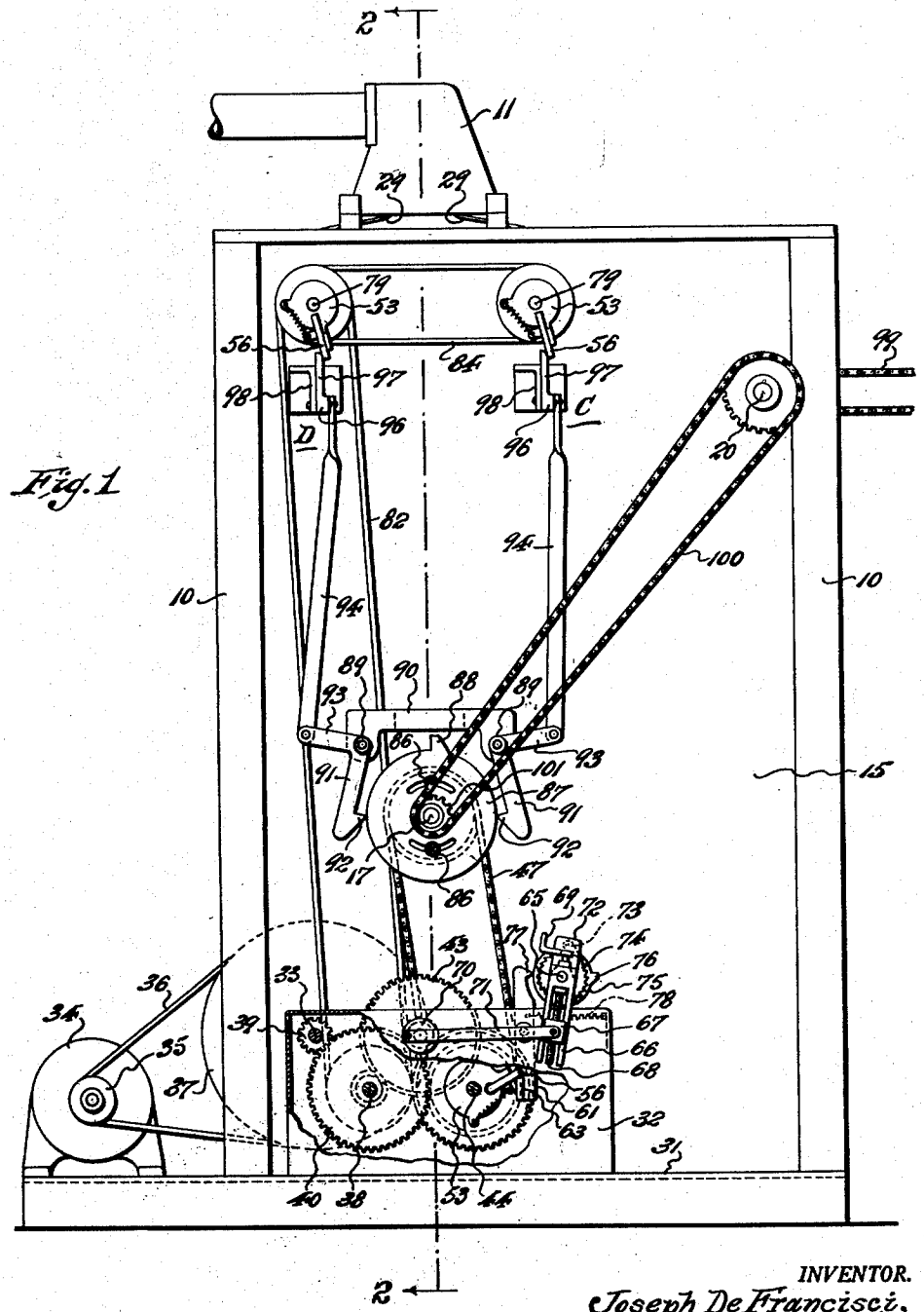
Aug. 24, 1954 J. DE FRANCISCI 2,687,101

RACK ROD LOADING MECHANISM FOR ALIMENTARY PASTE EXTRUSION APPARATUS

