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E. B. Bigelow & Waters,

Making Wire-Cloth Sieves.

No. 55,411. Patented June 5, 1866.

Fig: 2

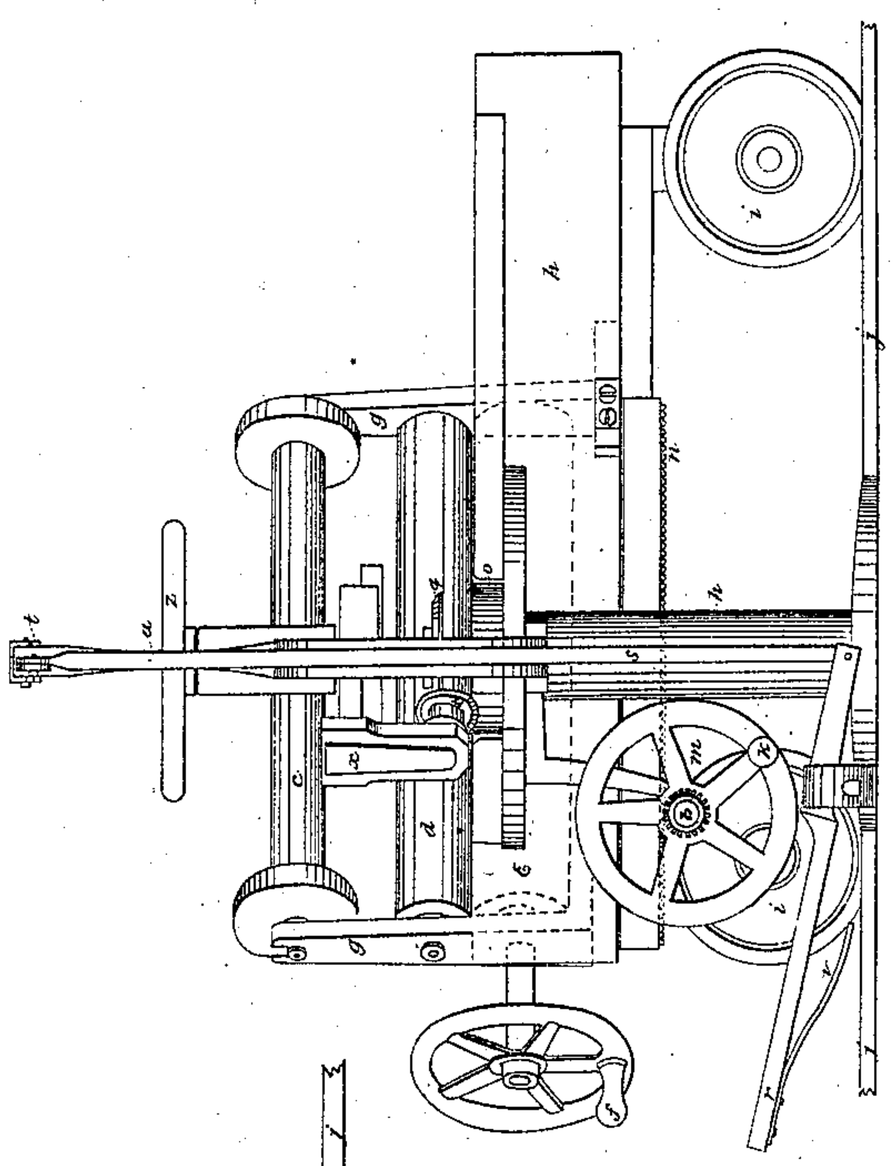
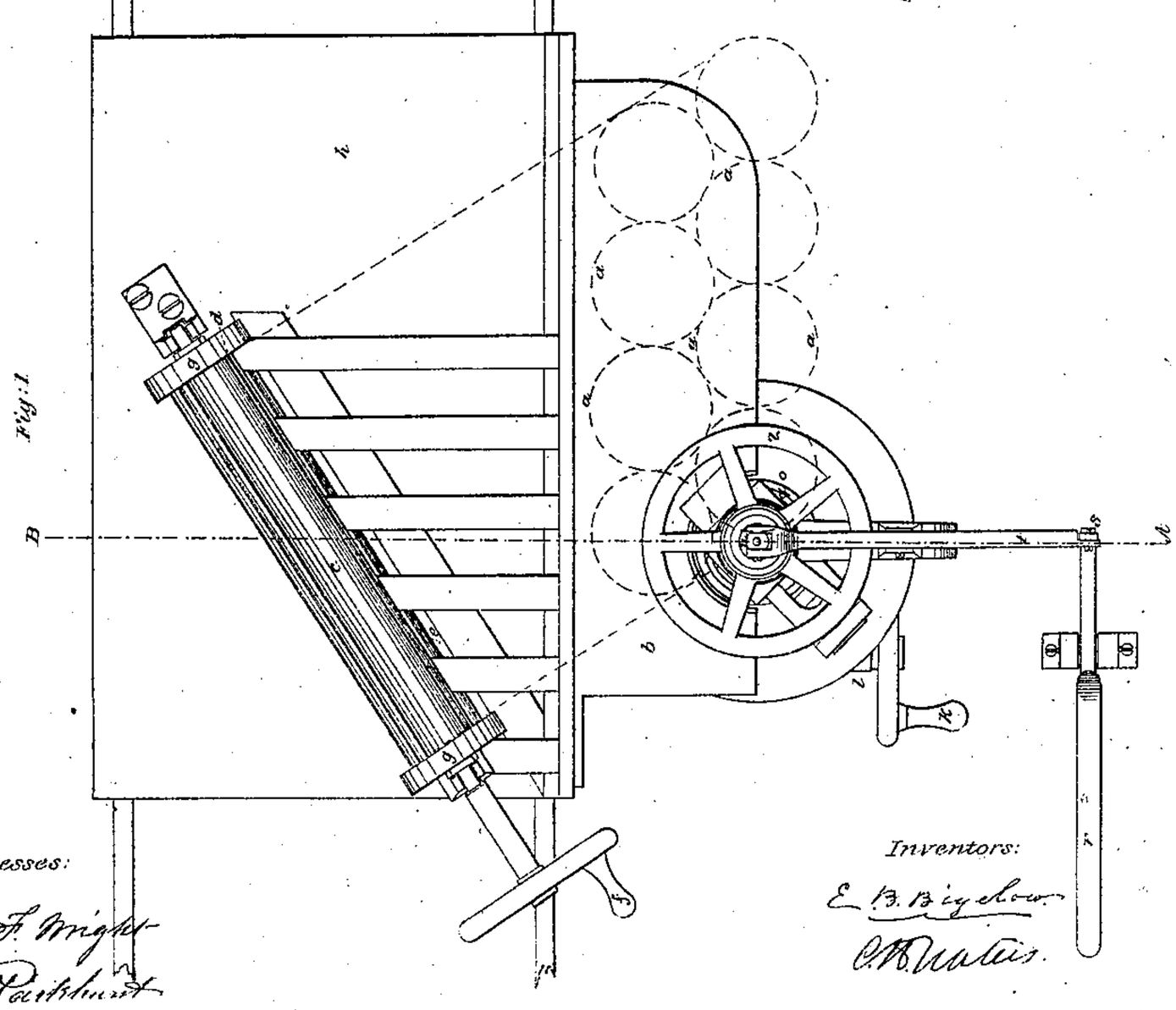


