

No. 697,511.

Patented Apr. 15, 1902.

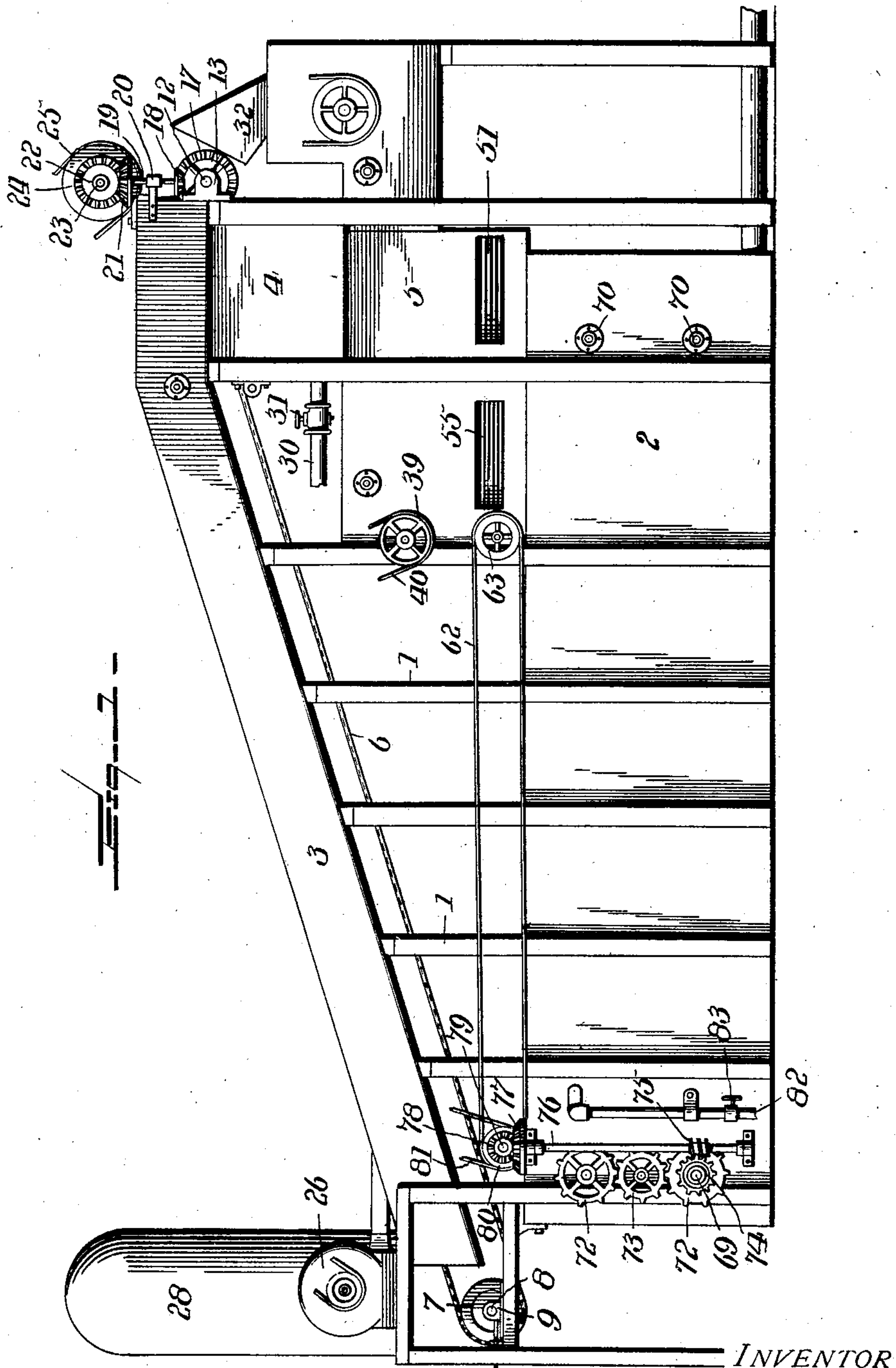
D. C. MAYO.

MACHINE FOR TREATING TOBACCO STEMS.

