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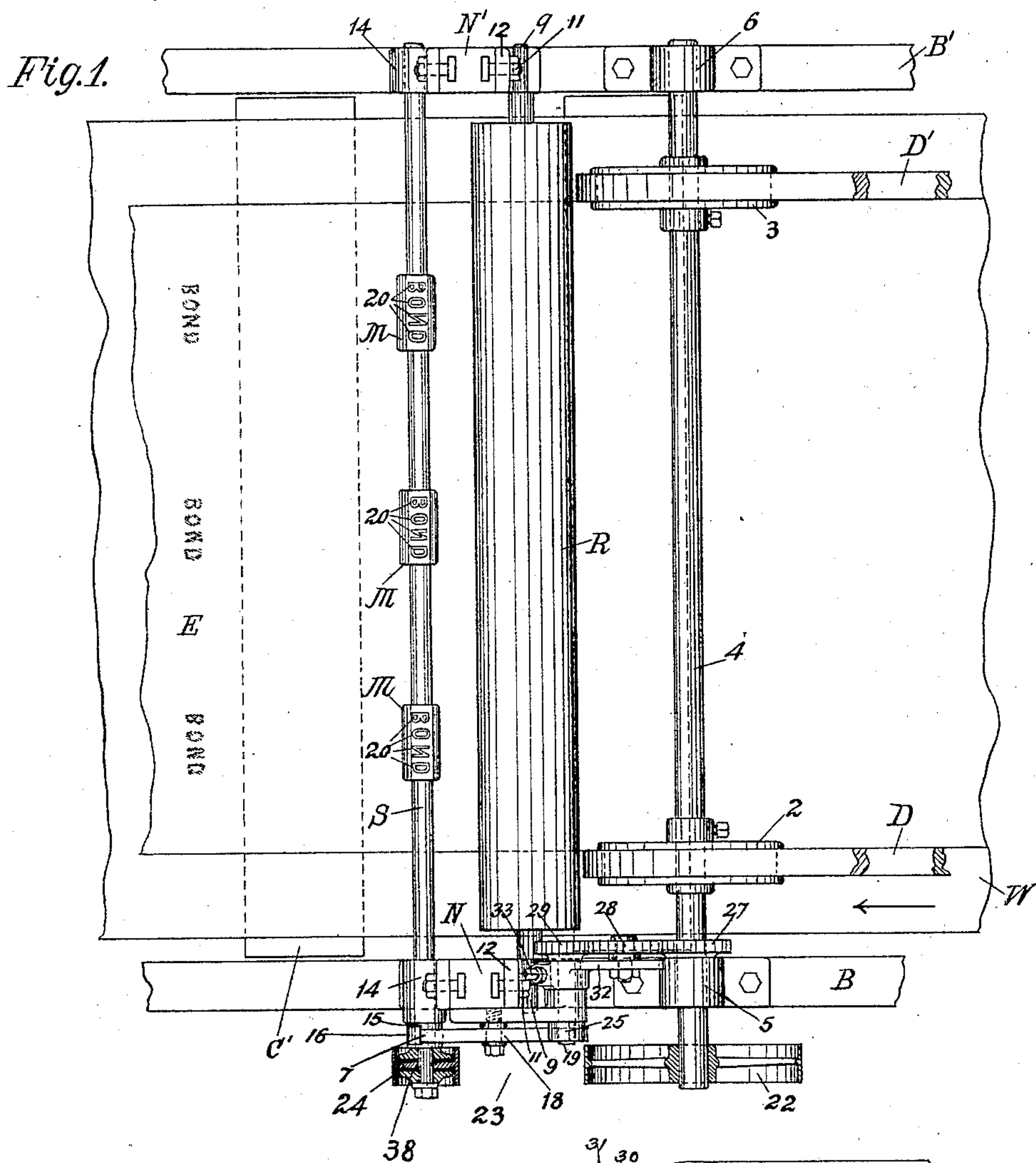
2 Sheets—Sheet 1.

