A. S. AMOUROUX.

MACHINE FOR FOLDING VERMICELLI AND SIMILAR PRODUCTS.

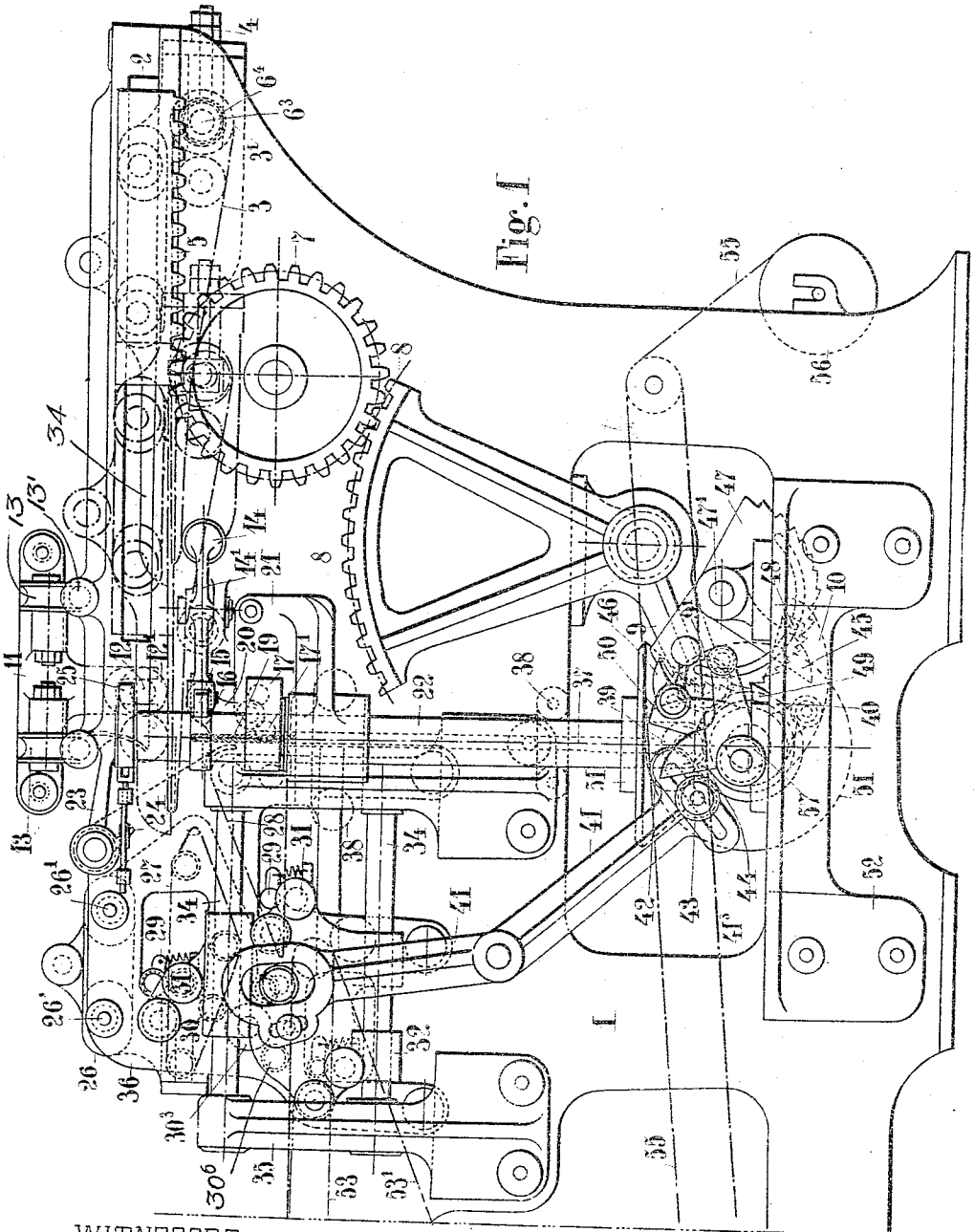
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10 SHEETS—SHEET 1.

Fig. 1



WITNESSES

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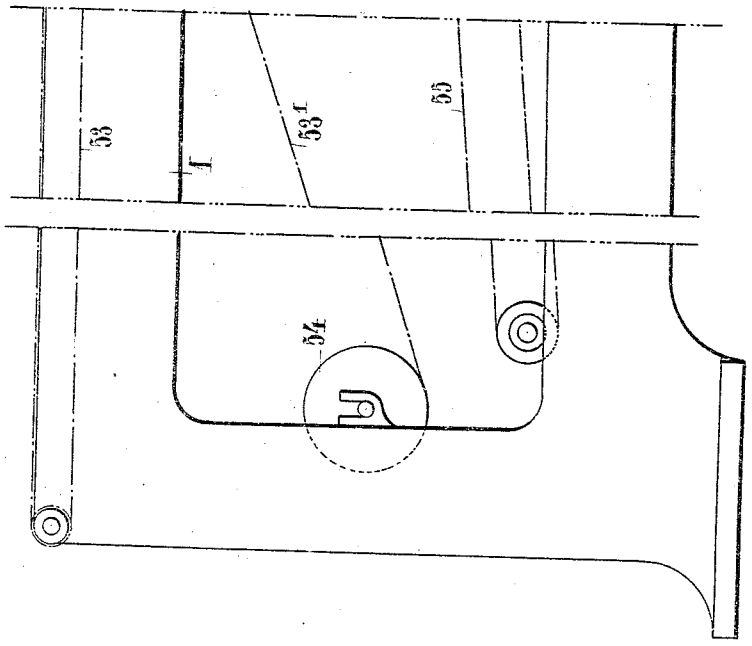
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10 SHEETS—SHEET 2.

Fig. 1ª



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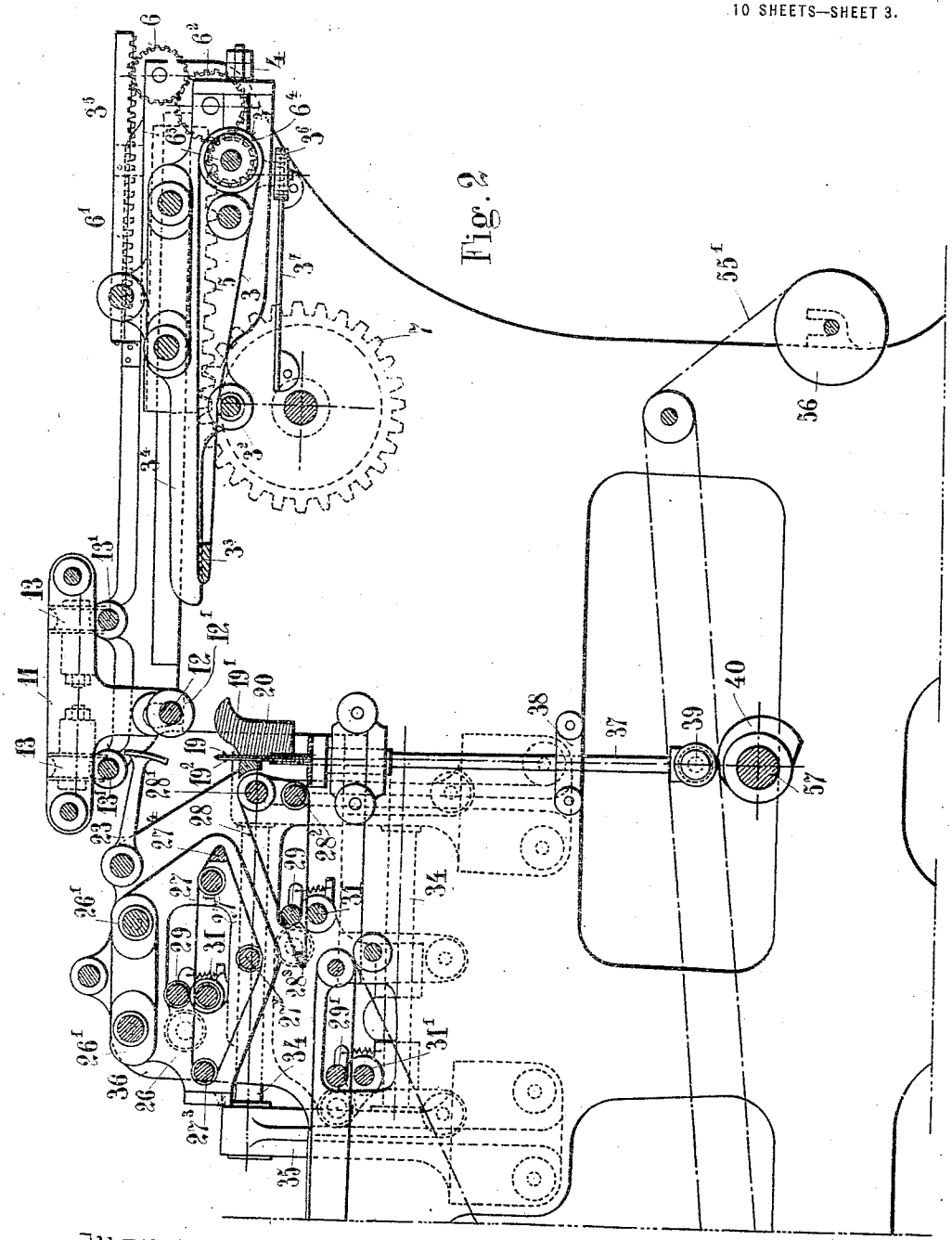
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10 SHEETS—SHEET 3.