(Application filed May 28, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Wm F. Doyle
M. J. Schley

BY

David C Mayo
H. E. Anderson
Attorney

INVENTOR

No. 697,511.

Patented Apr. 15, 1902.

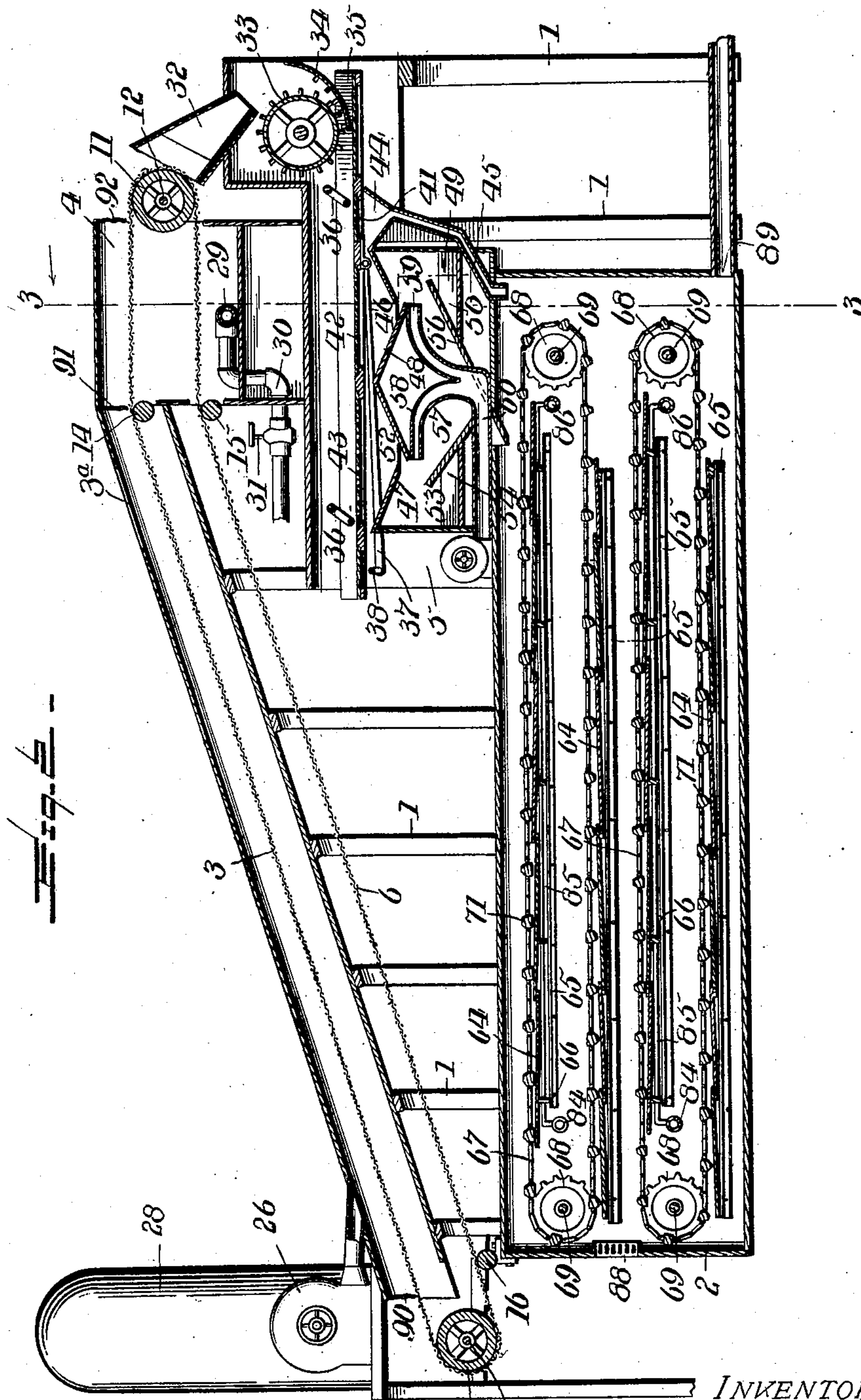
D. C. MAYO.