Fig: 1



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Making Wire-Cloth Sieves.

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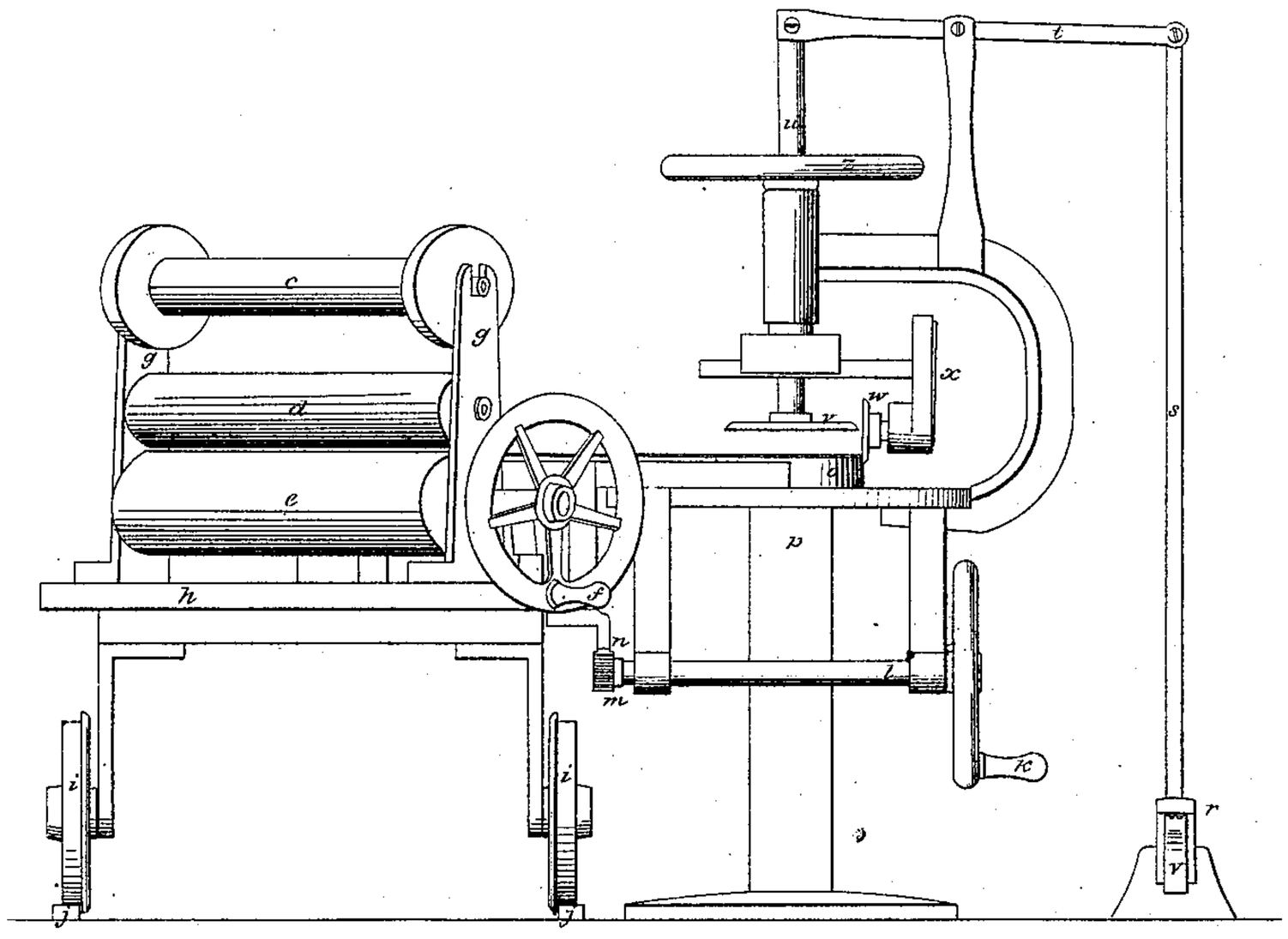
Fig: 3.