Fig. 2.



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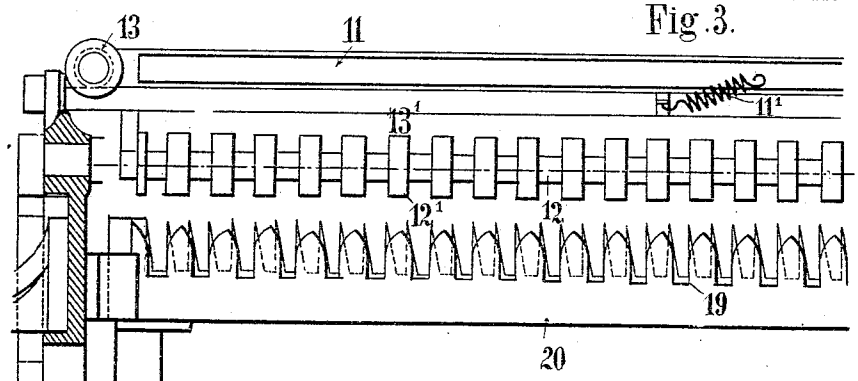
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10 SHEETS—SHEET 4.

Fig. 3.



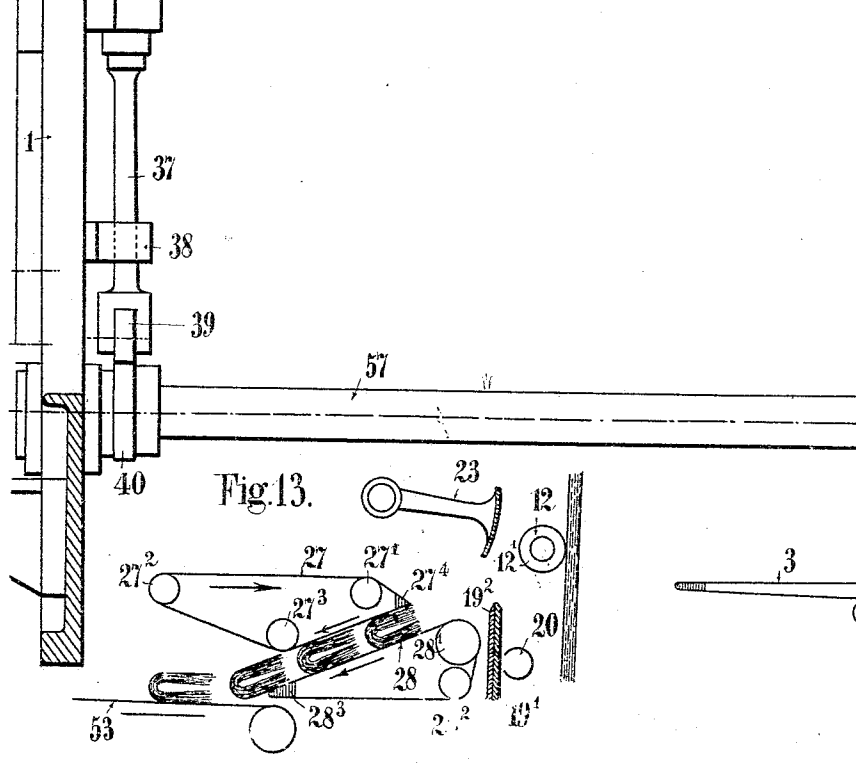
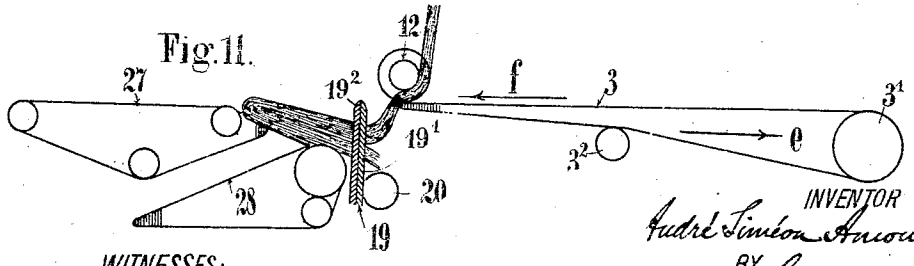


Fig. 13.

Fig. 11.



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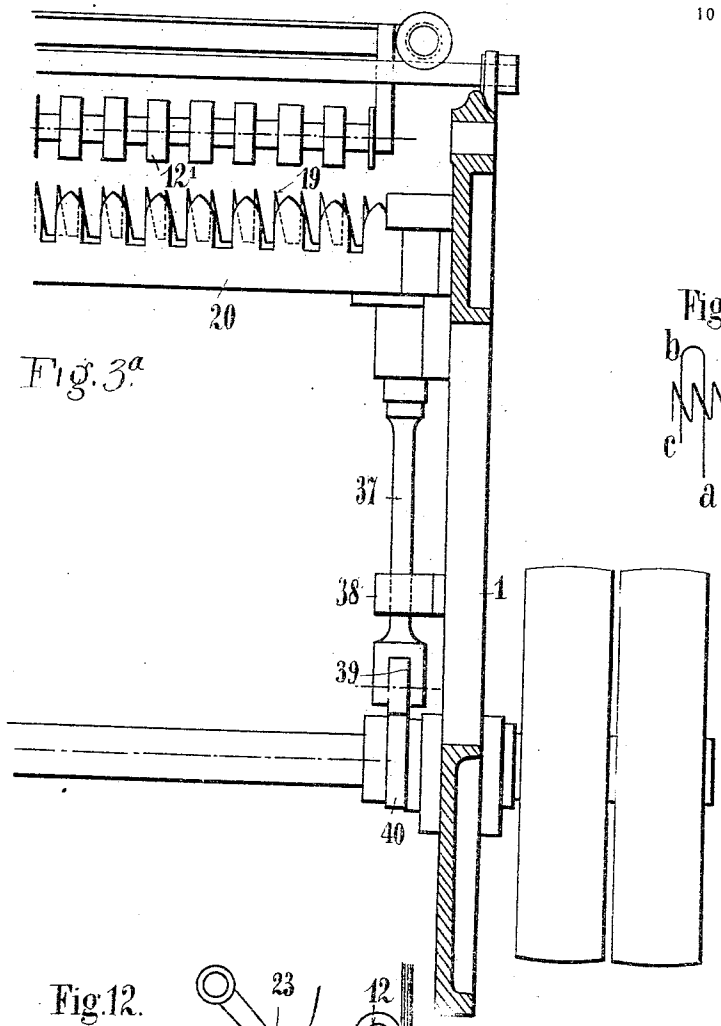


Fig. 3ª.