Filed Feb. 16, 1951 4 Sheets-Sheet 1

Fig. 1



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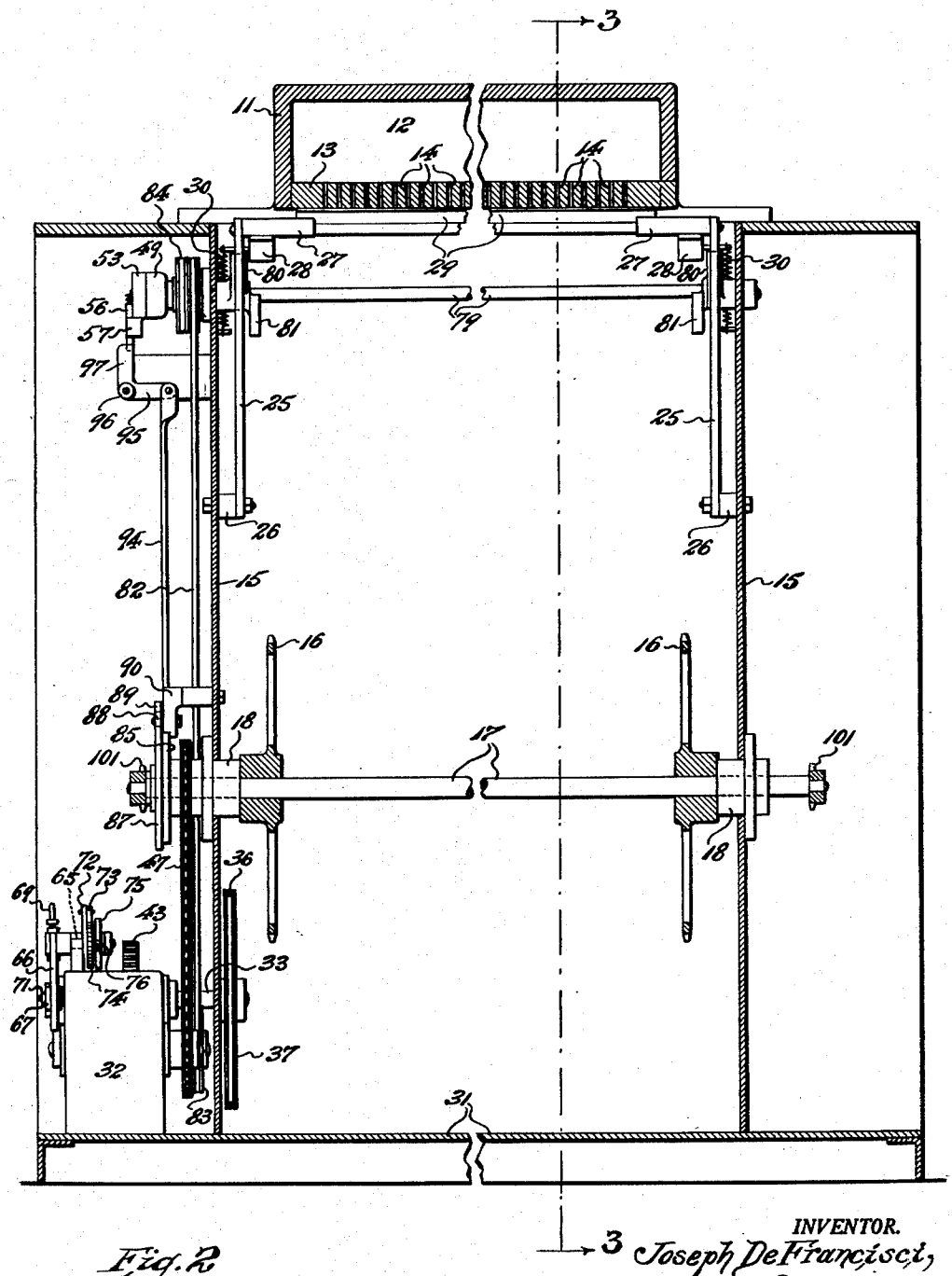