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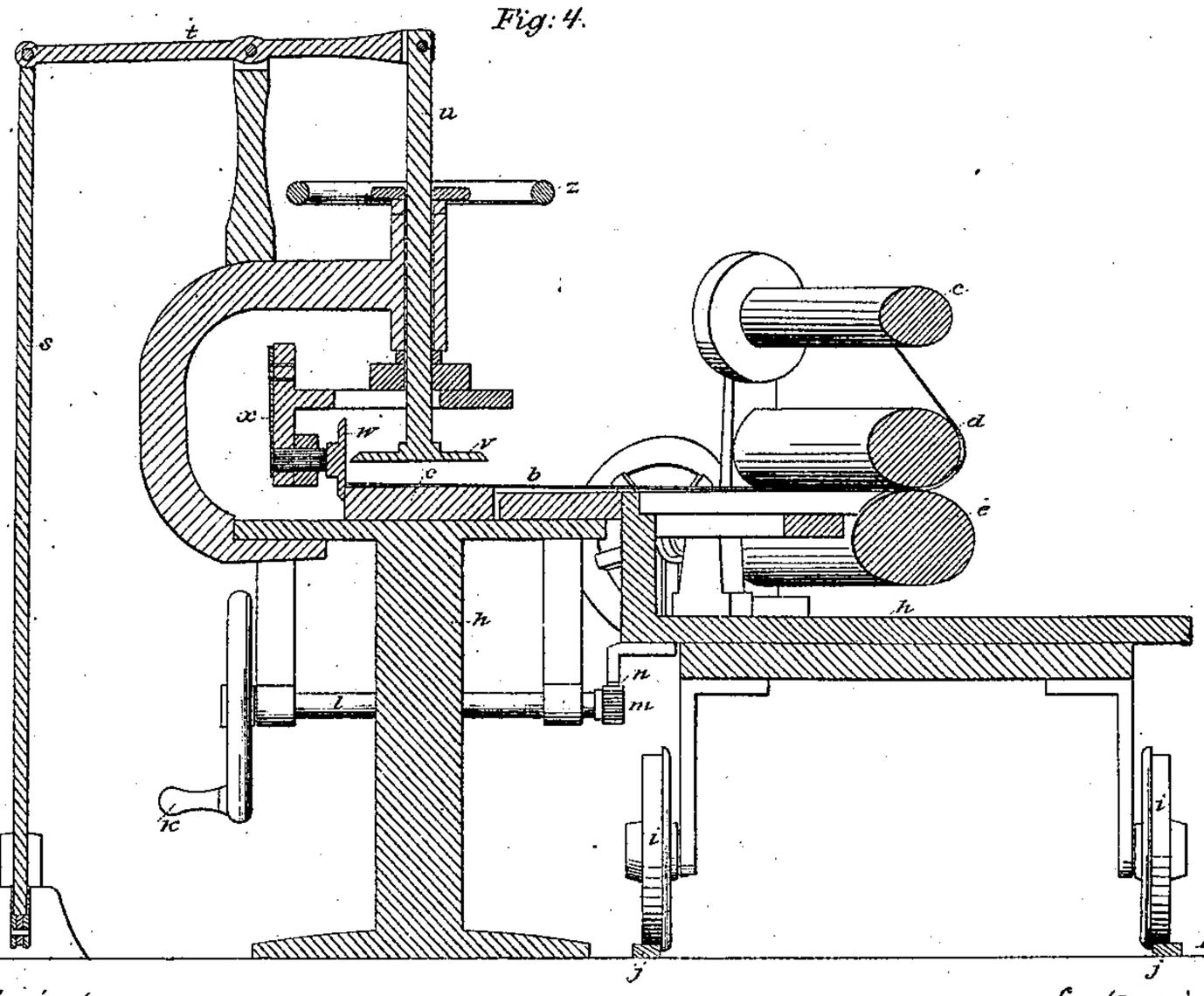

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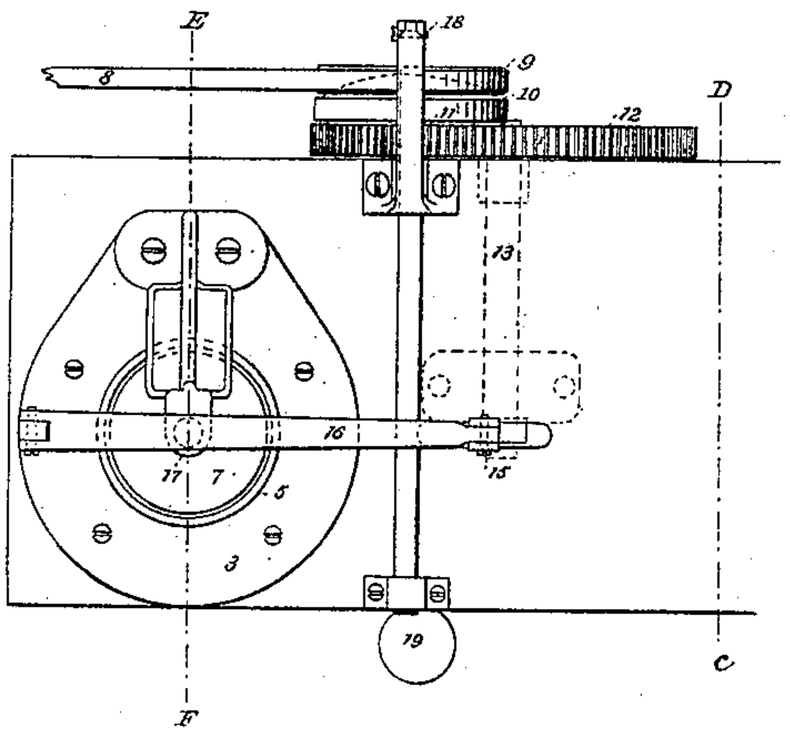
No. 55,411. Patented June 5, 1866.

