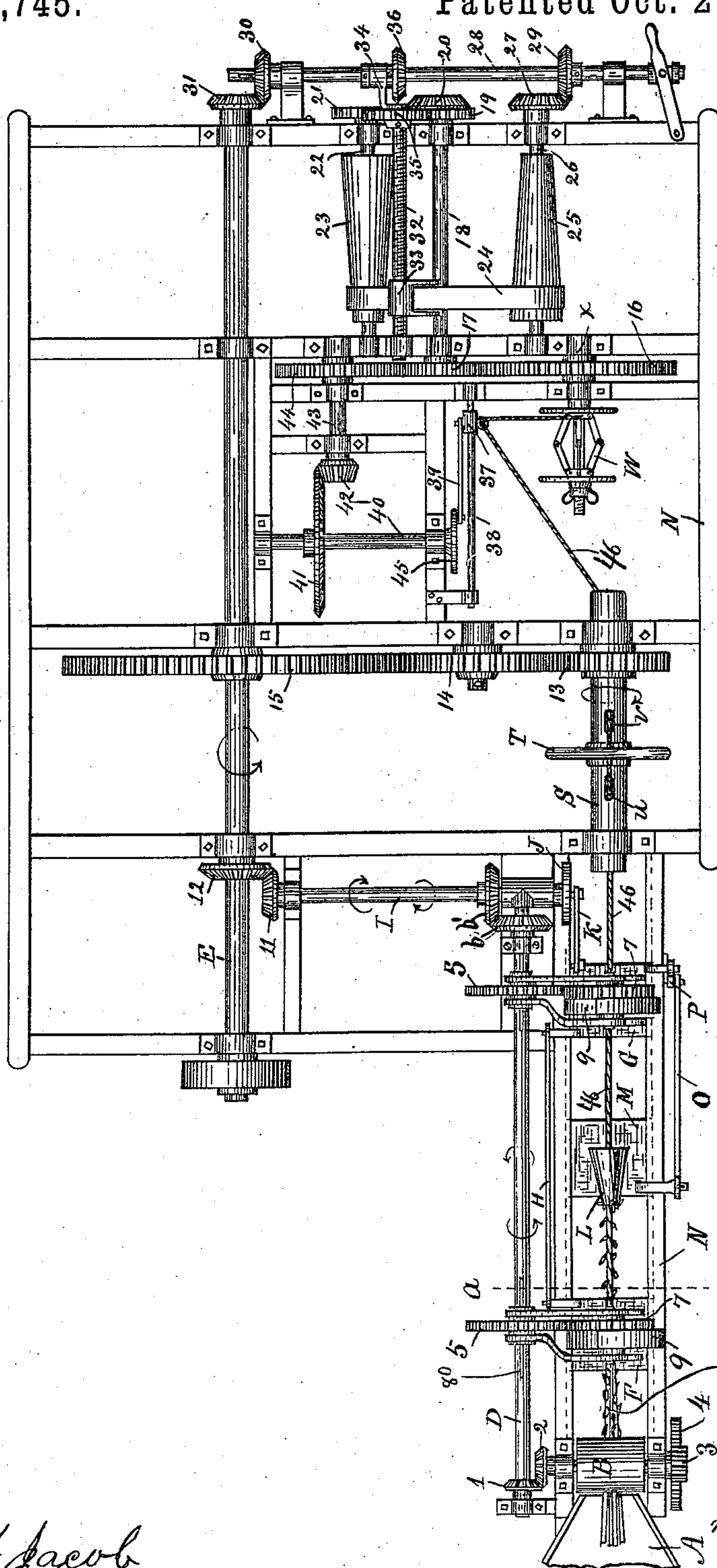


Fig 1.

Witnesses
Frank A. Jacob.
V. M. Hood.

Inventor:
Benjamin M. Watkins

By His Attorney
H. P. Hood.

(No Model.)

2 Sheets—Sheet 2.

B. M. WATKIN.

MACHINE FOR MAKING TWINE FROM STRAW.

No. 438,745.

Patented Oct. 21, 1890.