Fig. 2

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4 Sheets-Sheet 3

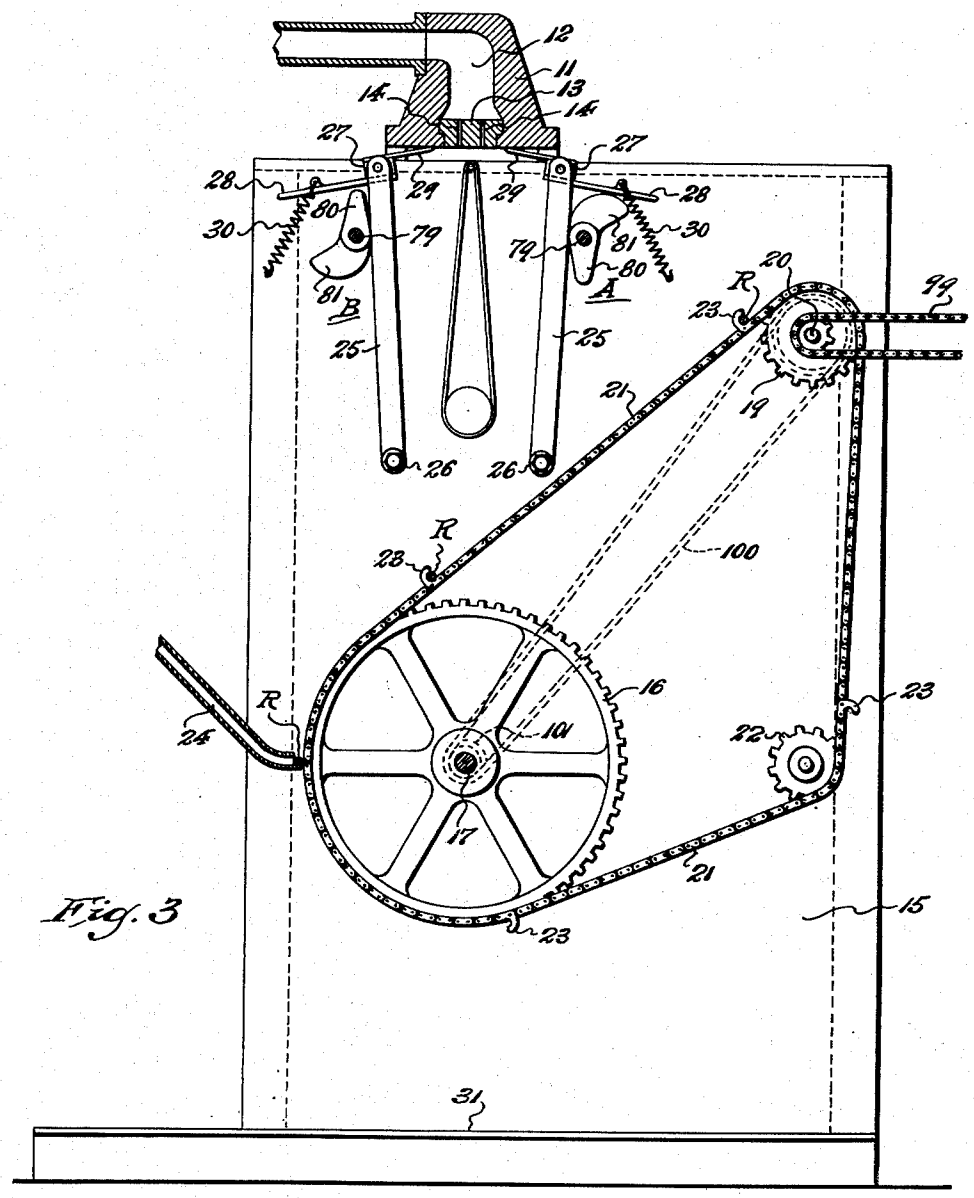

Fig. 3

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4 Sheets-Sheet 4

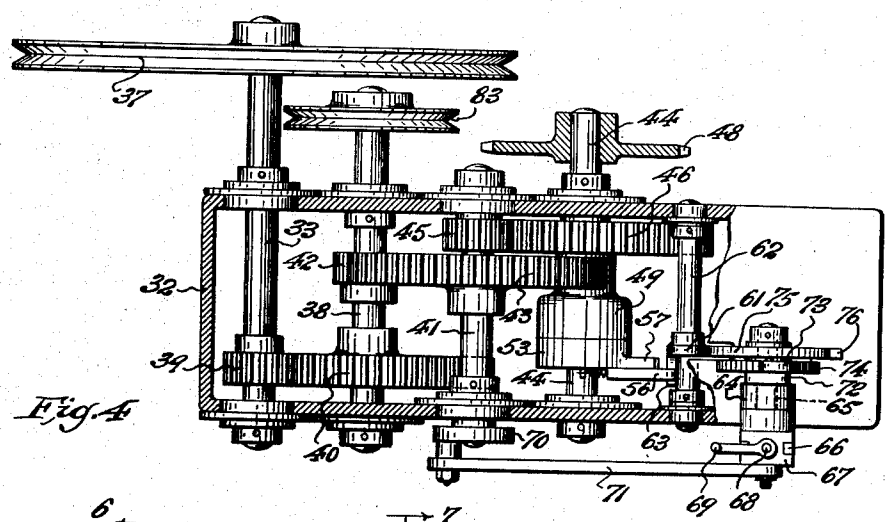

Fig. 4

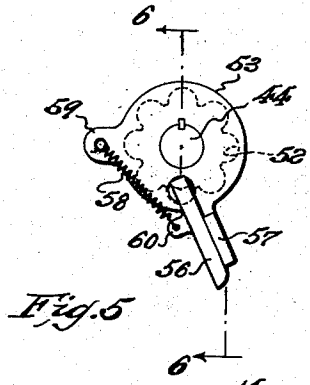

Fig. 5

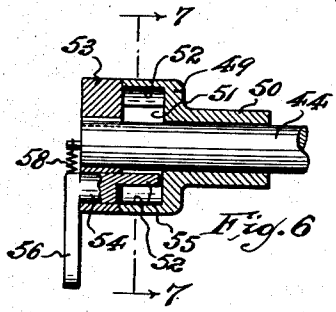

Fig. 6

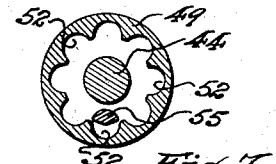

Fig. 7

Fig. 8

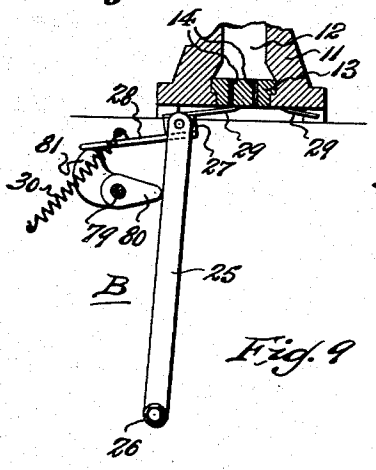

Fig. 9

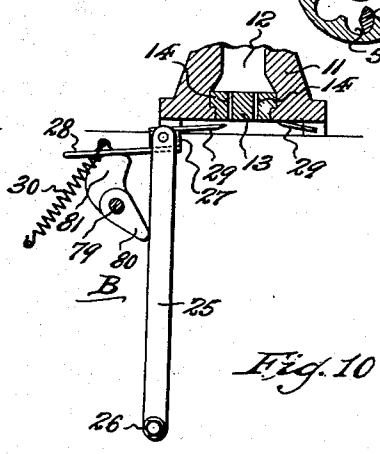

Fig. 10

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UNITED STATES PATENT OFFICE

2,687,101

RACK ROD LOADING MECHANISM FOR ALIMENTARY PASTE EXTRUSION APPARATUS

Joseph De Francisci, Brooklyn, N. Y.

Application February 16, 1951, Serial No. 211,222

9 Claims. (Cl. 107—7)

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This invention relates to apparatus for producing long alimentary paste products, such as macaroni, spaghetti and the like; and the invention has reference, more particularly, to improved mechanism for automatically depositing paste strings, as expressed from extrusion apparatus, in suspension upon rack rods ready for subjection to a drying process.