Fig: 6



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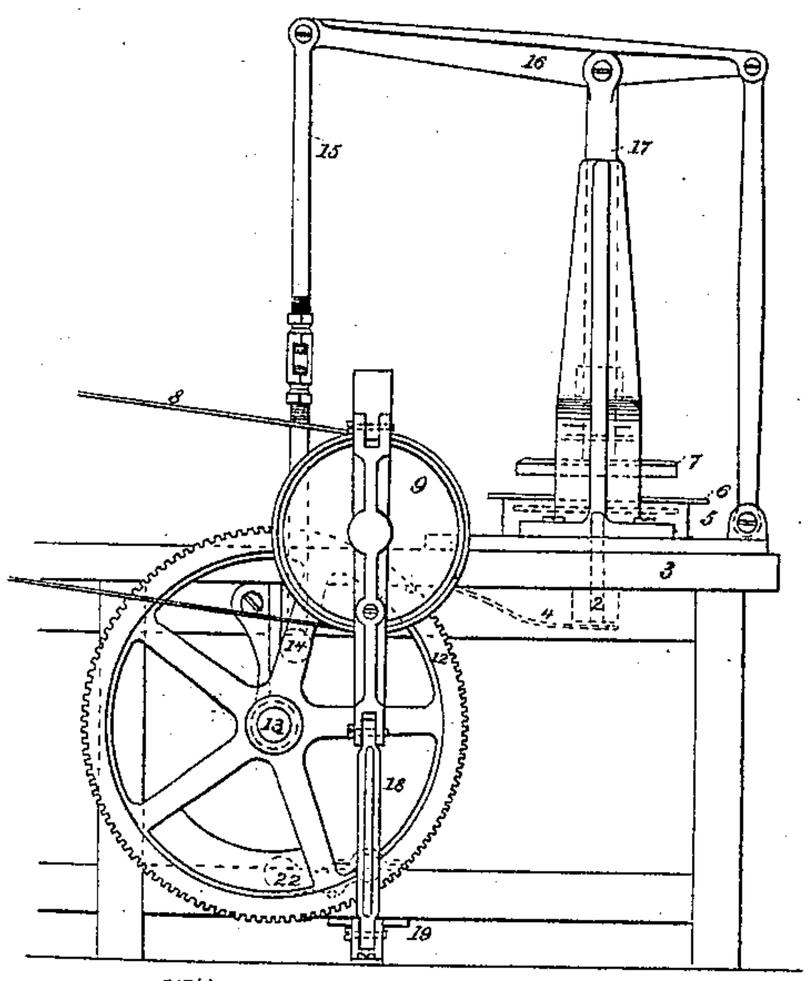

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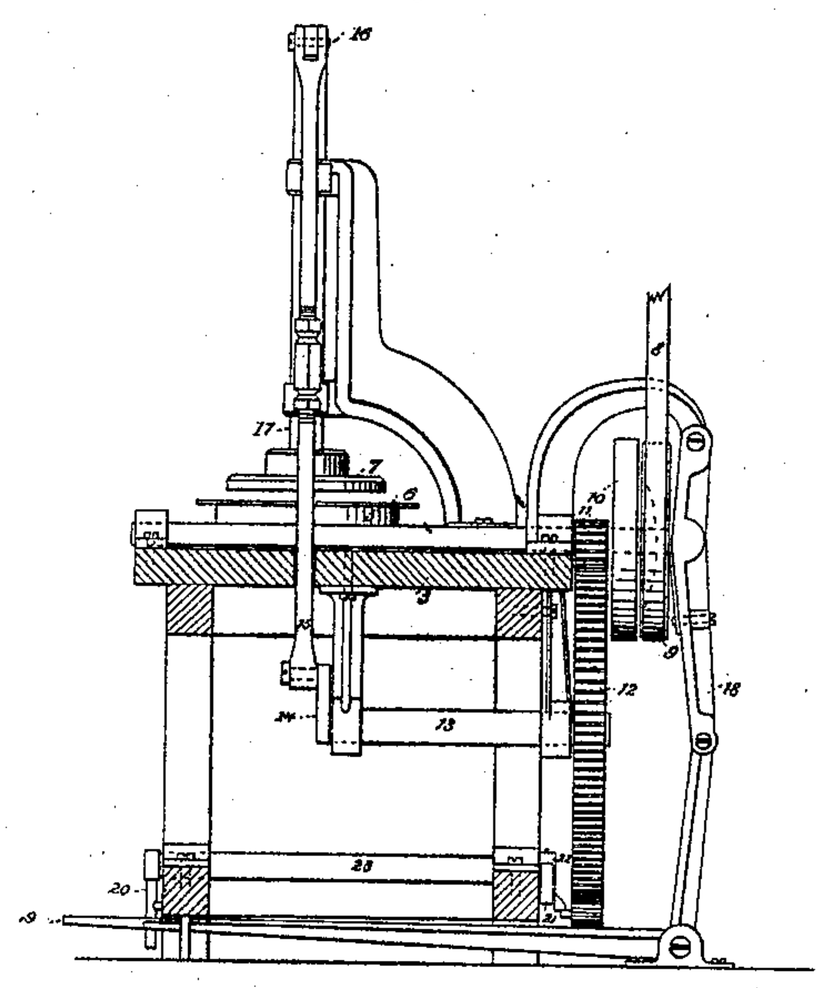

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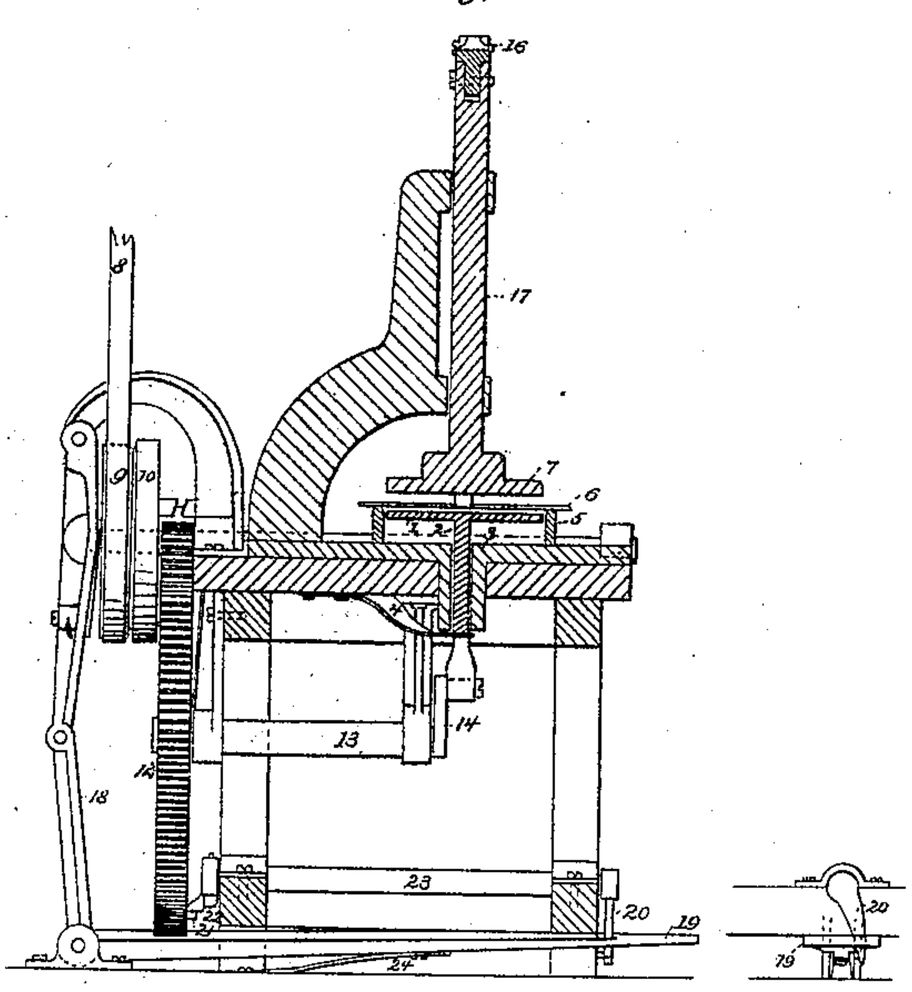