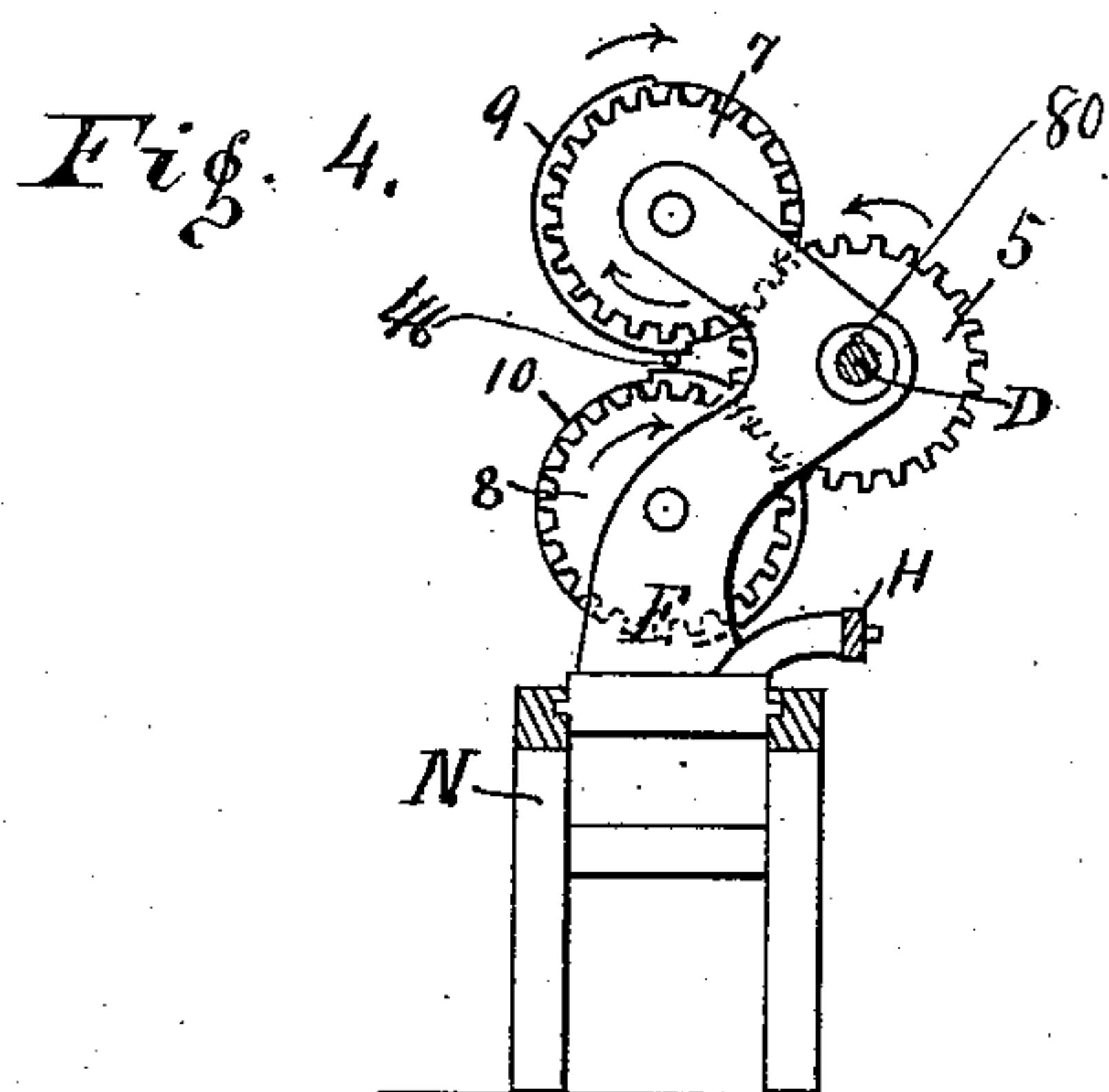


Fig. 3.