Fig. 14.

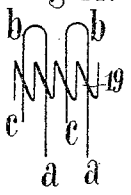


Fig. 12.

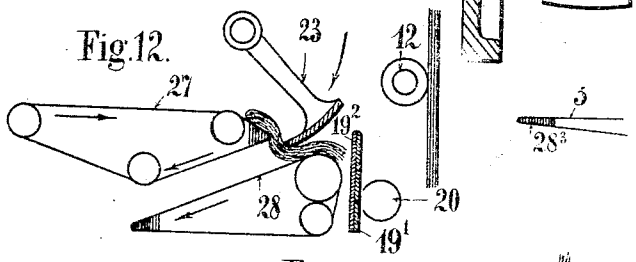
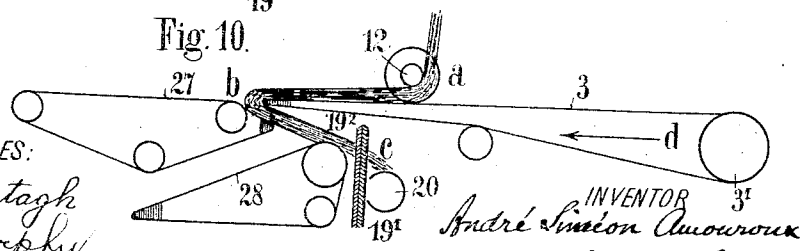


Fig. 10.



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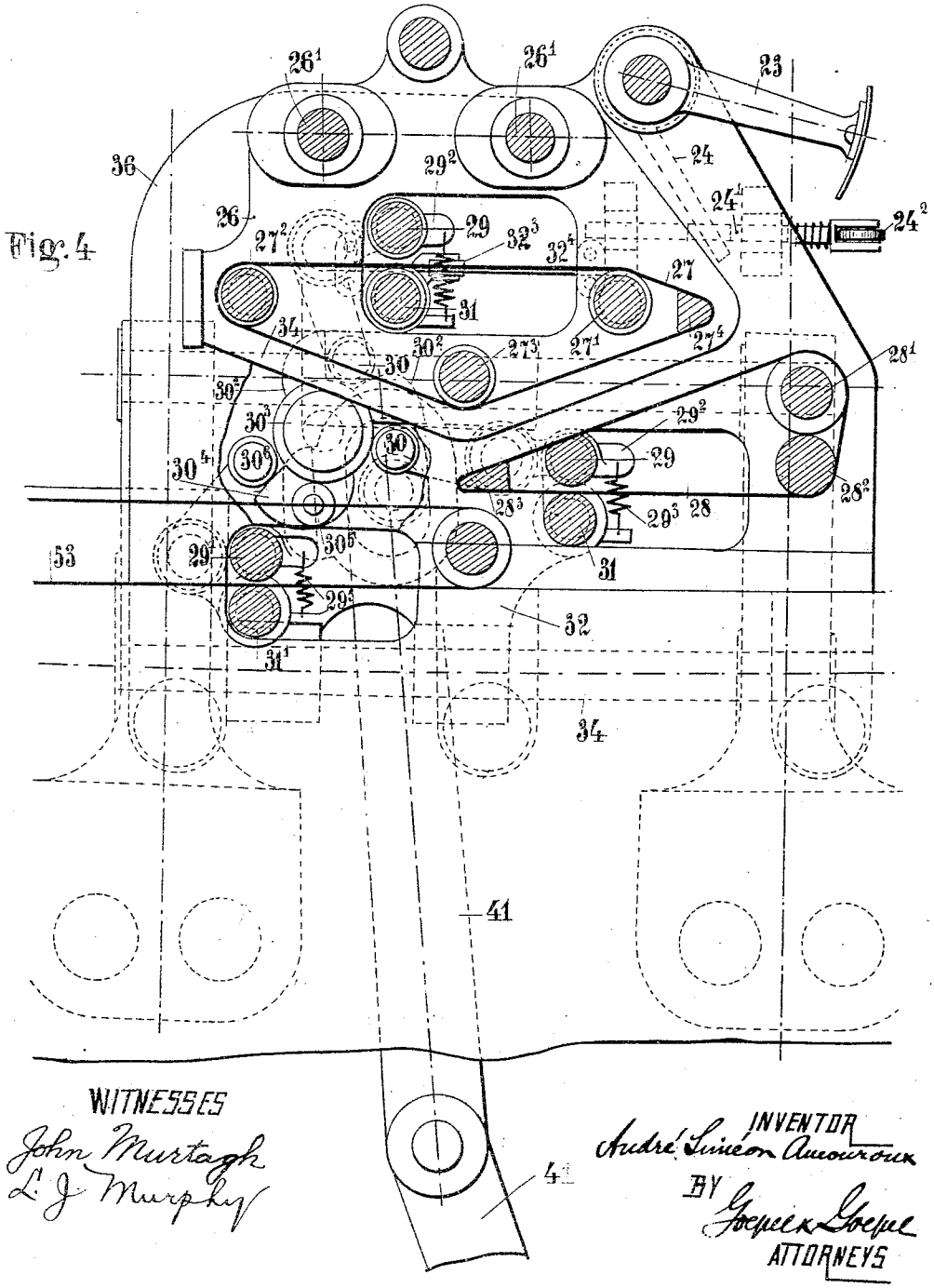
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10 SHEETS—SHEET 6.

Fig. 4



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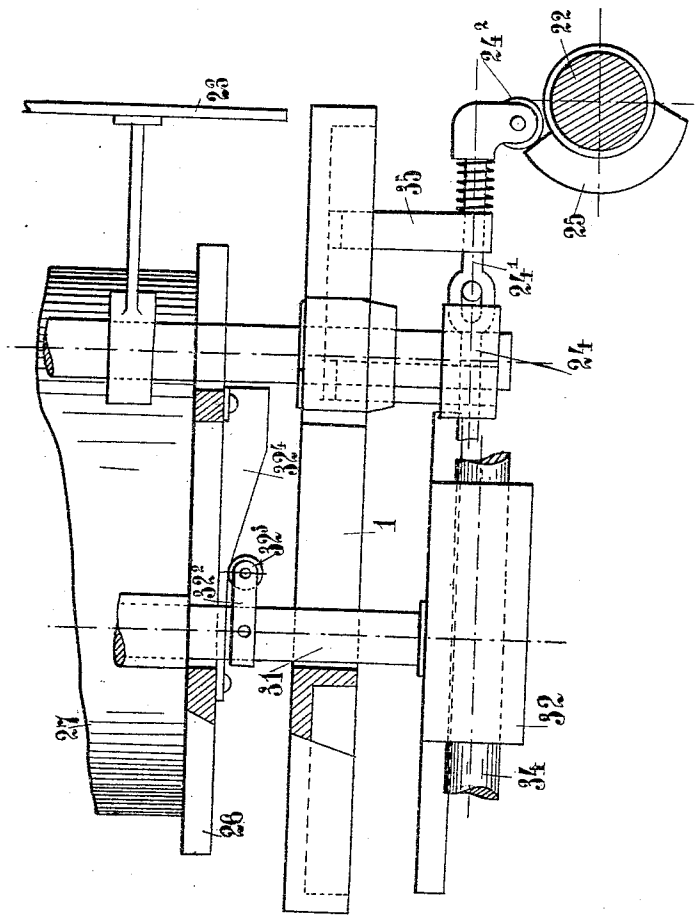
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10 SHEETS—SHEET 7.