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4 Sheets, Sheet 4.

Making Wire-Cloth Sieves.

No. 55,411. Patented June 5, 1866.

Fig: 9

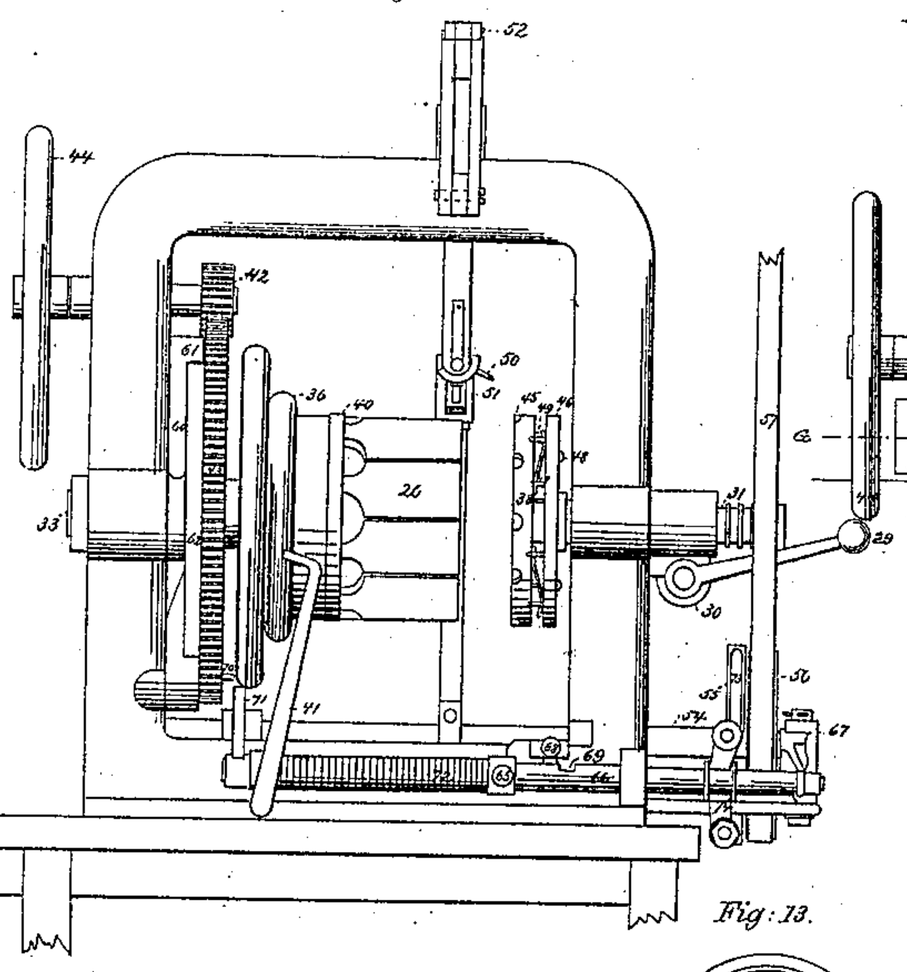


Fig: 10.

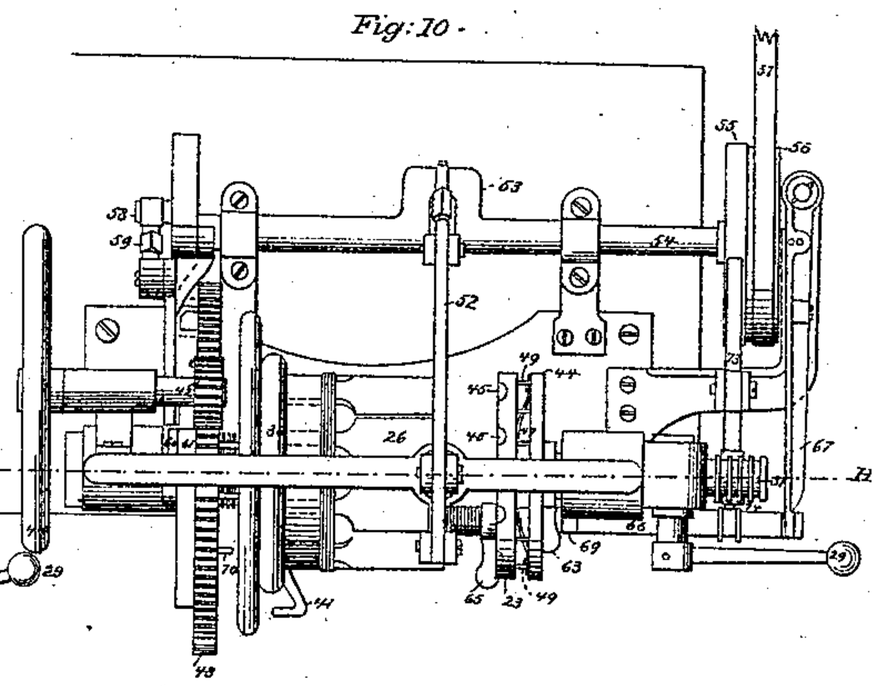


Fig: 13.