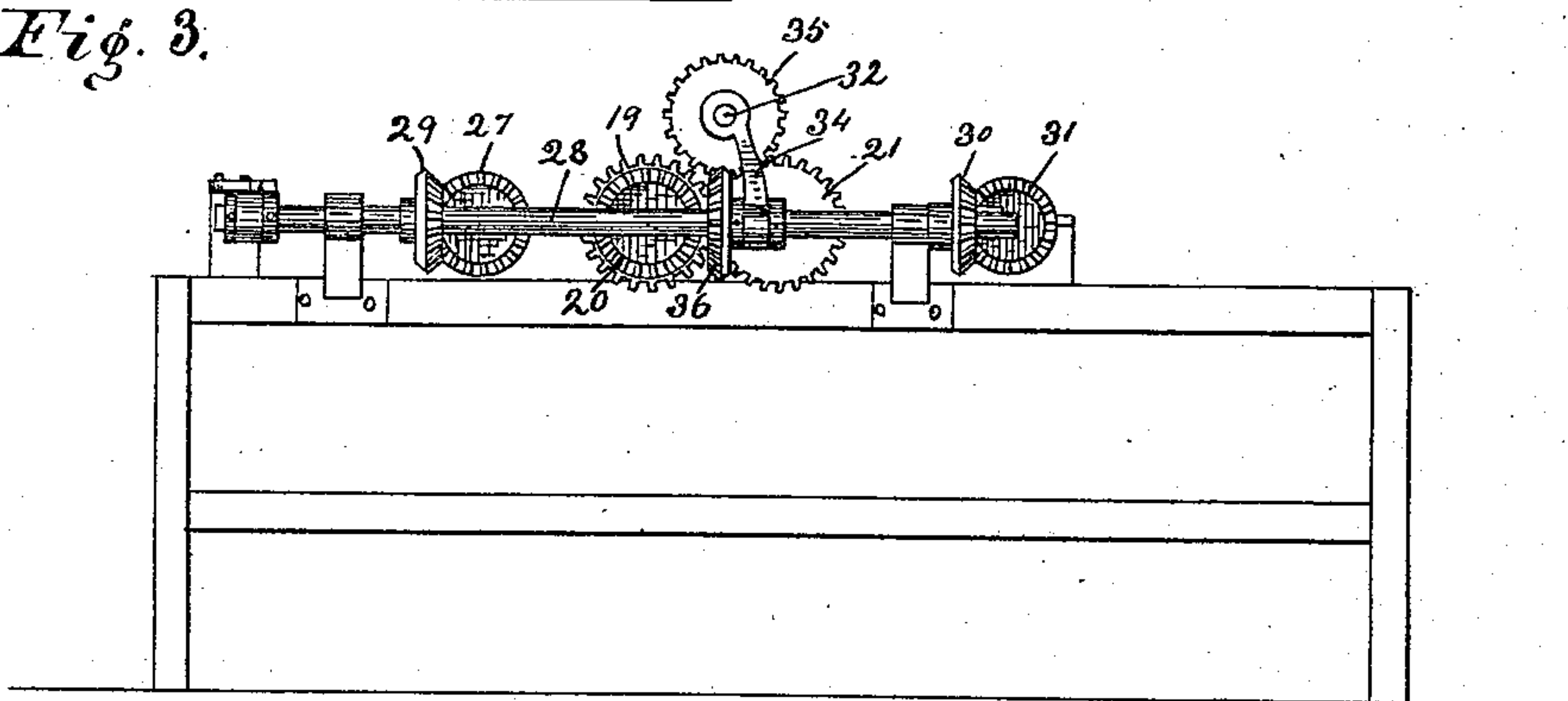
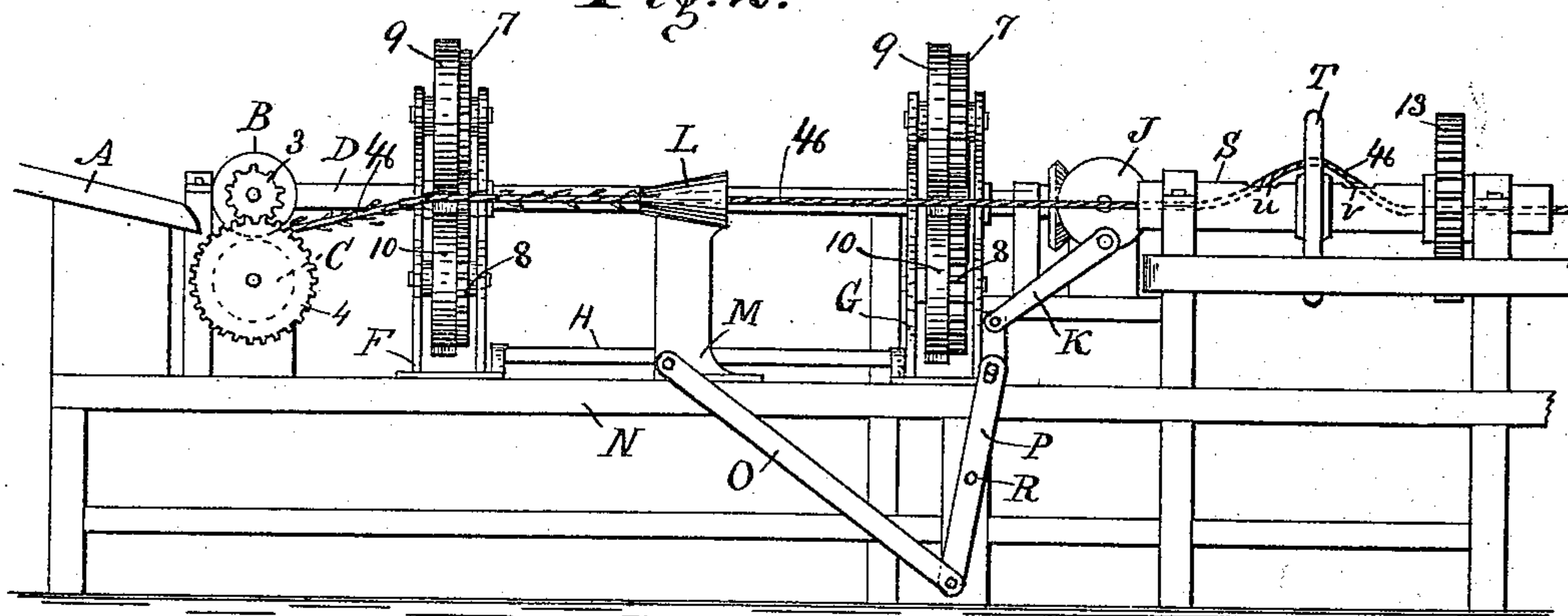