Fig. 5



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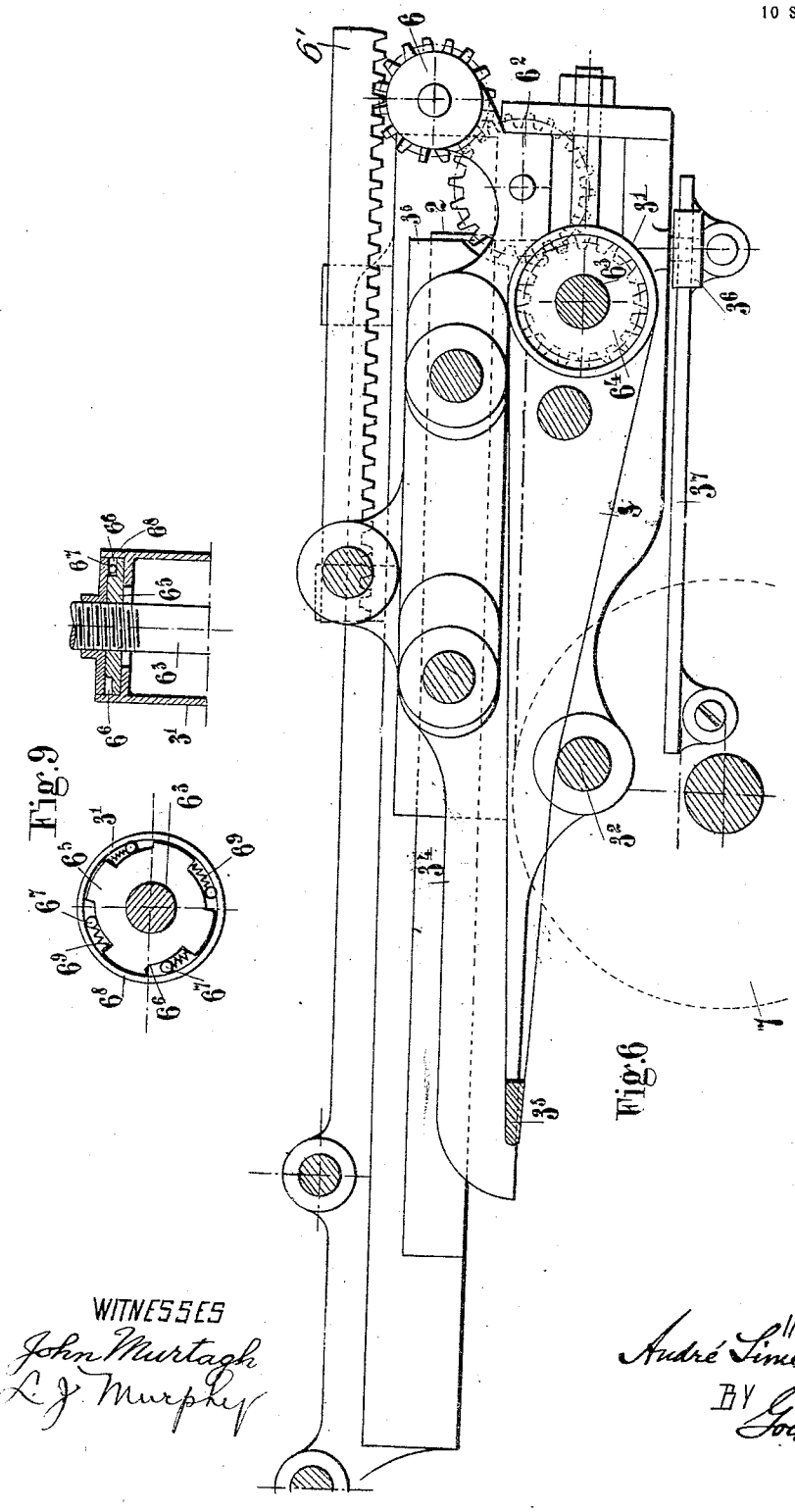


Fig. 6

Fig. 9

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10 SHEETS—SHEET 9.