F. H. RICHARDS.

WATER MARKER FOR PAPER MAKING MACHINES.

No. 412,794.

Patented Oct. 15, 1889.



Witnesses:

Wilbur M. Stone.
Geo. W. Drake

Inventor:

Francis H. Richards

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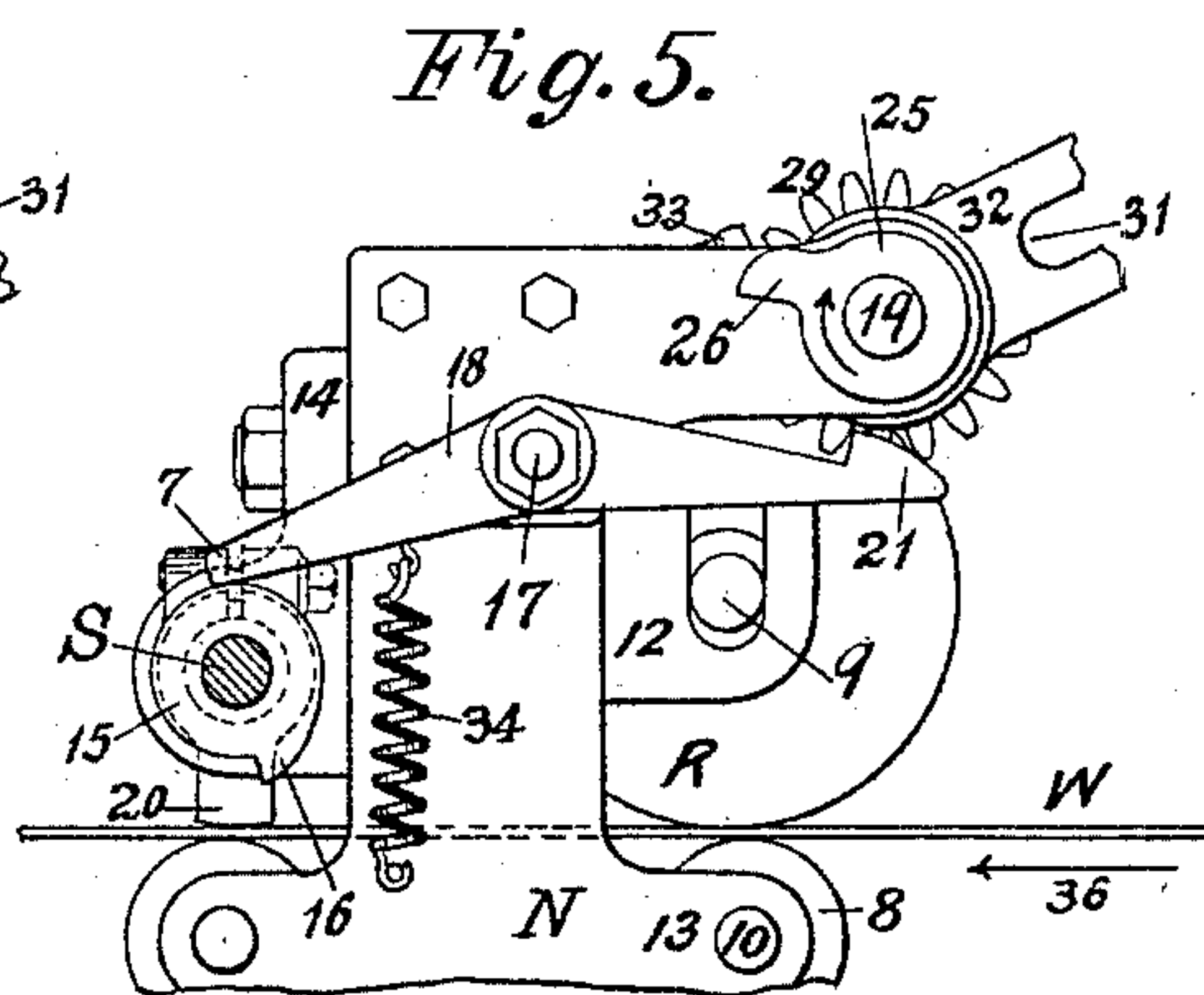
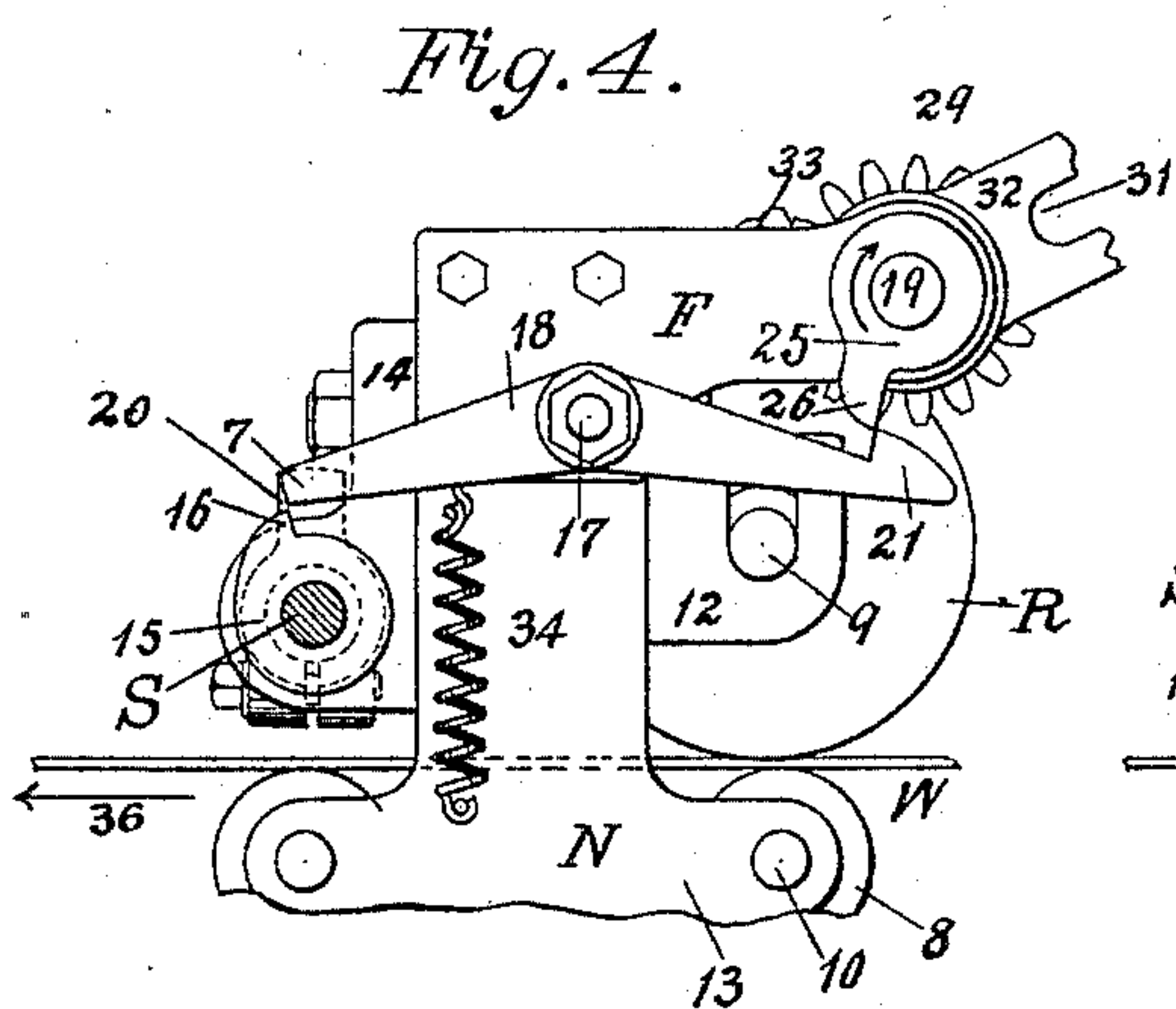