Fig. 2.



Witnesses
Frank A. Jacob,
T. M. Hood.

Inventor
Benjamin M. Watkin.

By His Attorneys
H. P. Hood

UNITED STATES PATENT OFFICE.

BENJAMIN M. WATKIN, OF GOODVIEW, INDIANA, ASSIGNOR OF ONE-HALF
TO GOODLOPE WRIGHT, OF SAME PLACE.

MACHINE FOR MAKING TWINE FROM STRAW.

SPECIFICATION forming part of Letters Patent No. 438,745, dated October 21, 1890.

Application filed February 27, 1890. Serial No. 341,966. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN M. WATKIN, a citizen of the United States, residing at Goodview, in the county of Randolph and State of Indiana, have invented a new and useful Improvement in Machines for Making Twine from Straw, of which the following is a specification.

My invention relates to an improved machine for making twine wholly or partly from straw or like material.

The object of my improvement is to combine in one machine means for removing the outer silicious covering of the straw, means for removing projecting or adhering straws or filaments from the loosely-twisted twine, means for twisting the straw filaments into twine, and means for automatically reeling the twine, all as hereinafter fully described.

The accompanying drawings illustrate my invention.

Figure 1 represents a plan of a machine embodying my invention. Fig. 2 represents a side elevation of the left-hand portion of the same. Fig. 3 represents an end elevation, the parts in the background being omitted. Fig. 4 represents a sectional elevation at the line *a* of Fig. 1, looking toward the left.

A is an inclined table or hopper, from which the straw is fed by hand to the machine.

B and C are a pair of horizontal rolls of like diameter, arranged one above the other and having their surfaces nearly in contact. The upper roll B is driven by means of a shaft D, connected with the main shaft E by shaft I and bevel gear-wheels *b b'* and 11 12 and a pair of bevel-gears 1 2. At the opposite end of the rolls from gears 1 and 2 the rolls are connected by spur-gears 3 and 4, the arrangement being such that the lower roll moves at about one-third the speed of the upper roll.