MACHINE FOR TREATING TOBACCO STEMS.

(Application filed May 28, 1901.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

Wm. F. Doyle
M. J. O'Leary

INVENTOR

BY *David C. Mayo*
H. G. Shumard
Attorney

No. 697,511.

Patented Apr. 15, 1902.

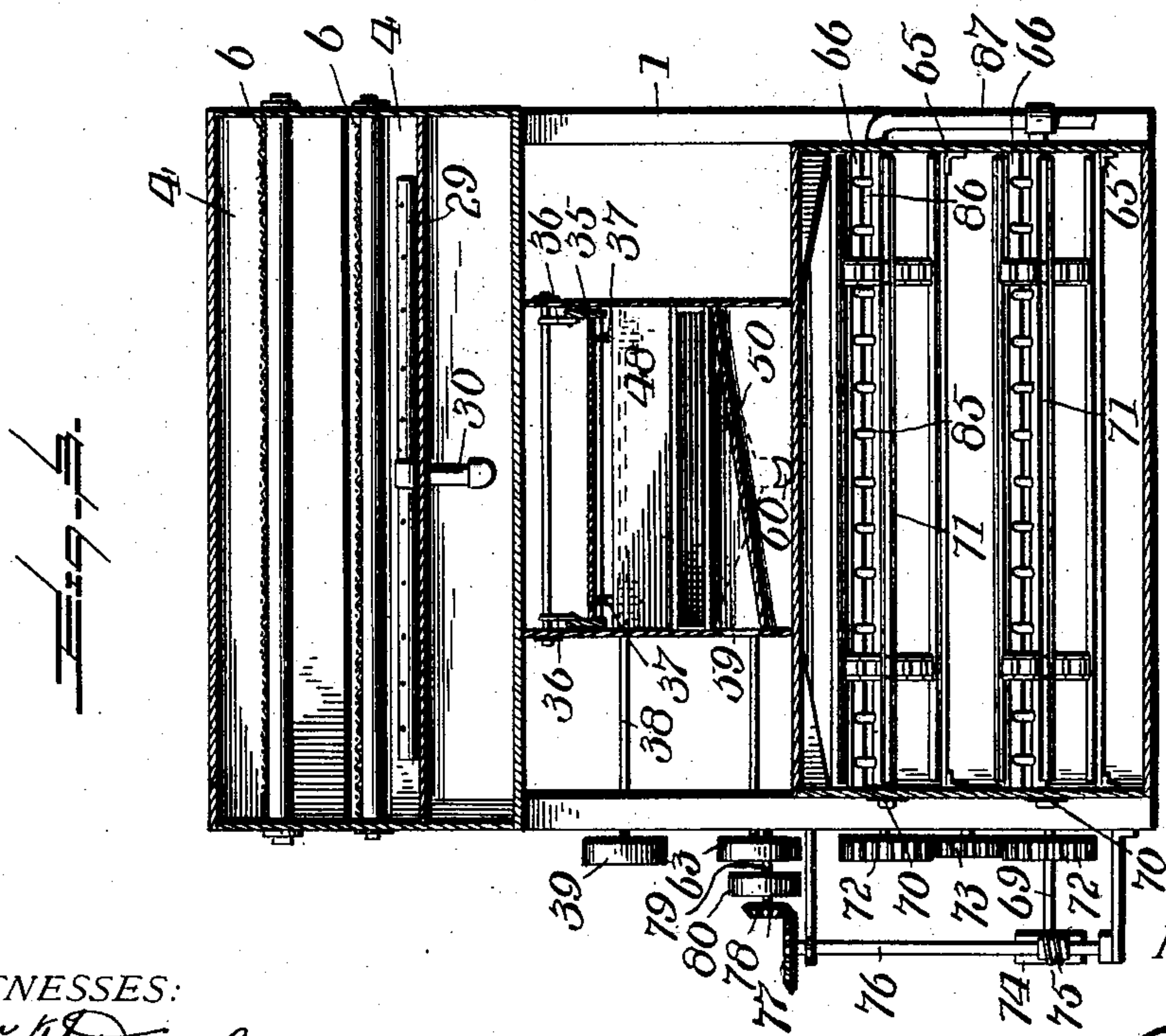
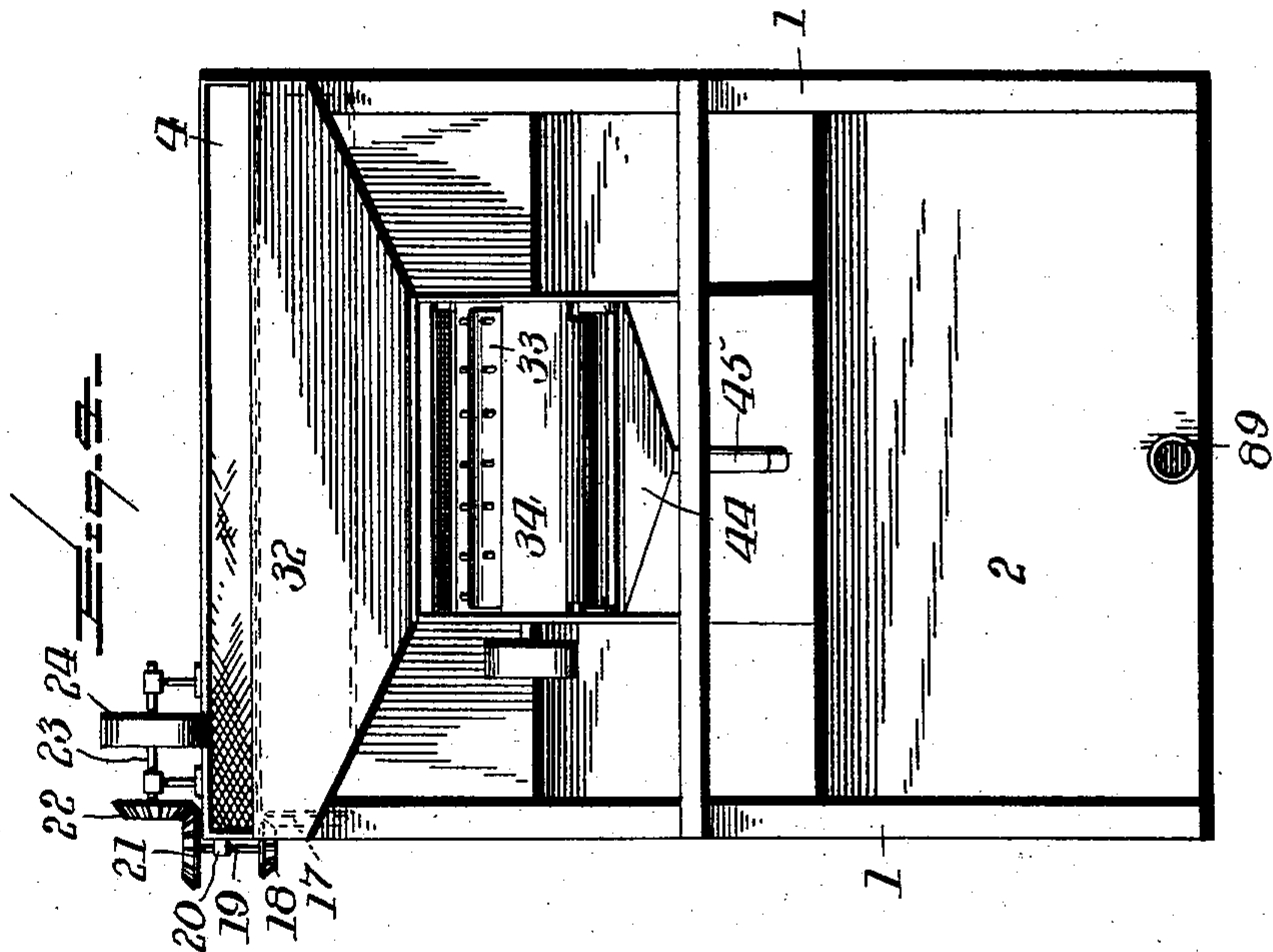
D. C. MAYO.