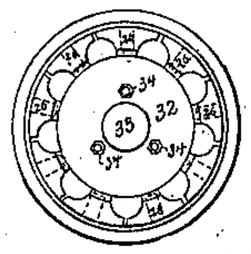


Fig: 11

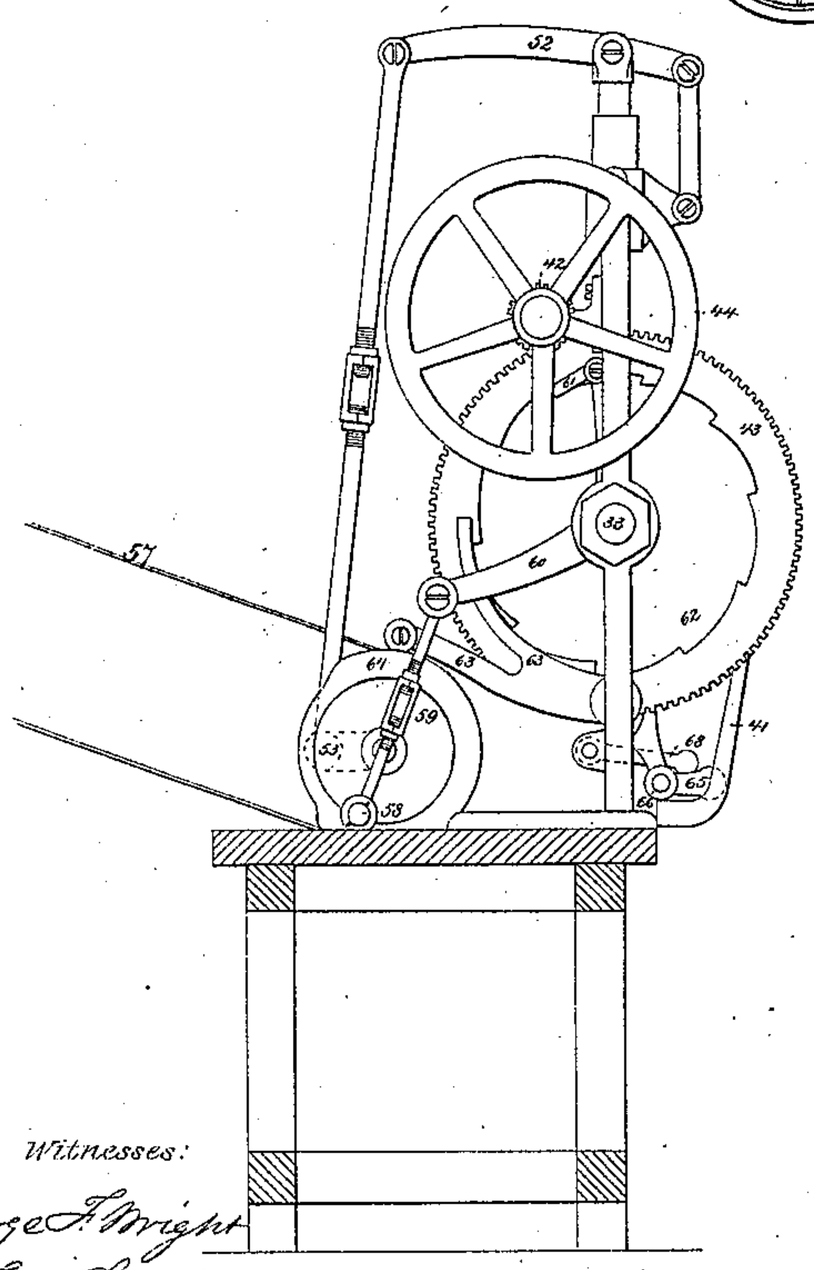
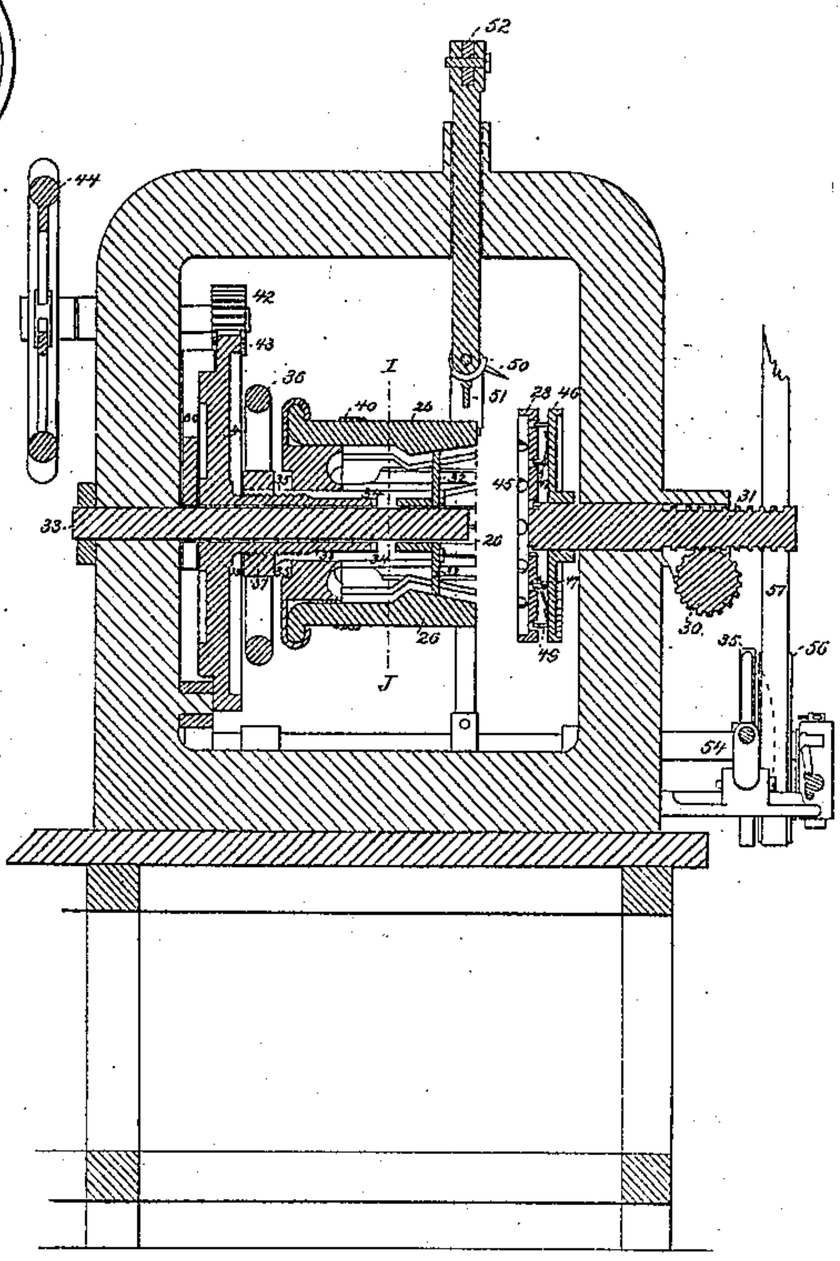