F and G are two frames alike in structure, mounted on ways in the main frame N, so as to slide longitudinally thereon, and each carries on bearings formed in suitable standards a spur gear-wheel 5, which is also mounted on shaft D, so as to slide longitudinally thereon and turn therewith, by means of a groove and spline 80 or other well-known connection, and a pair of spur gear-wheels 7 and 8, which

intermesh with gear-wheels 5, but do not intermesh with each other.

Secured to or formed integral with gear-wheels 7 and 8, and concentric therewith, are a pair of smooth-surfaced wheels 9 and 10. About one-half of the periphery of each of the wheels 9 and 10 is of larger radius than the remainder of the wheel, and the arrangement is such that as the wheels revolve their larger peripheries are opposed to each other and move in opposite directions with a narrow space between them, the purpose being to roll the straws 46 passing between them transversely during a part of each revolution of the wheels.

Frames F and G are coupled together by a connecting-rod H, so as to slide in unison along the main frame.

Frames F and G are given a limited reciprocating movement along the main frame by means of a shaft I, carrying a crank-plate J, which is connected with frame G by a pitman K. A pair of bevel-gears 11 12 connect shaft I with the main shaft E, and the arrangement is such that the frames move away from the rolls B C when the straws 46 are engaged by the larger peripheries of the wheels 9 and 10 and move toward the rolls when the wheels have released the straws.

Arranged between the frames F and G is a hollow conical knife L, which is mounted on a base M, adapted to slide longitudinally along the main frame N, the arrangement being such that the straws 46 passing between the wheels 9 10 on the frame F and between the wheels 9 10 on the frame G will also pass centrally through the hollow knife L. The base on which the knife L is mounted is connected with the sliding frame G by means of a connecting-rod O and a lever P, which latter is pivoted at R to the main frame, and is loosely connected at one end to frame G and at the other end pivotally to the connecting-rod O, the arrangement being such that when the frames F G move in one direction the knife L moves in the opposite direction.

S is a hollow cylindrical shaft having a radial flange T, and provided on opposite sides of said flange with perforations *u* and *v*. Flange T is perforated transversely to allow

the twine 46 to pass from perforation *u* to perforation *v*. Shaft S forms a twisting-head for twisting the twine *t*, and it is connected with the main shaft E, so as to be rapidly rotated thereby by means of spur-wheels 13, 14, and 15.

W is a reel mounted horizontally in bearings on the main frame at *x*.

Reel W is connected with the main shaft, so as to be rotated thereby at a variable speed, by means of the following mechanism: 16 is a spur-wheel secured to the reel-shaft. 17 is a spur-wheel secured to shaft 18 and intermeshing with wheel 16. Shaft 18 is mounted in bearings on the main frame, and is provided at its outer end with a spur-wheel 19 and a bevel gear-wheel 20. Wheel 19 intermeshes with a spur gear-wheel 21, secured to a shaft 22, which is provided with a conical or tapering drum 23. Drum 23 is connected by a belt 24 with a like drum 25, tapered reversely and mounted on a shaft 26. Shaft 26 is provided at its outer end with a bevel gear-wheel 27, which is connected with the main shaft E by shaft 28 and bevel gear-wheels 29, 30, and 31. 32 is a screw-threaded shaft carrying a screw-threaded guide 33, which embraces the opposite edges of the belt 24. Shaft 32 is mounted at one end in a bearing on the main frame and at the other end in a bearing 34, mounted on shaft 28. Secured to shaft 32 is a spur gear-wheel 35, which intermeshes with spur gear-wheel 21 on shaft 22.

The arrangement of the parts is such that when they are in the position shown in Fig. 1, wheel 29 intermeshing with wheel 27, the belt 24 is gradually moved by means of the screw-shaft 32 and guide 33 from the inner to the outer ends of drums 23 and 25, thus decreasing the speed of the reel as the quantity of twine thereon is increased. For the purpose of returning the belt to the position shown in Fig. 1 shaft 28 is moved longitudinally, so as to disconnect wheels 29 and 27 and bring a bevel gear-wheel 36, secured to the shaft, into engagement with bevel gear-wheel 20, and at the same time disconnect spur-wheel 35 from 21 and bring wheel 35 into engagement with wheel 19. By this movement the direction of rotation of screw-shaft 32 is reversed and guide 33 is forced to move in the opposite direction. The loose end of the forming twine is held in the hand of the operator while the ball of twine is removed from the reel and while the reverse movement is taking place.