MACHINE FOR TREATING TOBACCO STEMS.

(Application filed May 28, 1901.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

Wm. F. Doyle
M. B. O'Leary

BY

David C. Mayo
Attorney

INVENTOR

UNITED STATES PATENT OFFICE.

DAVID CRAWLEY MAYO, OF RICHMOND, VIRGINIA, ASSIGNOR TO W. GRAY MOSELEY, OF RICHMOND, VIRGINIA.

MACHINE FOR TREATING TOBACCO-STEMS.

SPECIFICATION forming part of Letters Patent No. 697,511, dated April 15, 1902.

Application filed May 28, 1901. Serial No. 62,265. (No model.)

To all whom it may concern:

Be it known that I, DAVID CRAWLEY MAYO, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Machines for Treating Tobacco-Stems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to a machine for manipulating tobacco-stems after the leaf has been stripped therefrom, the stems still retaining, however, small portions of the leaf.

The object of the invention is to save as much as possible of the leaf adhering to the stems and in as large pieces or particles as possible and also to separate these larger particles of leaf from the stems and also from the smaller particles of tobacco-leaf, the larger particles being applicable to a different use and of much more value than the smaller particles.

It has also for its object to separate the stems from the particles of leaf and also to grade the stems, so that the stems of the proper size may be passed from the machine to a drier and from thence to the mill, wherein they are ground and granulated, the larger stems not in condition for this purpose being again passed through the machine, so as to reduce them to the proper size for the grinding-mill.

To the accomplishment of the foregoing and such other objects as may hereinafter appear the invention consists in the construction and in the combination of parts, as hereinafter particularly described and then sought to be clearly defined by the claims, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a side elevation of the machine; Fig. 2, a vertical longitudinal section through the same; Fig. 3, a vertical cross-section on the line 3 3 of Fig. 2; Fig. 4, an end view of the machine looking from the right hand of Fig. 2.

In the drawings the numeral 1 designates uprights of a framework, in the lower part of which is built a chamber 2 and at the upper part a trough 3, which opens into a compartment 4, between which and the top of the chamber 2, at one end of the latter, is a compartment 5. Through the trough 3 and the compartment 4 extends an endless carrier 6, preferably formed of a suitable wire-cloth, which at its lower end passes around pulleys 7, the shaft 8 of which is mounted in sliding boxes 9, each capable of adjustment by a screw 10, so as to keep the endless carrier taut. The other end of the endless carrier passes around pulleys 11, mounted upon a shaft 12, journaled in boxes 13, secured to the frame of the machine, and between the pulleys 7 and 11 the carrier will pass over suitable guide-rollers 14, 15, and 16. The carrier 6 will be driven from the shaft 12, which carries a bevel-gear 17, with which meshes a bevel-pinion 18 on the lower end of a shaft 19, passing through a bracket 20 and having at its upper end a bevel-wheel 21, with which meshes a bevel-wheel 22 on a shaft 23, which is provided with a pulley 24, around which passes a belt 25, which will derive its motion from a suitable drive-shaft. A force-fan 26 directs an air-current into and through the trough 3 from near the lower end of the trough for the purpose of drying the stems on the endless carrier, and for that purpose the air drawn into the blower 26 may be heated by suitable means—for instance, by steam-pipes in a chamber 28 or otherwise—and, if desired, this hot air may be introduced by a fan at the bottom of the trough, so as to pass up through the stems and then over the top of them through the trough. This hot air may escape through an opening 3^a, made in the top of the trough. For the purpose of moistening the stems before their discharge from the endless carrier 6 jets of steam or water may be injected into the compartment 4 at the discharge end of the carrier through a perforated pipe 29, located in said compartment and communicating through the pipe 30 with a suitable source of supply, said pipe 30 having a controlling-valve 31.