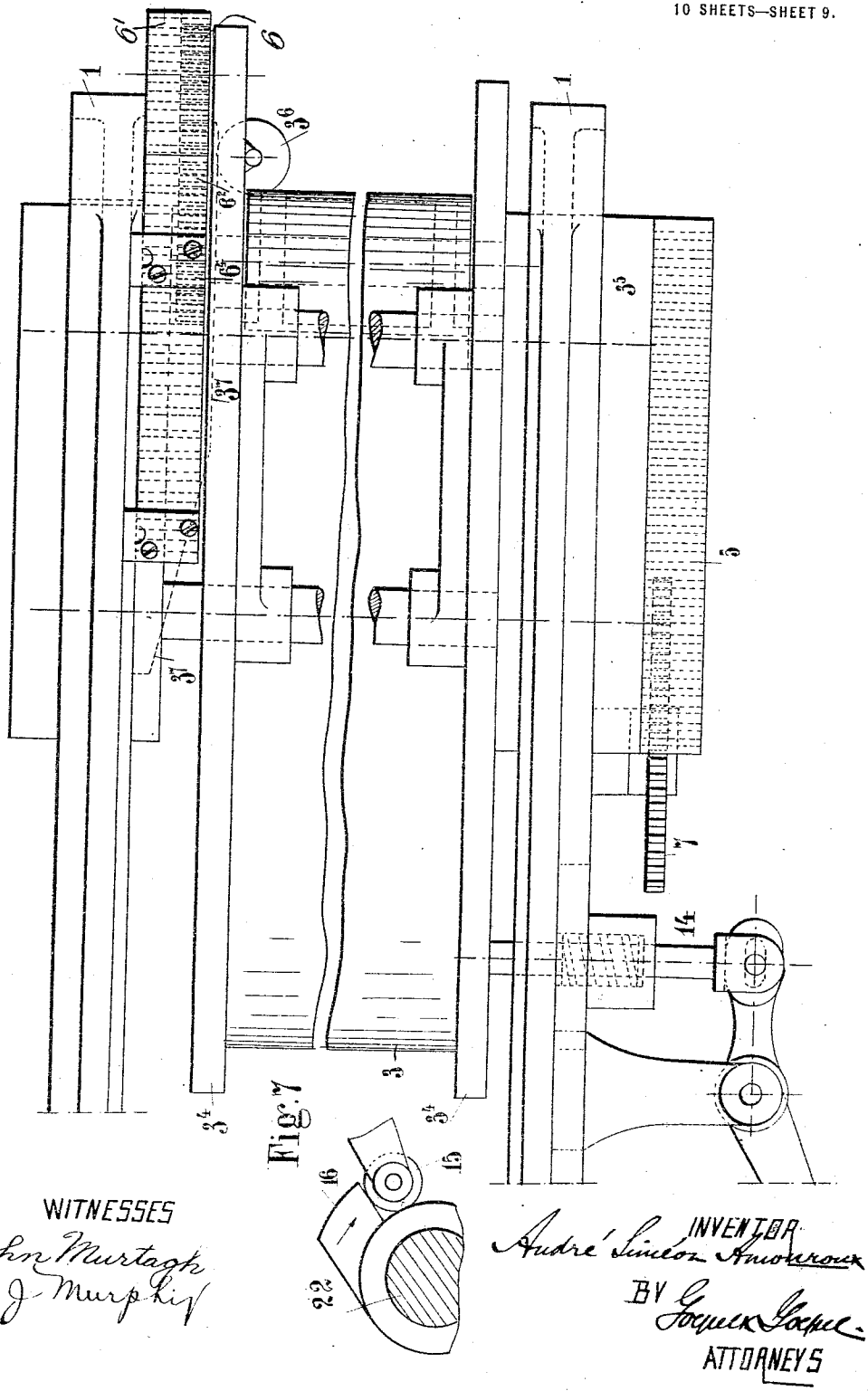


Fig. 7

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Fig. 8

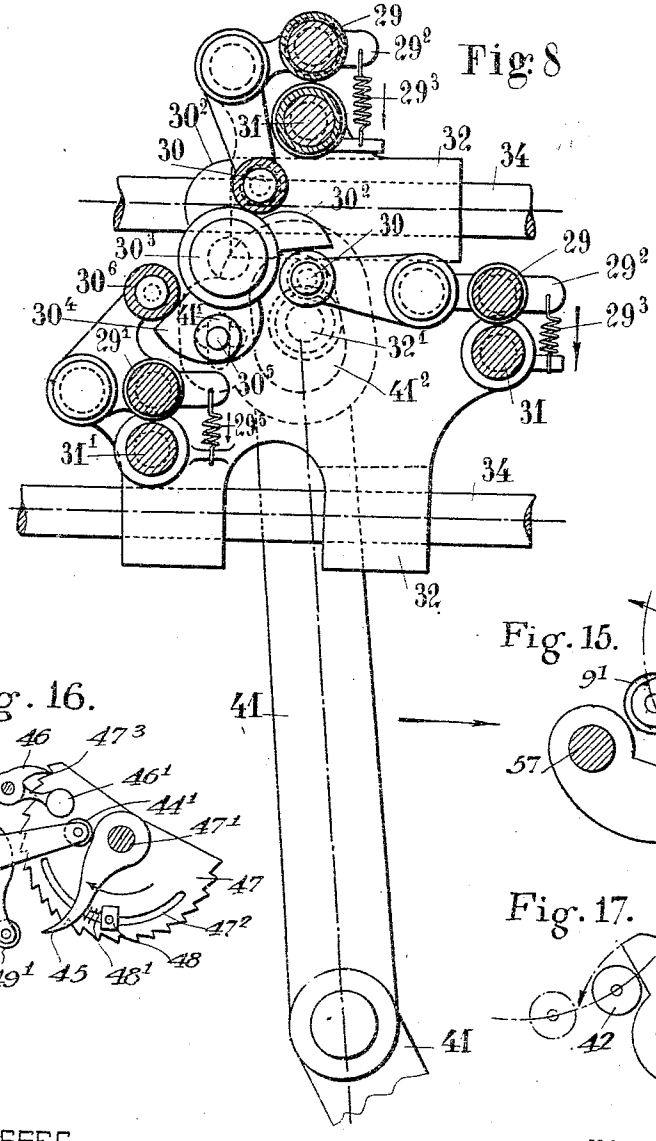


Fig. 15.

Fig. 16.

Fig. 17.

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UNITED STATES PATENT OFFICE.

ANDRÉ SIMÉON AMOUROUX, OF VIZILLE, FRANCE.

MACHINE FOR FOLDING VERMICELLI AND SIMILAR PRODUCTS.

1,145,874. Specification of Letters Patent. Patented July 13, 1915.

Application filed May 9, 1908. Serial No. 431,946.

To all whom it may concern:

Be it known that I, ANDRÉ SIMÉON AMOUROUX, a citizen of the Republic of France, and resident of No. 2 Rue Imbert, Vizille, Isère, France, have invented new and useful Improvements in or Relating to Machines for Folding Vermicelli and other Similar Products, which improvements are fully set forth in the following specification.

The object of this invention is to provide a machine for folding vermicelli and similar products.

This machine comprises intermittently movable endless bands serving to produce in combination with a driver, the folding of the threads of vermicelli conducted by groups to the machine, and comprises also a device for dividing the threads into groups and a band serving to transport the divided and folded parts of said groups and constituted by consecutively joined sheets or leaves combined in a manner to permit the disposing upon each one of the sheets or leaves of this band, of a number of folded bunches determined by the rows of divided and folded parts of the groups of threads.

The annexed drawings represent by way of example a form of embodiment of the invention.

Figures 1 and 1^a are complementary side views of the machine, Fig. 2 is a partial longitudinal sectional view of the machine, Figs. 3 and 3^a together show a transverse section, with the cutting device in elevation, Fig. 4 is a part of a longitudinal section but on a larger scale, Fig. 5 is a view in plan of a driving gear of the arm of the folding rail and the inclined piece which serves for the lateral displacement of a transporting canvas, Fig. 6 is a longitudinal section across the driving mechanism of a second transporting canvas, Fig. 7 is a plan view corresponding to Fig. 6 and showing the driving gear for the lateral movement of the transporting canvas, Fig. 8 represents pairs of grippers which seize the transporting canvases or aprons, Fig. 9 shows a detail, Figs. 10 to 13 represent consecutively the various phases of operation of the transporting canvas, the folding mechanisms and knives, Fig. 14 is a detail of the cutting mechanism, and Figs. 15, 16 and 17 shows the details of the driving cams mounted upon the driving shaft.

This machine comprises a frame comprising two side-members 1 (Figs. 1 to 3) and is provided at the upper part with a transverse roller 12 furnished with a series of annular flanges 12^1, adapted to permit the passage of the threads of the vermicelli therebetween as they come from the press and are collected in groups, each of which passes between two neighboring flanges 12^1. This roller is displaceable in the direction of its axis and for this purpose is attached to the lower part of a carriage 11 carried by four rollers 13 rolling upon two transverse rails 13^1. A spring 11^1 tends to return the carriage 11 to its normal position when the latter has been moved from said position. Each one of the groups of threads of vermicelli is destined to be folded upon itself and this folded part to be separated, the separated parts being again folded in their turn upon themselves. For producing the first folding, an endless band or apron 3 of canvas, by example, passes over two drums 3^1 and 3^2 and a bar 3^3 which latter causes the apron 3 to project as shown. The rollers 3^1, 3^2 and the one 3^3 are disposed in a carriage 3^4 (Fig. 6) which is furnished with two wings 3^5 sliding in horizontal openings 2 provided in the side-members 1 and permitting the displacement of the carriage 3^4 in the direction of the length and the width of the frame. This displacement of the frame causes the bar 3^3 to move under the roller 12 thus causing the first folding to the groups of threads. This movement is brought about by the aid of a rack 5 with which the carriage 3^4 is provided and which is engaged by a toothed wheel 7 (Fig. 2). This latter is engaged by a toothed sector 8 rigidly secured to an arm 9 carrying a contact roller 9^1 (see also Fig. 15.) which is adapted to be struck by a cam 10 carried by a horizontal drive shaft 57. The displacement of the carriage 3^4 in the direction of the width of the frame is produced by a pusher 14 pivoted at one of the extremities of an elbowed lever 14^1 of which the other extremity carries a roller 15 (Fig. 7). This latter is in contact with a cam 16 supported upon a vertical shaft 22 operated by the drive shaft 57 by means of the bevel gears 51 and carried by a bracket 52 fixed to one of the side-members 1. A roller 3^6, secured to the carriage 3^4, rolls either upon the tapering piece 3^7 or upon one of the side-members 1 of the frame and serves to guide the carriage 3^4 in order to bring it back to a certain transverse position from which