For the purpose of guiding the twine and distributing it evenly along the reel I mount opposite the reel a traveler 37 on a stationary guide-rod 38. The traveler 37 is caused to move slowly back and forth along the rod 38 by means of a pitman 39, connected to a crank-wheel 45 on a shaft 40, bevel gear-wheels 41, 42, one on the shaft 40, the other on the shaft 43, and a spur-wheel 44 on said shaft 43, intermeshing with a gear-wheel 17 on the shaft 18.

In operation a piece of twine 46 already

made is passed between rolls B and C, then between the wheels 9 and 10 of frame F, then through knife L, then between the wheels 9 and 10 of frame G, then into one end of hollow shaft S, then through perforations *u* and *v*, then out of the other end of the shaft, thence to traveler 37, and from there on to the reel W. A few straws, preferably oat-straws, are now secured to the twine and the machine is started. The straws in passing between rolls B and C are crushed and the outer silicious coating is broken up and dislodged by the rubbing action of the rolls, due to their differing speed. As the wheels 9 and 10 of frames F and G revolve and their larger diameters become opposed to each other, the straws are grasped at two points with a rolling movement on opposite sides of the knife L, and as the frames F and G move at the same time longitudinally along the main frame in the same direction that the straws are moving, while the knife L moves in an opposite direction, all loose ends and joints of the straws which project radially from the forming twine are trimmed off by the surrounding cylindrical knife. When the frames F and G are returning to their first positions, the smaller diameters of the wheels 9 and 10 are opposed, and they do not engage the straws. The twisting of the straws into twine is effected after they pass the rolls by the conjoint action of the flier S and the wheels 9 and 10, and the twine is automatically wound upon the reel, as before described, the twist which is given to the twine by the flier S between itself and the reel W being supplemented and continued in the proper direction to a point adjacent to the rolls B C by the action of wheels 9 and 10.

In case the straw is very tender it is found well to mix a small quantity of tow or other like fiber with it; but this does not affect the action of the machine.

I claim as my invention—

1. In a twine-machine, the combination, with twisting mechanism, of a pair of rolls having their peripheral surfaces slightly separated and intermediate connecting mechanism, whereby when one roll is rotated the other roll is rotated at a different speed, substantially as and for the purpose specified.

2. In a twine-machine, the combination of two pairs of smooth-faced wheels, the wheels of each pair being mounted in a suitable supporting-frame and connected by an intermediate wheel, so as to revolve in opposite directions transversely to the axial line of the twine, each of said wheels having a portion of its periphery of larger radius than the remainder, whereby the material to be formed into twine is seized at intervals at two points along its length between the wheels with a rolling movement, as set forth.

3. In a twine-machine, the combination of two pairs of smooth-faced wheels, the wheels of each pair being mounted in a suitable supporting-frame and connected by an intermediate wheel, so as to revolve in opposite di-

rections transversely to the axial line of the twine, each of said wheels having a portion of its periphery of larger radius than the remainder, whereby the material to be formed into twine is seized at intervals at two points along its length between the wheels with a rolling movement, and a conical knife arranged between said supporting-frames and in the path of the forming twine, and means for moving the knife longitudinally of the twine and relatively to the supporting-frames, whereby the material is drawn through the knife, substantially as and for the purpose set forth.

4. In a twine-machine, the combination of the reel, shaft 18, having gears 19 and 20 secured thereto, and intermediate connecting mechanism connecting the shaft and the reel,

shaft 22, having wheel 21 and tapering drum 23, shaft 26, having wheel 27 and tapering drum 25, said drums being reversely arranged, belt 24, connecting said drums, screw-shaft 32, having wheel 35, guide 33, shaft 28, arranged to revolve and to slide longitudinally, bearing 34, mounted on said shaft so as to move longitudinally therewith, and gear-wheels 29 and 36, secured to said shaft, all being arranged to co-operate substantially as specified, whereby the reel is rotated with varying speed and the belt is moved along the drums from end to end in opposite directions, as set forth.

BENJAMIN M. WATKIN.

Witnesses:

H. P. HOOD,
V. M. HOOD.