The tobacco-stems and adhering leaf-to-bacco discharge from the endless carrier into

a spout 32, located at the discharge end of the carrier, which spout delivers the stems to the breaker, which consists of a toothed cylinder 33 and a concave 34, the cylinder being rotated by power from any suitable source. The particles of leaf are broken and separated from the stems by the breaker, and the stems are also broken up by the breaker, and the leaf and stems thus broken are discharged onto a reciprocating screen 35. This screen is suspended within the compartment 5 by means of link hangers 36 and is reciprocated by means of pitmen 37, connected to the screen and also to the crank-shaft 38, which is journaled in the side walls of the compartment 5 and has a pulley 39 on its end, around which passes a drive-belt 40, deriving motion from a suitable shaft. The screen is provided with three different grading-surfaces 41, 42, and 43, the first one being nearest to the breaker and corresponding to a No. 24 wire-cloth and which preferably will be two feet in length. The next one, 42, will correspond to a No. 7 wire-cloth and preferably will be about four feet in length, and the next one, 43, will correspond to a one-half-inch wire-cloth and will preferably be about six feet in length; but the dimensions of these may vary from those stated. The first screening-surface 41 is intended for the separation of the dust or foreign matter that may pass onto the sieve with the stems and particles of tobacco-leaf. The second screening-surface is for the separation or grading of the smaller particles of leaf suitable for granulated smoking-tobacco, and the third sieve is for the separation of the larger particles of leaf, which are adapted for use in the manufacture of cut-plug tobacco and which are worth in the trade about twice as much as the smaller particles of leaf used for granulated smoking-tobacco, and hence will be perceived the advantage of this manner of separating or grading the particles of leaf-tobacco broken from the stems by the breaker. The dust and foreign matter which passes through the first screening-surface 41 falls into a hopper 44 and is carried off by a spout 45. The particles of leaf passing through the second screening-surface 42 fall into a hopper 46, formed in the top of a box 47, and by an inclined board 48 are directed from the hopper toward a chamber 49, formed in the box 47 and having an inclined bottom 50, which will discharge the particles of leaf through the opening 51, formed in the wall of the compartment 5. The larger particles of leaf which pass through the screening-surface 43 fall into the hopper 46 and are directed by the inclined board 52 into the chamber 53, provided with the inclined bottom 54, which discharges the leaf through the opening 55, made in the wall of the compartment 5. Such particles of stems as pass through the screening-surface 42 with the tobacco-leaf fall onto an inclined board 56, and the particles of stems which pass through the screening-surface 43 with the tobacco-leaf

fall onto an inclined board 57, which directs them onto the board 56, and from the board 56 the tobacco-stems pass into the drying-chamber 2. The particles of leaf-tobacco are prevented from passing down onto the boards 56 and 57 with the tobacco-stems by means of an air-current impelled through the air-flues 58 and 59, said flues diverging from a main flue 60, through which air is impelled by means of a fan 61, which is operated by a belt 62, passing around the pulley 63 on the fan-shaft. The blast of air issuing from the air-flues 58 and 59 blows the tobacco-leaf away from the tobacco-stems, so that the leaf will fall into the chambers 49 and 53, respectively, while the stems, being heavier, will fall onto the inclined boards 56 and 57 and be directed to the drying-chamber 2, as before indicated. The air-flues 58 and 59 will extend the width of the opening between the bottom of the hopper 46 and the lower ends of the inclined boards 48 and 52, so that all of the tobacco-leaf and such stems carried with the same will be subjected to the air-blast and separated from the stems and delivered into the chambers 49 and 53, respectively. It will thus be seen that the two grades of tobacco-leaf are delivered into and out of separate chambers in the box 47 and that the particles of tobacco-stems small enough for the grinding-mill will pass into the drying-chamber, while the larger pieces of stems too large for the grinding-mill will pass over the tail end of the reciprocating screen 35 and be collected and again returned to the breaker through the trough 33, so as to be broken into smaller particles, so as to pass through the screens and onto the drying-chamber, where they will be thoroughly dried, so as to place them in proper condition for the grinding-mill.