Fig: 12



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Inventors:

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C. H. Waters.

UNITED STATES PATENT OFFICE.

E. B. BIGELOW, OF BOSTON, AND CHARLES H. WATERS, OF GROTON, MASSACHUSETTS, ASSIGNORS TO CLINTON WIRE CLOTH COMPANY.

IMPROVEMENT IN MACHINERY FOR MAKING WIRE SIEVES.

Specification forming part of Letters Patent No. **55,411**, dated June 5, 1866.

To all whom it may concern:

Be it known that we, ERASTUS B. BIGELOW, of Boston, county of Suffolk, and State of Massachusetts, and CHARLES H. WATERS, of Groton, and county of Middlesex, and State aforesaid, have invented certain new and useful Improvements in the Method of Manufacturing Wire-Cloth Sieves, and in the Machinery used therefor; and we do hereby declare that the following description, with the accompanying drawings, forms a full, clear, and exact specification thereof.

The drawings represent the machinery used in our improved method.

Similar letters represent similar parts in the different views.

The first part of our improvement relates to the method of cutting out the sieve-bottoms from the wire-cloth.

Figures 1, 2, 3, and 4 represent what we term the "cutter," Fig. 1 being a top view, Fig. 2 a side view, Fig. 3 a front view, and Fig. 4 a vertical section on line A B of Fig. 1.

The wire-cloth from which the sieve-bottoms are made, instead of being woven narrow and cut into squares, as has been heretofore done, is woven wide—say wide enough for several sieve-bottoms, and is cut out round in diagonal rows across the web, the circles of one being in part cut out of the spaces between the circles of another row, thus saving a percentage of the cloth. The position of the circles is shown by the dotted lines *a* in Fig. 1.

The cloth (indicated by the red letter *b*) from which the bottoms are to be cut is wound in more or less quantity upon the roller *c*, and thence it passes between the two friction feed-rollers *d* and *e*, and extends outward to the action of the cutter, which will be hereinafter explained.

At one end of the lower feed-roller, *e*, is affixed a crank, *f*, by which the operator draws off at will the cloth from the cloth-roll *c* to bring it under the action of the cutting apparatus. The said cloth-rolls and feed-rolls are set in appropriate standards *g*, upon a moving carriage, *h*, which moves upon the four wheels *i* upon the guiding-rails *j*, and said carriage is moved by the operator by the crank *k*, through the shafts *l* and the pinion *m* and the rack *n*.

o is a circular die resting upon a suitable support, *p*, having a plane circular area at its surface coinciding with the desired size of the sieve-bottoms, and any desired portion of the end of the web of wire-cloth is brought over the stationary die by means of the two combined motions produced by the cranks *f* and *k*. When the desired portion of the wire-cloth is brought over the stationary die *o* it is firmly held during the process of cutting by means of the circular presser *q*, which is actuated by the foot of the operator upon the lever *r* through the connecting-rod *s*, the lever *t*, and the upright connecting-rod *u*, to the lower end of which the circular presser *q* is affixed.

v is a counteracting-spring to reverse the motion and throw up the presser from its pressure upon the cloth and die when the foot of the operator is withdrawn; but while the cloth is firmly held upon the die by the circular presser the circular sieve-bottom is cut by the revolving cutter *w*, the sharp edge of which cuts against the upper periphery of the circular die. The revolving cutter is constantly pressed to its contact with the die by the spring *x*, and receives its revolving motion by the action of the operator upon the hand-wheel *z*, one revolution of which cuts out a sieve-bottom, and thus completes the first step of our improved method.

The second part of our improvement relates to forming the sieve-bottoms for the hoop, or turning up the edges in the form of a tin-box cover, and of such diameter that the flange or edge is adapted to be received between the hoops of the sieve, to which they are to be nailed or fastened. The machinery for this purpose we term the "former," and it is shown in the drawings by Figs. 5, 6, 7, and 8.

Fig. 5 is a rear elevation. Fig. 6 is a top view. Fig. 7 is a vertical section on line C D of Fig. 6; and Fig. 8 is a vertical section on line E F of Fig. 6.

Similar numbers represent similar parts in all the views.

1 represents a circular plate resting upon a vertical stem or shaft, 2, which is fixed loosely in a vertical cylindrical passage in the bed-plate 3, and rests ultimately upon the spring 4. The circular plate 1 moves vertically in a short cylinder, 5, which is affixed to the top of the bed-plate 3.

The circular sieve-bottom 6, the edge of which is to be formed or flanged, is placed in the machine ready to be acted upon by the plunger 7, the area of which is a little less than the interior of the cylinder 5, and which, being depressed by appropriate machinery, hereinafter described, forces down the middle portion of the sieve-bottom, and with it the plate 1, by the yielding of the spring 4, and thus, by the action of the cylinder and plunger, the edge of the sieve-bottom is turned up or flanged. Upon the withdrawal of the plunger the action of the spring forces up the plate to its original level, and thus forces the sieve-bottom out of the cylinder, and the machine is again ready to repeat the operation.