the carriage may be moved. The roller 3^1 communicates to the endless apron a movement of translation in the direction of the length of the latter, while the carriage 3^4 is being displaced from the left to the right of Figs. 1, 2 and 6. To this effect a toothed wheel 6 engages, on the one side with a rack 6^1 fixed to the frame, and on the other side with a toothed wheel 6^2 which is in turn in mesh with a toothed wheel 6^4 carried upon a shaft 6^5 upon which the roller 3^1 is loosely mounted (see also Figs. 6 and 9.) Upon this shaft is mounted a disk 6^5 presenting at its periphery grooves 6^6 in which are movably placed balls 6^7, which are limited exteriorly by a retainer 6^8 forming part of the roller 3^1. These grooves are disposed on the one hand in such a manner that the balls 6^7 pressed by the springs 6^9 wedge between the walls of said grooves and retainer 6^8 when the carriage 3^4 displaces itself from the left to the right of Figs. 1, 1^a and 6 in order to produce the rotation of 3^1 and on the other hand in such a manner that the balls 6^7 permit the disk 6^5 to turn freely without engaging the retainer 6^8 and the roller 3^1 when the carriage 3^4 displaces itself from the right to the left of Figs. 1, 2 and 6. These racks 5^1 and 6^1 are of a size sufficient for the toothed wheels 7 and 6 to remain respectively in engagement with them, whatever be the position transverse of the carriage 3^4 in the frame. The track on which the carriage 3^4 moves is not adjustable. The position of the roller 3^1 can be separately adjusted for the purpose of adjusting tension of the band 3.

Beneath the separating roller 12 and the point of the extreme limit of movement of the band 3 when the carriage 3^4 is displaced by the cam 10 from the right toward the left in Figs. 1 and 2, a fixed transverse supporting comb 20 is provided (see also Fig. 3) between the teeth of which the groups of threads are led. At the side of this comb is disposed the supporting device composed of a vertically movable beam 19 carrying two series of plates 19^1 and 19^2; certain of these plates 19^1 are fixed to the said beam and the others 19^2 are adapted to be displaced simultaneously upon the latter in the direction of the length of said beam. The vertical movement of the supporting device permits it to firmly seize all the groups of threads and this movement is produced by two cams 40 which are mounted upon the shaft 57 and upon which roll the contact rollers 39 (see Figs. 1, 2 and 3). These are secured to vertical rods 37 sliding in the guides 38 and rigidly secured to the knife carrying beam 19. A cam 17 mounted upon the shaft 22 acts upon the roller 17' of the series of plates 19^2 which are displaceable upon the knife carrying beam 19 and maintaining normally the plates of this series in its normal position. As long as the cams 40 hold this beam at its upper position, the cam 13 permits the knives of the first series to be displaced under the action of the second series under the action of a spring, thus to support the groups of threads.

The folding of the separated and folded parts of the groups of threads in order to obtain the bunches is accomplished by means of two endless bands 27 and 28, (see Figs. 1, 2, 4, 5 and 13) and a driver 23; these parts already folded are destined to be disposed in parallel relation upon the two bands and to be forced by the driver into the free space existing between said bands. The band 27 passes over a bar 27^4 and three rollers 27^1, 27^2 and 27^3 of which two, 27^1 and 27^3 have their upper part at the same height. The bar 27^4 causes the band 27 to form a projection as shown. In the same manner, the band 28 passes over two rollers 28^1 and 28^2 and upon a bar 28^3. Parts of the bands 27 and 28 which are between the bar 27^4 and a roller 27^2 and between the roller 28^1 and the bar 28^3 respectively, are parallel and leave between themselves the free space mentioned above. The rollers 27^1, 27^2 and 27^3 and the bar 27^4 are fixed in a support 26 (see also Fig. 4) which is slidable upon two transverse bars 26^1 mounted in a carriage 36. These are adapted to be displaced in the direction of the length of the frame in order to permit regulation of the length of the bunches and carry also the rollers 28^1, 28^2 and the bar 28^3 of the band 28 and the driver 23. These two bands 27 and 28 are moved simultaneously in the direction of their length. This movement takes place uniformly upon all the width of 27 and 28, and is produced by the aid of the grippers composed each of two rollers 31 and 29 (see Figs. 1, 2, 4 and 8) between which passes said band and which are mounted on a support 32 slidable upon the guides 34 carried by brackets 35 fixed to the side-members 1 of the frame. Each of these rollers 29 is carried by one of the extremities of two levers 29^2 and which by means of the springs 28^3 tend to move the rollers 29 and 31 into contact with each other. A roller 30 carried upon the other extremity of one of the levers 29^2 and in contact with a projection 30^2 of a disk 30^3 retards normally the return of the rollers 29 and 31 corresponding. This disk presents a third projection 30^4 carrying a pin 30^5 which penetrates in a groove 41^1 provided at one of the extremities of an elbowed lever 41. When the latter oscillates in a certain direction the pin 30^5 communicates to the disk 30^3 a rotary movement which permits the levers 29^2 to oscillate and the springs 29^3 to move the rollers 29 against the rollers 31. This same movement of the lever 41 serves to move the grippers in the direction of the

length of the frame and at the same time they are brought together for gripping the bands 27 and 28. To this effect, the arm 41 presents a second groove 41^2 in which passes a stop 22^1 rigidly secured to support 32. The oscillation of the lever 41 is produced by engagement with a contact roller 42 of one arm 50 (see also Fig. 17) mounted upon the arbor 57 and actuated by each movement of the latter, this roller being adapted to be fixed in different points in a groove 41^3 which arrangement permits the variation of the amplitude of the movement of the latter. The support 26 of the band 27 is however adapted to be moved transversely in the frame at the moment when the support 32 is moved itself longitudinally. This is done by means of the piece 32^2 (see Fig. 5) carrying a roller 32^3 which rolls upon a trapezoidal piece 32^1 mounted on the support 26. The driver 23 is rigidly secured to an arm 24 (Figs. 4 and 5) which engages in an opening of a sliding piece 24^1 which carries a contact roller 24^2 slidable upon a cam 25 of the shaft 22. The bunches of vermicelli are deposited from these bands 27 and 28 upon leaves of paper by example, disposed the one following the other so as to constitute a continuous band 53^1 (Figs. 1 and 2) and which unwind themselves from a bobbin-spool 54 and rest partially upon the upper part of a band 53. These are displaced intermittently at the same time and to the same amount as are the endless bands 27 and 29 and are engaged by the grippers on the supporter 32 and composing roller 29^1 and 31^1 (see Figs. 4 and 8) which are carried by two levers and which a spring 29^5 tends to draw together. One of these levers is furnished with a roller 30^6 against which engages the third projection 30^4 of the disk 30 for maintaining the roller 29 normally spaced from the roller 31^1.