Within the drying-chamber 2 there will be placed a number of floors or platforms and also any desired number of endless carriers and also heating-pipes. I have illustrated two endless carriers and four platforms or floors, each of which I prefer to construct as follows: The floors are each made up of a number of metallic plates 64, which overlap at their meeting edges, so as to provide for expansion and contraction, which may be considerable under the influence of the drying-heat within the chamber. These metallic plates may rest directly upon angle-irons 65, extending lengthwise and bolted to the sides of the heating-chamber, or they may rest upon cross-bars 66, which will rest upon the angle-irons 65. The endless carriers will consist of chains 67, passing over sprocket-wheels 68, secured upon shafts 69, journaled in suitable boxes 70, attached to the side walls of the heating-chamber, the chains of each carrier being connected together by transverse bars 71, which serve to scrape over the floors or platforms, so as to move the tobacco-stems over each platform or floor, and the floors will be so positioned in relation one

to the other that the stems will drop from one floor down onto the floor immediately below and then carried to the end of that floor and discharged onto the next lower floor and then over the same, and so on over the several floors, as will appear clear from the construction illustrated in Fig. 2 of the drawings, and in order that one carrier may move the stems over two floors one of the floors will be located between the upper and lower portions of the carrier and the other floor located beneath the lower part of the carrier, as indicated in Fig. 2 of the drawings. The two sprocket-wheel shafts 69 at one end of the heating-chamber extend through the walls of the chamber and are provided each with a gear-wheel 72, which will mesh with an intermediate idler 73, so that the two shafts will turn in the same direction in order to give the proper direction of movement to the two carriers, and the lower shaft 69 will have upon its end a worm-wheel 74, with which will engage a worm 75 on a shaft 76, which has a bevel-gear 77 at its upper end, with which meshes a bevel-pinion 78 on a shaft 79, which shaft has a pulley 80, which receives a belt 81, which will connect with a suitable drive-shaft, and said shaft 79 may also carry the pulley around which the belt 62 will pass, so as to transmit motion to the fan-pulley 63, before mentioned.

For the purpose of heating the chamber 2 a steam or hot-air pipe 82, provided with a valve 83 and leading from a suitable source of supply, communicates with the transversely-extending pipes 84, located inside of the heating-chamber, and from these pipes or headers extend any desired number of longitudinal pipes 85, which at their opposite ends open into the transverse pipes or headers 86, which discharge into the pipe 87, leading to the outside of the chamber. The longitudinal pipes 85 are located immediately below each of the upper platforms or floors, as indicated in Fig. 2 of the drawings, and will pass through the transverse supporting-bars 66, as there illustrated. By this arrangement of pipes the heat is brought very close to the upper floors and is radiated from those floors to the lower floors, and thus a uniform heating of the chamber is obtained, so as to thoroughly and efficiently dry the tobacco-stems which are being moved through the chamber over the floors by the endless carriers, as before described. In order to obtain a proper heating of this chamber, it is necessary that there should be kept up a circulation of hot air, and for that purpose a ventilator 88 is formed in one end of the chamber and a fan (not shown) is caused to communicate with the other end of the chamber—say at the point 89—so as to keep up a circulation of air through the chamber, thus causing a forced circulation in the chamber and carrying off all moisture, so that the stems will be properly dried to put them in proper condition for the grinding-mill, the stems being discharged

from the chamber through an opening formed therein.

For the purpose of confining to some extent the air received in the trough 3 from the blower 26 I provide at the lower or receiving end of said trough a flexible curtain or shutter 90 and also provide a similar curtain 91 at the upper end of the trough, where it opens into the compartment 4, and also another curtain of like character at the end 92 of the compartment, where the tobacco-stems pass from the compartment and are delivered to the spout 32. These flexible curtains give or yield as the mass of tobacco-stems are moved along, so as to allow the stems to pass, and at the same time they confine the air to a greater or less extent within the trough, thus facilitating the drying of the stems.