The present invention has for an object to provide an automatic rack rod loading mechanism and associated paste string cut-off mechanism for cooperation with a continuous paste string extrusion apparatus which is adapted to emit paste strings in spaced relation so as to form a linear row or rows thereof ready for deposit upon drier rack rods by which the paste strings are to be supported for drying; said loading mechanism including a rack rod conveyer, and power transmission means for actuating said conveyer and the cut-off mechanism, said power transmission means being entirely mechanical and including adjustable means for regulating the operation thereof, whereby to synchronize the movements of the rack rod conveyer and the cut-off mechanism relative to the paste string emission rate of the extrusion apparatus.

Other objects of this invention not at this time more particularly enumerated will be understood from the following detailed description of the same.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which:

Fig. 1 is a side elevational view of the rack rod loading mechanism; Fig. 2 is a transverse vertical sectional view of the same, taken on line 2—2 in Fig. 1; Fig. 3 is a vertical cross-sectional view, taken on line 3—3 in Fig. 2.

Fig. 4 is a plan view of portions of the power transmission means and manipulatable regulating means therefor, the housing support of which is shown in part section, this view being drawn on an enlarged scale.

Fig. 5 is an end view of a one revolution clutch which forms part of the power transmission mechanisms by which the rack rod conveyer and the cut-off mechanisms are actuated; Fig. 6 is a longitudinal sectional view, taken on line 6—6 in Fig. 5; Fig. 7 is a transverse sectional view, taken on line 7—7 in Fig. 6, showing the released condition of the clutch; and Fig. 8 is a view similar to that of Fig. 7, but showing the engaged condition of the clutch.

Fig. 9 is a fragmentary vertical cross-sectional view, similar to that of Fig. 3, but showing the operative stroke of a cut-off mechanism; and Fig. 10 is a similar view showing the retractive stroke of the cut-off mechanism.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

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Referring to the drawings, the reference character 10 indicates the framework by which the paste extrusion die head, the paste string cut-off mechanism and the paste string racking and conveyer mechanism of the apparatus is supported.

Mounted upon the top of the framework 10 is an elongated die head 11 into the interior chamber 12 of which is continuously delivered plastic alimentary paste under constant pressure. Supported in the bottom of the die head 11 is a longitudinally extending die plate 13. The die plate 13 is provided with laterally and parallelly spaced longitudinal rows of die apertures 14; said rows substantially corresponding in length to the length of the die head chamber 12.

Supported by the framework 10 beneath the die head 11 is rack rod loading and conveyer mechanism by means of which rows of paste strings emitted from the die plate 13 are automatically looped over drier rack rods, and thereupon delivered for transfer to suitable drier apparatus. Mounted adjacent to the under faces of respective side walls 15 of the framework 10, within the interior of said framework, are laterally spaced and aligned paste string racking conveyers between which the rows of paste strings emitted from the die plate 13 descend.

Each racking conveyer includes a drive sprocket 16 of relatively large diameter which is fixed on a transverse driven shaft 17 that extends through the lower part of the framework. Said drive shaft is journaled in and between bearings 18 which are respectively mounted in connection with the respective side walls 15 of the framework 10. Located within the upper part of the framework, so as to be respectively aligned with the respective drive sprockets 16, in upwardly and forwardly offset relation thereto, are relatively small carrier sprockets 19. Said carrier sprockets 19 are freely rotatable on jack shafts 20 which are supported in connection with the side walls 15 of the framework. Arranged to run over and between each drive sprocket 16 and cooperating carrier sprocket 19 is a conveyer chain 21. The ascending courses of the conveyer chains 21, which extend between the drive sprockets 16 and carrier sprockets 19, intersect the planes of descent of the rows of paste strings emitted from the die plate 13. The descending or return courses of the conveyer chains 21 are preferably guided over the idler sprockets 22 which are also supported in connection with the side walls 15 of the framework 10. Affixed to the conveyer chains 21, at suitably spaced intervals therealong, are rack rod engaging hooks 23.