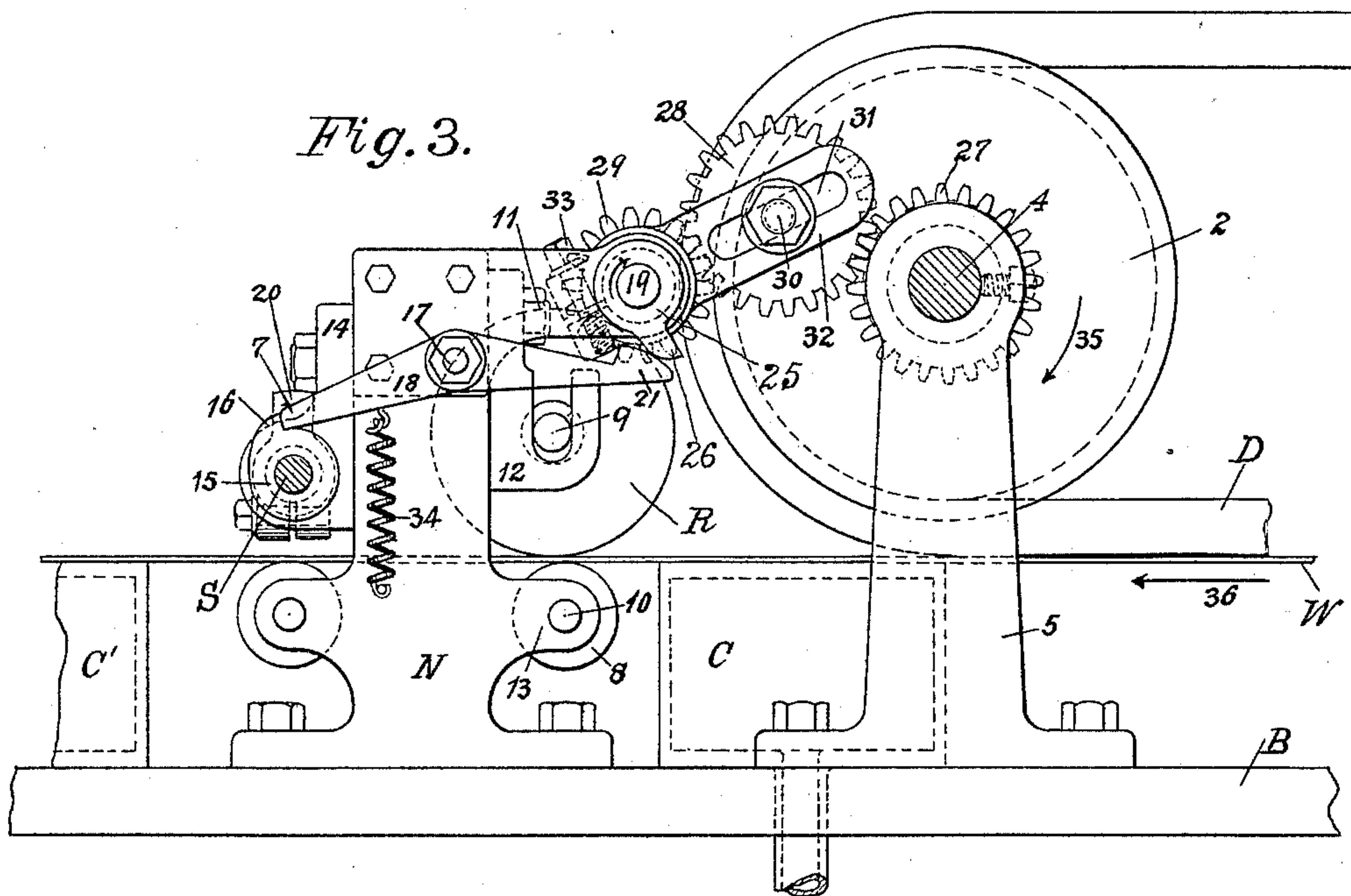
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF SPRINGFIELD, MASSACHUSETTS.