Power is applied to the driving-belt 8 through the loose pulley 9, the fast pulley 10, the pinion 11, the cog-wheel 12, the shaft 13, the crank 14, the connecting-rod 15, the lever 16, and the connecting-rod 17, to the lower end of which the plunger 7 is affixed. The driving-belt 8 runs without actuating the machine as long as the loose pulley 9 revolves loosely upon its axis, but when pressed to its friction-hold against the tight pulley 10 by the jointed lever 18, which is actuated by the foot of the operator upon the treadle 19, the driving-belt actuates the entire machine.

The treadle 19 being depressed for the purpose of bringing the machine into action, is so retained by means of the gravitating catch 20, until again thrown out of action by the pin 21 upon the cog-wheel 12, which, after each complete operation, impinges upon the projecting lever 22, at the opposite end of the rocker-shaft 23, to which the catch 20 is affixed, when the spring 24 immediately throws up the treadle and relieves the jointed lever 18, and the friction between the fast and loose pulleys ceases.

The third part of our improvement relates to the expansion and nailing of the sieve, and the machinery for this purpose we term the "expanding fastener." It is exhibited in Figs. 9, 10, 11, 12, and 13.

Fig. 9 is a front view. Fig. 10 is a top view; Fig. 11, an end view; Fig. 12, vertical section on line G H of Fig. 10, and Fig. 13 is a detail section of the expanding-mandrel on line I J of Fig. 12.

When a sieve is to be constructed one of the hoops is placed upon the expanding-mandrel, which is composed of a number of segments, 26, constructed so as to be readily expanded and contracted, and the wire sieve-bottom, having been previously flanged, is capped over the hoop on the mandrel. The lower hoop or batten is then placed within the nailing-cup 28, and is advanced toward the mandrel by means of the lever 29 and the pinion 30 and the rack 31, until the batten appropriately circumscribes the hoop and sieve-bottom, as in the ordinary construction of a sieve. The mandrel is then expanded to the required tension, which is effected by the action of the follower 32 against the interior inclined or wedge-like surfaces of the segments of the mandrel. To the follower 32, which slides freely upon the shaft 33, are attached the three short connecting-rods 34, which, by suitable lips 35, are connected with the hub of the hand-wheel 36, which has in its hub a female screw-thread, 37, working upon a male screw-thread, 38, on the sleeve-cylinder 39.

40 is an elastic band which contracts the radiating segments of the mandrel upon the withdrawal of the follower.

When a more powerful expansion is required to give the sieve its final tension it is effected by arresting the rotary motion of the hand-wheel 36 by means of the dog-stop 41, and throwing the pinion 42, moved by hand-wheel 44, into gear with the cog-wheel 43, which is attached to the sleeve-cylinder 39.

The segments of the expanding-mandrel are made of metal, in order to serve as anvils on which to clinch the nails that are used in making the sieve. The nailing-cup has a number of small openings, 45, in the flange that receives the batten, and usually corresponding with the number of segments of the mandrel, and through which the holes are punched and the nails are driven that fasten the batten and hoop together to perfect the sieve.

Immediately in rear of the nailing-cup 28, and bearing loosely upon the same shaft, is a circular plate, 46, parallel with the nailing-cup, and kept at a limited distance therefrom by the springs 47 and the gage-pins 48. Near the outer circumference of this circular plate are a number of small pins, 49, which, on the completion of the sieve, and upon the withdrawal of the nailing-cup by action of the lever 29 and its appurtenances, projects through suitable openings in the plate of the nailing-cup, and thus forces out the newly-made sieve.

50 represents the automatic punch for punching the holes, and 51 the automatic hammer for driving the nails used in nailing the sieve, which work upon the same rod, and either of which being brought into action receives its required vertical motion through the lever 52, the crank 53, the shaft 54, the tight pulley 55, and the fast pulley 56, to which the power is communicated by the driving-belt 57.

Simultaneously with the vertical motion of the nailing device the mandrel receives an intermittent rotary motion from the shaft 54 through the crank 58, the connecting-rod 59, the lever 60, the vibrating catch 61, and the ratchet-wheel 62, which is attached to the side of the cog-wheel 43. The number of notches in the ratchet-wheel 62 corresponds with the number of slots 45 in the flange of the nailing-cup, and ordinarily with the number of segments of the mandrel, and the arrangement of the parts of the machine is such that the descending of the punch 50 or hammer 51 occurs during the cessation of the intermittent rotary motion of the mandrel.

63 is a friction-brake which, by the requisite form and position of the cam 64, fixed upon the shaft 54, is compressed upon the periphery of the ratchet-wheel 62, and holds it and

the connected mandrel firmly during the recession of the catch 61.

When it is desired to bring the machine into operation the hand of the operator is applied to the handle 65, and a limited motion from right to left is given to the shipping-rod 66, and through the lever 67 the loose pulley 56 is brought to its friction-hold upon the tight pulley 55, and the gravitating latch 68 drops into a notch, 69, in the shipping-rod 66, and retains the machine in action until one complete revolution and process of punching or nailing is effected, when the projecting pin 70 in the cog-wheel 43 strikes the lever 71, upon the end of the shipping-rod 66, and by a partial revolution of said rod throws off the gravitating latch 68, when the spiral spring 72 immediately throws back the shipping-rod to its original position, and the machine is thrown out of action.

73 is a friction-brake which, being connected with the shipping-rod 66 by the lever 74, releases its hold upon the tight pulley whenever the shipping-rod is moved to the left and the machine is in revolution.

We claim—

1. The cutting apparatus, constructed and operated substantially as described.

2. The forming apparatus, constructed and operated substantially as described.

3. The expanding fastener, constructed and operated substantially as described.

4. The method of manufacturing wire-cloth sieves by the successive use of the cutting apparatus, cutting the sieve-bottoms diagonally across the web of the cloth, the forming apparatus for turning up the edges of the sieve-bottom, and the expanding fastener for distending the sieve-bottoms, substantially as described.

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