Supported in connection with the framework 10, at the rear thereof, is a rack rod delivery chute 24, which inclines downwardly so that its discharge end terminates adjacent to the rearward sides of the drive sprockets 16 and the con-

veyer chains 21 which run thereover, whereby to hold the lowermost rack rod R contained in the chute 24 in the path of movement of approaching carrier hooks 23, whereby said rack rod will be picked up by the latter so as to extend between the conveyer chains, and so as to be carried upwardly and forwardly thereby.

Mechanisms are provided for automatically cutting away, at proper times, the rows of paste strings emitted from the die plate 13 so as to detach the same from the latter. Each mechanism comprises an independent cutting means for each row of paste strings issuing from the die plate apparatus 14. Each cutting means is actuated by its own operating mechanism, but in alternated timed relation one to the other, and in timed relation to the operation of the rack rod loading mechanism, all as hereinafter more particularly set forth. The cutting mechanisms comprise a forward cutting means A for operation upon the forward row of emitted paste strings, and a rearward cutting means B for operation upon the rearward row of emitted paste strings.

Each cutting means comprises cutter blade operating levers 25, the lower ends of which are pivotally connected to fulcruming supports 26 which project from the inner faces of the side walls 15 of the framework. The upper free ends of the levers 25 are respectively disposed below and adjacent to the respective ends of the die head 11. Pivotally connected with the upper end of each lever 25 is an oscillatable bracket block 27 which is provided with a rearwardly extending tail piece 28. A forwardly projecting cutter blade 29 is affixed by its ends to and for extension between the bracket blocks 27. Connected between the tail piece 28 and the adjacent side wall 15 of the framework are diagonally and downwardly extending pull springs 30 which yieldably exert both down tilting draft upon the tail pieces, whereby to up tilt the cutter blade 29 to operatively engage its free cutting edge with the external or bottom face of the die plate 13, and rearward swinging draft upon the lever and cutter blade assembly.

Novel means is provided for transmitting actuating power to the rack rod loading and conveyer mechanism and to the operating mechanisms by which the respective cutting means A and B are actuated. Said power transmission means is entirely mechanical, and includes manually adjustable means for regulating and timing the paste string loading and cutting operations relative to paste string emission from the die plate of the die head. This power transmission means is mounted on the base 31 of the framework 10, and is preferably inclosed in a housing or gear box 32. Journaled in and between the side walls of the housing or gear box 32 is a power input shaft 33. Said power input shaft 33 may be driven from any source of power, but is preferably driven by an electric motor 34, the drive pulley 35 of which is connected by drive belt 36 to a driven pulley 37 which is fixed upon an exteriorly projecting end portion of said input shaft 33. Journaled in and between the side walls of the housing or gear box 32 is a cutting mechanism drive shaft 38 which is driven at a relatively high speed from the input shaft 33 by reduction gearing comprising the drive gear 39 and driven gear 40. Also journaled in and between the side walls of the housing or gear box 32 is a regulating mechanism drive shaft 41 which is driven at reduced speed from the drive shaft 38 by reduction gearing comprising the drive gear 42 and driven gear 43. Similarly, journaled in and between the side walls of the housing or gear box 32 is a rack rod conveyer drive shaft 44, which is intermittently driven by a one-revolution clutch device, operation of which is controlled and timed by the regulating mechanism, all as hereinafter more particularly set forth. The driven member of said clutch is continuously driven at further reduced speed from the drive shaft 41 by reduction gearing comprising the drive gear 45 and driven gear 46. The shaft 17, which operates the rack rod conveyer drive sprockets 16, is driven from the conveyer drive shaft 44 by chain and sprocket transmission 47, the drive sprocket 48 of which is fixed upon an exteriorly projecting end portion of said conveyer drive shaft 44.