WATER-MARKER FOR PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 412,794, dated October 15, 1889.

Application filed May 31, 1887. Serial No. 239,868. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Water-Markers for Paper-Making Machines, of which the following is a specification.

This improvement applied to Fourdrinier paper-making machines makes water-marks in the web at different adjustably-fixed distances apart.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan or top view of a part of a Fourdrinier paper-machine embodying my improvements. Fig. 2 is a side elevation of the parts shown in Fig. 1. Fig. 3 is an enlarged side elevation similar to Fig. 2. In this view certain driving-pulleys are removed. Figs. 4 and 5 are similar views of a part of Fig. 3, illustrating the operation of the let-off mechanism.

Similar characters designate like parts in all the figures.

My improvements are applicable to the ordinary Fourdrinier paper-making machines, and may be applied to such machines already in use.

In the drawings, B B' designate portions of the ordinary top rails, which carry the suction-boxes C C' by means of the usual connections. (Not shown in the drawings.) Over these suction-boxes the endless "wire" W runs in the ordinary manner in the direction indicated by the arrow.

D and D' designate the dekle-straps, which are ordinarily used for holding the pulp in place on the wire-cloth W. These straps are carried at one end by wheels 2 and 3, fixed on a shaft 4, which is carried in brackets 5 and 6, that stand, respectively, on rails B and B'. Forward of the suction-box C, and underneath wire W, there is the usual roll 8 for supporting said wire under the weight of the dandy-roll R. This roll R is supposed to be the same as the plain dandy-roll now commonly used; but it may be either of the "wove" or of the "laid" varieties, as may be preferred. Said roll R is held in place by journals 9, which turn in slots formed in the adjustable bearing 12, which are secured by bolts 11 or otherwise to standards N N', re-

spectively. These standards, like the brackets 5 and 6, are carried on the rails B and B', respectively. As shown in the drawings, the roll 8 is carried by its journals 10 in the bearings 13, formed on said standards N N'; but in practice said roll may be otherwise supported and the bearing 13, if this be used, may be adjustably affixed to said standard.

All the parts above described are or may be the same as now used.

I will next describe my improvements. Forward of the dandy-roll R a shaft S carries adjustably fixed thereon one or more suitable water-markers, as M. These water-markers are usually made detachable from said shaft and also adjustable longitudinally thereof. Shaft S is carried in bearings 14, adjustably fixed by means of suitable bolts on standards N N'; or it may be otherwise suitably supported. The position of said shaft is such that when it is revolved at a proper speed the types 20 on said water-markers M will roll in proper contact with the web of paper E, which is being made on the wire W. The movement of shaft S is intermittent, the duration of the intermission being varied for the purpose of making the water-marks at different distances apart in the length of the web E; but during its movement said shaft has a uniform velocity. This is readily obtained by means of ordinary change-gearing, or by a belt and pulleys. The driving-pulley 22 is conveniently placed on the dekle-shaft 4, and from pulley 22 a belt 23 runs to the driven pulley 24 on the water-marker shaft S. These pulleys (or the gears, if gears be used in place of pulleys) are to be made of such relative sizes as will in practice cause the types 20 to roll against the web E without any sliding movement thereon. Operated by this means it is evident said shaft S would normally have a continuous rotary movement. For rendering said movement intermittent, one of the pulleys (in this instance pulley 24) is preferably affixed to its shaft by means of an ordinary friction-clamp or the like, as 38; and a let-off or stop mechanism is provided to temporarily interrupt said rotary movement. This mechanism is preferably constructed and arranged as follows: The shaft S has fixed thereon a hub 15, having thereon a projecting dog 16 for engag-