In order to dispose upon each of the leaves of the band 53 a determined number of rows of bunches (this number depending upon the length of the latter and of that of the leaves), and in order that each one of these rows may not be permitted to rest upon the junction of the leaves there is provided means adapted to act upon the second roller 43 (Fig. 1) which the lever 41 carries and which is able to be fixed in any desired position in the groove 43 of the latter. For this object, a cam 49 (Fig. 16) carrying a contact roller 49^1 is mounted upon the shaft 57 and is adapted to advance by one tooth, at each turn thereof, a ratchet 47 which presents a certain number of teeth which a pawl 46 normally engages to prevent retrograde movement when this ratchet is disposed by the cam 49. Said ratchet is mounted upon a shaft 47^1 upon which is adapted to freely turn an arm 45 terminated by a projection which is normally out of the way of the path 49^1. The ratchet 47 presents an arcuate groove 47^2 in which a buffer 48 is adapted to be disposed and adjusted in any desired position. To this buffer is fixed by one end, a spring 48^1 disposed at the other end against the arm 45. Supposing that at a certain given moment the right extremity (Figs. 1 and 2) of a plate 53 finds itself beneath the interior extremity of the free space existing between the bands 27 and 28 and the tooth 47^3 (Fig. 16) and the ratchet 47 be in mesh with the pawl 46. At each turn of the shaft 57 the bands 27 and 28 and 53 are displaced an amount determined by the cam 50 (Fig. 17) of the roller 42 and of the elbow lever 41 at the same time that the ratchet 47 turns one tooth. The buffer 48 is fixed in the groove 47^2 at a position such that at the moment when the leaf (under consideration) of the band 53 is covered by a number n of rows of bunches which it is able to carry, and where, by consequence, the ratchet 47 is turned through n teeth, the arm 45 which reposes upon this spring 48^1 is placed upon the path of the roller 49^1 which very soon strikes and forces it to turn on the shaft 47^1. The arm 45 is disposed in such a manner as to come in contact in the course of its rotation with a roller 44^1 (Fig. 16) carried by one of the arms of the elbow lever 46 free upon the shaft 57,—the other arm of this lever striking the roller 43 causing the lever 41 to turn a considerable amount when the cam 50 comes in contact with the roller 42. The three bands 27, 28 and 53 advance by a greater than usual amount in such a manner that each row of bunches is not disposed upon the juncture of the leaf under consideration of the band 53 and of the following leaf. The position of the roller 43 in the groove 41^3 cannot be chosen in each case in the manner to give exactly the displacement which it is necessary to communicate to the three ribbons in order that the junctions of the leaves be cleared. In the course of this movement of rotation, the arm 45 strikes a stop 46^1 rigidly secured to the pawl 46 and moves the latter to one side of the ratchet 47; this returns by its own weight and is ready to commence a new movement.

An endless band 55 (Figs. 1 and 2) actuated by means not illustrated, serves to advance a band 55^1 upon which the waste of threads of vermicelli coming from the separating thereof fall and which wind themselves upon a bobbin 56.

The operation of the machine is as follows: Suppose at a certain moment the carriage 3^4 is at the end of its course at the right (Figs. 1 and 2) and on the side of the machine where the vertical shaft 22 is located, admitting, however, that the bands 27, 28 and 53 are immovable, the rollers 29 and 29^1 being maintained away from the rollers 31 and 31^1, and that the left extrem-

ity of one leaf of the band 53 is disposed above the interior extremity of the free space between the bands 27 and 28, the teeth 47^3 of the ratchet 47 being in engagement with the pawl 46. The vermicelli descends from the special dies which discharge each groups of threads, the number of the dies being equal to the desired number of threads to be contained in each bunch. These groups of threads descend by their own weight into the space between the flanges 12^1 of the roller 12 which is now at the side of the machine on which is located the shaft 22, and passing in the space existing at this moment between the said roller and the bar 3^3 of the band 3 (Fig. 10). The cam 10 of the shaft 57 coming in contact with the roller 9^1 of the arm 9 causes the toothed sector 8 to oscillate on its shaft; and this produces a displacement of the carriage 3^4 by means of wheels 7 and the rack 5. The carriage advances in the direction of the arrow *d* (Fig. 10) the length of the side of the machine on which is located the shaft 22 and carries the projecting part of the band 3 into contact with the groups of threads which this projecting part has drawn into the grooves of the roller 12, in such a manner that the separated parts *a b* of the threads situated below the band 3, lie thereupon. On the other hand by means of the traction operated by the band 3 upon the said threads, the separated parts *b* and *c* which are now located above the projecting part of the band 3, pass in the spaces between the teeth of the fixed comb 20 and are engaged between the plates of the two series of plates 19^1 and 19^2 of the supporting mechanism, the series 19^2 being maintained in the position of repose by the cam 17, and coincident then with the other series. The advancement of the band 3 has, on the other hand, the effect of partially laying the groups of threads upon the bands 27 and 28. These groups of threads are thus folded in a vertical plane. When the carriage 3^4 has effected a part of its course toward the left of Figs. 1 and 2 (Fig. 10) and is disposed transversely in such a manner that it moves away from the shaft 22 by the means of pusher 14, the roller 15 and the cam 16 of the shaft 22; the roller 3^6 rolls then upon the oblique part of the bearing of the side-members 1 of the trapezoidal piece 3^7 afterward upon the side-members 1 adjacent thereto. These groups of threads are drawn in this movement upon the band 3 and drawn in turn by the roller 12 and the carriage 11 which rolls upon the rails 13^1. These parts *a b* of the groups of threads are now no longer in the same vertical plane as the parts *b c* which rest upon the now stationary bands 27 and 28, and between the plates of the dividing mechanism and in the spaces between the teeth of the comb 20 have not been displaced transversely. During the displacement of the carriage 3^4 in the direction of the arrow *d*, the wheel 6 in engagement with the rack 6^1 turns the wheel 6^2 and the pinion 6^4 but without moving the roller 3^1 of which the retainer 6^8 slides upon the balls 6^7. At this instant, the cam 10 permits the carriage 3^4 to return to its first position by moving in the direction of the arrow *e* (Fig. 11). The toothed wheel 6 being always in engagement with the rack 6^1 causes the wheel 3^1 to turn on its shaft and communicates to the band 3 a movement in the direction of the arrow *f*. This band then disposes the parts *a b* of the groups of thread which lie upon it at the side of the parts *b c* of the groups upon the bands 27 and 28 toward the plates of the supporting mechanism as upon the teeth of the comb 20. Since the projection of the band 3 is not disposed above the supporting means this is lifted up by cams 40, the rollers 39 and the rods 37 all the parts *a b* and *b c* of the groups of threads, being strongly grasped between the plates, since the cam 17 which holds the series of plates 19^2 at the position of repose permits this series to be displaced under the tension of the spring 1^1, which divides the groups of threads into two parts (Fig. 11). The carriage 3^4 of the band 3 continues to move in the direction of the arrow *e*, groups of threads coming from the press being able to descend anew between the roller 12 and the bar 3^3. On the other hand, this movement of the carriage 3^4 causes the roller 3^6 to return into contact with the oblique parts of the piece 3^3 and return the carriage 3^4 to its first transverse position; the roller 12 being no longer in contact with the groups of threads, returns to its first position by the action of the spring 11^1, at the same time that the separating means descends and that the series of the plates 19 and the latter are returned to the position of repose by the cam 17. These groups of threads have then undergone an initial folding at this moment and have been divided in sections. These sections rest then at one part upon the band 27, and at another part upon the band 28 and sag by their own weight forming themselves into folds in the passage existing between the bands 27 and 28 (Fig. 12). The driver 23 actuated by the cam 25 of the shaft 22 descends at this instant and presses the divided parts of the groups of threads to the bottom of the fold which commences to appear and in the median plane of the free space existing between the bands 27 and 28 (Fig. 12). At the moment when the driver 23 comes in contact with said sections and pushes them into said space, the projection of the cam 50 strikes the roller 42 and actuates the lever 41. From this, it results that the disk 30^3 turns, and that the pro-

jection 30^2 of the latter permits the spring 39^3 to press the rollers 29 of the grippers upon the rollers 31 to cause them to seize the bands 27 and 28. Then one of the walls of the groove 41^2 coming in contact with the stop 32^1 of the support 32 causes the latter to displace it in the direction of the arrow of Fig. 8, which communicates a movement of translation to the bands 27 and 28, the speed of the movement being substantially that of the driver 23 (Fig. 12). At the same time the roller 32 causes the support 26 to displace itself transversely in the frame, in the manner which 27 moves away from the side of the frame or where the shaft 22 is located. From this it results that the fold of the supporting parts of the groups of folded threads arising from the first folding is not disposed directly under the sections of these parts but a little to the side. The arm 41 produces at the same time a displacement of the band 53 by means of the grippers 29^1 and 31^1 in such a manner that the latter advances a certain distance in order to leave a free space for a new row of bunches (Fig. 13). This displacement is produced at each turn of the shaft 57 and corresponds to a movement of one amplitude determined by the ratchet 47 which advances one tooth on the rotation of said shaft. The support 26 being then brought back by a spring (not shown) to this first position at the side of the frame, which carries the shaft 22, the machine produces a new row of bunches which descend upon the band 53, the ratchet advancing again one tooth, and so on. When the leaf of the band 53 (under consideration) is completely covered with bunches, the spring 48^1 of the stop 48 (Fig. 16) draws the latter into the path of the roller 49^1 when the cam 48 causes ratchet 47 to turn one rotation. This roller then strikes 45, raises it and moves it into contact with the roller 44^1 of the lever 44, the latter then comes in contact with the roller 43 and causes it to make at this movement a greater amplitude than that which the cam 50 or the roller 42 communicates normally to 41; this prevents the bunches from being deposited upon the junction of the leaves of the band 53. The arm 45 rises puts the pawl 46 out of engagement with the ratchet 47, in such a manner that the latter falls by its own weight. All is ready then to cover a new leaf with bunches.