Although other types of one-revolution clutch devices may be employed, a preferred type of one-revolution clutch device by which the conveyer drive shaft 44 is driven comprises, as shown (see Figs. 1 and 4 to 8 inclusive), a driver clutch member 49 which is freely rotatable on said shaft 44. On the hub 50 of the driver clutch member 49 is fixed the power transmission element by which it is to be driven, in this case the driven gear 46. The driver clutch member 49 is provided with an outwardly open chamber 51, the walls of which are formed to provide a plurality of internally open, circumferentially spaced clutch key reception splines 52. Fixed on the shaft 44, to oppose the open chamber 51 of the driver clutch member 49, is the driven clutch member 53. Rotatably mounted in and through the driven clutch member 53 is the journal portion 54 of a clutch key 55 of segmental cross-section. Extending radially from the outer end of said journal portion 54 is an actuating lever arm 56. Radially extending from the periphery of the driven clutch member 53 is an external stop arm 57 which is adapted to be abutted by the lever arm 56, whereby to determine the released position of the clutch key 55; in which position the same is withdrawn from a clutch reception spline 52 of the driver clutch member 49, with its chordal face opposed to said spline (see Fig. 7). A pull spring 58 is interconnected between a fixed ear 59, which extends from the driven clutch member 53, and an ear 60 with which the lever arm 56 is provided. This spring 58 yieldably urges the lever arm 56 in direction operative to rotate the journal portion 54 whereby to turn the clutch key 55 into a clutch key reception spline 52 (see Fig. 8), and thereby clutch the driven clutch member 53 to the driver clutch member 49 so that the former, and the shaft 44 to which it is affixed, will be rotated by the driver clutch member 49.

Releasable detent means is provided to engage the clutch lever arm 56 so as to draw the same back into stopped engagement with the stop arm 57, and thus to hold the clutch device in released or inactive condition. This detent means comprises a detent lever 61 which is pivotally supported on a fulcruming shaft 62 that extends between the side walls of the housing or gear box 32 adjacent to the clutch device. The lower arm of the detent lever 61 is provided with an angularly projecting arrester lug 63 which normally lies in the path of movement of the clutch lever arm 56 when it revolves with the rotated driven clutch member 53. The upper arm of the detent lever 61 projects exteriorly from and above the housing or gear box 32. Means is provided for tripping the detent lever 61, whereby to release

the clutch device for operation. This tripping means is operated by the means for regulating and timing the paste string loading and cutting operations, and will therefore be now described in connection with the latter.

Mounted in a bearing standard 64, which upstands from the top of the housing or gear box 32 adjacent to the upper arm of the detent lever 61, is a rock-shaft 65. Fixed on the forward or outer end of said rock-shaft is a dependent rocker-arm 66, which is in the form of an open frame by which is carried a knuckle block 67 subject to adjusting movement thereon toward or from the fulcrum of the rocker-arm which is provided by the rock-shaft 65. An axially extending adjusting screw 68 is rotatably supported in the upper end of the rocker-arm 66, but in such manner as to be held against axial movement. Said adjusting screw 68 is threaded through the knuckle block 67. Affixed to the upper end of the adjusting screw is a crank-handle 69 by means of which said screw can be rotated, whereby to adjust the knuckle block on the rocker-arm so as to increase or decrease the effective leverage length of the rocker-arm and thus amplitude of oscillatory movement of said rocker-arm and rock-shaft. Means is provided for oscillating the rocker-arm and rock-shaft, said means comprising a crank-wheel 70 mounted on an exterior end of the drive shaft 41, and connected with the knuckle block 67 by a connecting link or rod 71. Fixed on the rearward or inner end portion of the rock-shaft 65 is an upwardly projecting rocker-arm 72 which carries a drive pawl 73. Freely rotatable on the rock-shaft 65, adjacent the rocker-arm 72, is a ratchet wheel 74 adapted to be operatively engaged by the drive pawl 73. Connected with said ratchet wheel, so as to be rotated thereby, is a trip cam 75 provided with a radially projecting tripper member 76. This trip cam 75 engages the upper arm of the detent lever 61, the latter being preferably provided with a nosing 77 which normally lies in the path of movement of the tripper member 76 of said trip cam. An anchored pull spring 78 is connected with the upper arm of the detent lever 61, whereby to cause the detent lever to follow the trip cam 75.