ing with a stop-arm 7, forming a part of lever 18. Said lever is pivotally secured at 17 to bracket N, and is held in its normal position by a spring 34, one end of which is fixed to arm 7 and the other end to bracket N. Cam 25, which is carried on stud 19 in bracket N, engages with the cam-shaped end 21 of lever 18. Said cam 25 in turning on its shaft forces down end 21 of lever 18, thereby lifting end 7 and liberating dog 16, fixed to shaft S. Said cam 25 is driven from shaft 4 (always slower than shaft S) through the train of gears 27, 28, and 29. The sizes of the gears in this train may be varied to produce different spaces between the water-marks on web E. Gear 29, being made larger relative to gear 27, the time of one revolution of cam 25 will be increased and the distances apart of the water-marks correspondingly increased. The intermediate gear 28 is carried on a stud 30, adjustably fixed in slot 31 of rocking arm 32. Said arm has its bearing on a sleeve projecting from bracket N, and is adjustably secured thereto by the well-known clamp-screw 33. This apparatus is a well-known means for transmitting motion from one gear to another, especially where one member of the train of gearing is sometimes to be changed for another of different size. By this means the water-marks may be varied in their distances apart longitudinally in the web, for such distance must be equal to the circle described by the type 20 plus the distance traveled by the web during the interruption of the movement of shaft S. The result is, that the same water-marking devices may be used for making sheets of different sizes and with the water-marks all properly located in the sheets.

The operation of my improved mechanism is as follows: The several parts of the machine being at rest, as shown in Figs. 1 to 3, inclusive, with the projecting portion 26 of cam 25 against end 21 of lever 18, and the arm or projection 16 of dog 15 against arm 7 of said lever, the machine is started, with shaft 4 revolving in the direction shown by arrow 35, and the wire W traveling in the direction shown by arrow 36. Cam 25 turns from the position shown in Fig. 3 to that shown in Fig. 4, during which time it has moved lever 18 sufficiently to release dog 16 on shaft S, thereby allowing said shaft to be driven forward by belt 23 from pulley 22 on shaft 4. Immediately after cam 25 passes the position shown in Fig. 4 lever 18 is returned to its normal position by spring 34, as shown in Fig. 5, ready to intercept said

dog 16 when this shall have completed one revolution. In the meantime shaft S is being driven from shaft 4 until the types 20 on the water-markers M have rolled around into contact with the web of paper, as shown in Fig. 5. Shaft S continues its revolution until dog 16 comes again into contact with stop-arm 7 of lever 8, thereby stopping said shaft, after which stud 19 still continues revolving, as before, and when cam 25 again comes to its position shown in Fig. 3 the mechanism repeats the whole operation.

It will be understood that this water-marking apparatus is capable of modification in various ways and degrees, after the manner of machines in general and within the scope and limits of my invention.

Having thus described my invention, I claim—

1. In a water-marking device for paper-making machines, the combination of the shaft carrying the water-markers, a driving-pulley, substantially as described, thereon, a projecting arm or dog fixed on said shaft, a reciprocating stop-arm interposable into the path of said dog for interrupting the rotation of said shaft, and means for intermittently oscillating the stop-arm, all substantially as described.

2. The combination, in a paper-making machine, of the wire W, shaft S, carrying the water-markers, having a pulley whereby it is driven, and a dog 16, a stop-arm operating to interrupt the movement of said dog and shaft S, and a cam having a continuous movement slower than the movement of shaft S and operating said stop-arm, all substantially as described.

3. The combination, in a paper-making machine, of the wire carrying the web, a shaft above and crosswise of said wire and carrying the water-markers, and having thereon a dog for stopping the revolution thereof, means, substantially as described, operating to impart to said shaft a normally-continuous and uniform rotary movement, a stop-arm arranged to intercept said dog and thereby stop said shaft, a cam operating said stop-arm to release said dog, and change-gearing driving said cam, whereby the interruption of the movement of said shaft may be continued for a longer or shorter time, all substantially as described, and for the purpose specified.

FRANCIS H. RICHARDS.

Witnesses:

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