The length of the fold of the sections of groups of threads can be regulated in the following manner: In order to fold the former it is necessary that the latter be cut longer. The supporting means not being movable in the direction of the length of the machine, it would be necessary that the band 3 advance a greater distance beyond this device for the same displacement of the carriage 3^4. The rollers 3^1, 3^2 and the bar 3^5 can, at this effect, be displaced simultaneously in the latter as has been mentioned.

As it is desirable that the second folding be made just at the middle of the folded parts, the passage existing upon the bands 27 and 28 ought to be disposed for this purpose at the middle of these parts. The said bands and the pusher 23 are disposed to this effect upon the carriage 3^4 which can be displaced in the direction of the length of the frame for permitting the moving of said parts 27, 28 and 23 away from the supporting means.

Corresponding to the length of the sections of the groups of threads the displacement of the bands 27, 28 and 53 ought to vary. For this, the roller 42 which actuates the cam 50 and which produces this displacement at normal times, is adapted to be displaced in the groove of the arm 41 in which the roller 43 is equally movable. In making the position of 42 to vary, for the movement toward or away from the axis of the cam 50, the amplitude of its course and consequently that of the displacement of the arm 41 and the ribbons 27, 28 and 53 can be changed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a machine for folding vermicelli, the combination, with a comb and a separating roller above the same, of a horizontally moving endless folding band which pushes the hanging vermicelli between said comb and separating roller, and means for receiving the vermicelli so folded.

2. In a machine for folding vermicelli, the combination, with a comb and a separating roller above the same, of a horizontally moving endless folding band which pushes the hanging vermicelli between said comb and separating roller, and spaced folding bands on which the vermicelli so folded is deposited by said first-named band.

3. In a machine for folding vermicelli, the combination, with a comb and a separating roller above the same, of a horizontally moving endless folding band which pushes the hanging vermicelli between said comb and separating roller, means for receiving the vermicelli so folded, and means for cutting off the ends of the vermicelli.

4. In a machine for folding vermicelli, the combination of a comb, a separating roller above the same, and a horizontally reciprocating endless band to push the vermicelli between said comb and separating roller.

5. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a reciprocating endless folding band to push the vermicelli threads through between the comb and separating roller, and

means whereby the said band and said separating roller are moved laterally.

6. In a machine for folding vermicelli, the combination of a comb, a laterally movable separating roller parallel therewith, a reciprocating endless folding band entering the space between said comb and separating roller and with which the latter travels in contact, and means for moving said band laterally.

7. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a reciprocating folding band which pushes the vermicelli between the comb and separating roller and causes it to enter alternate interdental spaces of the comb, and means for moving said band laterally during its return movement to cause the upper portions of the folded vermicelli threads to enter the other interdental spaces of the comb when the folding band is withdrawn.

8. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a reciprocating folding band which pushes the vermicelli between the comb and separating roller and causes it to enter alternate interdental spaces of the comb, means for moving said band laterally during its return movement to cause the upper portions of the folded vermicelli threads to enter the other interdental spaces of the comb when the folding band is withdrawn, and means for cutting the threads in the comb.

9. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a reciprocating folding band which pushes the vermicelli between the comb and separating roller and causes it to enter alternate interdental spaces of the comb, means for moving said band laterally during its return movement to cause the upper portions of the folded vermicelli threads to enter the other interdental spaces of the comb when the folding band is withdrawn, and an automatically operated knife adjacent the comb.

10. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a folding band to push the vermicelli through between said comb and roller and thus fold the same the first time, spaced endless bands upon which the folded vermicelli is received, means for cutting off the vermicelli, and a folding member to push the vermicelli into the space between said spaced endless bands and thereby fold it a second time.

11. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a folding band to push the vermicelli through between said comb and roller and thus fold the same the first time, spaced endless bands upon which the folded vermicelli is received, means for cutting off the vermicelli, a folding member to push the vermicelli into the space between said spaced endless bands and thereby fold it a second time, and means for then driving said endless bands in opposite directions to discharge the folded bundle.

12. In a machine for folding vermicelli, the combination of a comb and separating roller in front of which the vermicelli is presented, a folding band to push the vermicelli through between said comb and roller and thus fold the same the first time, spaced endless bands upon which the folded vermicelli is received, and a pivoted driver or folder to push the vermicelli into the space between said spaced endless bands.

13. In a machine for folding vermicelli, the combination of members between which the vermicelli is pushed in order to be folded the first time, spaced endless bands on which the so folded vermicelli is deposited, and means to push the vermicelli between said bands to give it a second fold.

14. In a machine for folding vermicelli, the combination of members between which the vermicelli is pushed in order to be folded the first time, spaced endless bands on which the so folded vermicelli is deposited, means to push the vermicelli between said bands to give it a second fold, and means for then driving said bands in opposite directions.

15. In a machine for folding vermicelli, the combination of members between which the vermicelli is pushed in order to be folded the first time, spaced endless bands on which the so folded vermicelli is deposited, and a pivoted driver or folder to push the vermicelli between said bands to give it a second fold.

16. In a machine for folding vermicelli, the combination of members between which the vermicelli is pushed in order to be folded the first time, spaced endless bands on which the so folded vermicelli is deposited, means to push the vermicelli between said bands to give it a second fold, means for then driving said bands in opposite directions, and an endless sheet-carrying band upon which the folded bundles are deposited.

17. In a machine for folding vermicelli, the combination of members between which the vermicelli is pushed to fold it the first time, spaced endless bands on which it is deposited, means in connection with said bands by which the vermicelli is doubled and caused to enter the space between them, and means for driving said bands in opposite directions.

18. In a machine for folding vermicelli,

the combination of members between which the vermicelli is pushed to fold it the first time, spaced endless bands on which it is deposited, means in connection with said bands by which the vermicelli is doubled and caused to enter the space between them, and a system of movable pincers for driving said bands.

19. In a machine for folding vermicelli, the combination of members between which the vermicelli is pushed to fold it the first time, spaced endless bands on which it is deposited, means in connection with said bands by which the vermicelli is doubled and caused to enter the space between them, a sheet-carrying endless band to receive the folded bundles, and a system of movable pincers to drive all of said bands in consonance with each other.

20. In a machine for folding vermicelli, the combination of endless bands on which the vermicelli is deposited and between which it is folded, a sheet-carrying endless band, means for driving said bands, and means for effecting the "jumping" of the joints between the sheets on said sheet-carrying band.

21. In a machine for folding vermicelli, the combination of endless bands on which the vermicelli is deposited and between which it is folded, a sheet-carrying endless band, a cam-operated lever, a system of pincers operated thereby to drive said bands, and means in connection with said lever to effect the "jumping" of the joints between the sheets.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ANDRÉ SIMÉON AMOUROUX.

Witnesses:
SAVARY,
DURAND H.