Under the construction described I am able to practically separate all of the tobacco-leaf from the stems and save the same and at the same time am able to utilize the tobacco-stems, the smaller particles of the leaf being separated and used in the making of granulated smoking-tobacco, the larger particles of leaf being separated and used for the manufacture of cut-plug tobacco, and the stems themselves being granulated and used for the purpose for which granulated stems are ordinarily employed, and this grading and saving will amount to very much in the aggregate when it is remembered that ordinarily tobacco-leaf is worth from six to eight cents per pound, while the stems are worth from three to four dollars per ton. The machine also enables the stems to undergo the manipulation described and to have the particles of leaf separated therefrom without the necessity of first drying the stems sufficiently to enable them to be reduced in the grinding-mill, which when necessary under treatments heretofore practiced very materially reduces the quantity of tobacco obtained or saved. Furthermore, the machine described reduces materially the number of men necessary as operators in utilizing tobacco-stems under methods heretofore practiced.

I have illustrated and described the preferred construction and arrangement of the several parts; but changes can be made in the details without departing from the essential features of my invention.

Having described my invention and set forth its merits, what I claim is—

1. In a machine for treating tobacco-stems, the combination with a device for breaking the stems and leaf attached to the same, and a sieve for separating and grading the broken stems and leaf, of an endless carrier for carrying the stems and attached particles of leaf to the disintegrating device, a trough through which said carrier travels, and means for directing an air-current through said trough, substantially as described.

2. In a machine for treating tobacco-stems, the combination with a device for breaking the stems and leaf attached to the same, and

a sieve for separating and grading the broken stems and leaf, of a carrier for delivering the stems and attached leaf to the disintegrating device, and means for subjecting the stems and attached leaf to the action of steam before delivering the stems and attached leaf to the disintegrator, substantially as described.

3. In a machine for treating tobacco-stems, the combination with a device for breaking the stems and leaf attached to the same, and a sieve for separating and grading the broken stems and leaf, of an endless carrier for carrying the stems and attached particles of leaf to the disintegrating device, a trough through which said carrier travels a fan for impelling a current of air through said trough, a compartment for inclosing a portion of the carrier next to the disintegrating device, and a perforated pipe in said compartment, substantially as described.

4. In a machine for treating tobacco-stems, the combination of a disintegrator for breaking the stems and the leaf attached to the same, a reciprocating sieve having a grading-surface of different meshes, separate chambers beneath the sieve to receive the different grades of tobacco-leaf, means for separating leaf from stems, a drying-chamber, and means for delivering the tobacco-stems to said chamber, substantially as described.

5. In a machine for treating tobacco-stems, the combination of a disintegrator for breaking the stems and the leaf attached to the same, a reciprocating sieve having a grading-surface of different meshes, separate chambers to receive the separate grades of leaf, means for separating leaf from stems, and means to receive the stems separate from the leaf, substantially as described.

6. In a machine for treating tobacco-stems, the combination of a disintegrator for breaking the stems and the leaf attached to the same, a reciprocating sieve having a grading-surface of different meshes, separate chambers to receive the separate grades of leaf,

means for creating an air-blast for carrying the leaf from particles of the stems, and means for delivering the stems to a drying-chamber, substantially as described.

7. In a machine for treating tobacco-stems, the combination of a disintegrator for breaking the stems and the leaf attached to the same, a reciprocating sieve having a grading-surface of different meshes, a box formed with a hopper to receive the tobacco-leaf and particles of stems from the sieve and having separate compartments for the separate grades of leaf, inclined boards in said hopper to direct the broken leaf and particles of stems toward the separate compartments, air-flues and means for impelling an air-current through the same and against the falling leaf and stems to carry the leaf from the stems, and means for receiving the particles of stems separated from the leaf, substantially as described.

8. In a machine for treating tobacco-stems, the combination of a disintegrator and separator for detaching the leaf from the stems and separating one from the other, a drying-chamber and means for delivering the stems from the separator to the drying-chamber, said drying-chamber containing a platform formed of a number of plates having their adjacent edges overlapping and out of line with each other, an endless carrier for moving the stems over said platform in the direction in which the plates overlap each other, heating-pipes extending along the under side of the overlapping plates, and means permitting the entry of air into one end of said chamber and its exit from the opposite end, substantially as described.

In testimony whereof I affix my signature in presence of two-witnesses.

DAVID CRAWLEY MAYO.

Witnesses:

RANSON GUY,
L. W. BRANDER.