The above described means for transmitting actuating power to the rack rod loading and conveyer mechanism operates to drive the latter intermittently, i. e. in a step by step manner so that each advance step is followed by a period of rest or dwell, whereby, after loading of paste strings on rack rods R and cutting away the loaded strings from the die plate 13, time is allowed for emission from said die plate of the next batches of paste strings to be loaded on succeeding rack rods. To this end, the described transmission means operates as follows:

The period of rack rod conveyor rest or dwell continues so long as the one-revolution clutch is held inactive. Said clutch is held inactive by the detent lever 61 which is normally held by the trip cam 75 in position to engage the lever arm 56 of the clutch by the arrester lug 63 of said detent lever. Such engagement of the clutch lever arm 56 swings the same back against the stop arm 57, thus withdrawing the clutch key 55 of the driven clutch member 53 from clutched engagement with the driver clutch member 49. While the clutch is thus held inactive, the continuously rotated crank wheel 70 and connecting link or rod 71 oscillates the rocker-arm 66 and rock-shaft 65, whereby the upper rock-arm 72 and drive pawl 73 carried thereby is likewise oscillated so that said drive pawl, by its engagement with the ratchet wheel 74, rotates the trip cam 75. Such rotation of the trip cam 75 eventually moves the tripper member 76 into engagement with the nosing 77 of the detent lever 61, whereby, in passing the latter, said detent lever is momentarily oscillated so as to withdraw the arrester lug 63 from the clutch lever arm 56, thus releasing the latter for forward movement under the draft of the pull spring 58, and thereby rotating the clutch key 55 into engagement with a reception spline 52 of the driver clutch member 49, whereupon said driver clutch member transmits rotary movement to the driven clutch member 53 and conveyer drive shaft 44. As the operating clutch completes one revolution, the clutch lever arm 56 is again brought into engagement with the arrester lug 63 of the detent lever 61, whereby the clutch key 55 is withdrawn from the engaged spline 52 of the driver clutch member 49, thus stopping the driven clutch member 53 and conveyer drive shaft 44, so that the rack-rod conveyer is again stopped for a period of rest or dwell. The intervals of rest or dwell of the rack rod conveyer may be lengthened or shortened to accommodate the operation thereof to the speed of paste string emission from the die plate 13, and according to the length of paste strings desired to be produced and loaded upon the rack rods R. Regulation of the intervals of rest or dwell of the rack rod conveyer can be effected by adjusting the position of the knuckle block 67 on the dependent rocker-arm 66. If said knuckle block is moved toward the rock-shaft 65, the effective leverage length of the rocker-arm 66 is decreased, and the amplitude of oscillation of the upper rocker-arm 72 and drive pawl 73 is increased, so that the ratchet wheel 74 and trip cam 75 is progressively advanced by longer steps, and consequently advance of the tripper member 76 is hastened, and a shorter time elapses before the latter operates the detent lever 61 to activate the clutch 49—53. On the other hand, if the knuckle block 67 is moved away from the rock-shaft 65, the effective leverage length of the rocker-arm 66 is increased, and the amplitude of oscillation of the upper rocker-arm 72 and drive pawl 73 is decreased, so that the ratchet wheel 74 and trip cam 75 is progressively advanced by shorter steps, and consequently advance of the tripper member 76 is slowed, and a longer time elapses before it becomes operative upon the detent lever 61, whereby to activate the clutch 49—53.

Each cutting means A and B is actuated by its own operating mechanism which are generally respectively designated by the reference characters C and D. Each such operating mechanism comprises a driven shaft 79 that extends through the upper part of the framework and which is journaled in suitable bearings mounted in connection with the side walls 15 of the framework 10. Said shaft 79 is disposed so as to cross adjacent to and outwardly of the operating levers 25 of the cutting means served thereby. The shaft 79 is driven by a one-revolution clutch device, preferably of the same type as that above described by which the rack rod conveyer drive shaft 44 is driven, the construction of which is therefore designated by corresponding reference characters. The driven member 49 of the clutch is freely rotatable on the outer end portion of the shaft 79 which is located at the same side of the apparatus at which the housing or gear

box 32 of the power transmission mechanism is located. Fixed on the shaft 79 are respective cam members by which the respective operating levers 25 of the cutting means to be operated thereby are actuated. These cam members are each formed to provide a cam lobe 80, adapted to operatively engage the adjacent operating lever 25, and an inwardly offset trailing cam lobe 81 adapted to operatively engage the tail piece 28 of the oscillatable bracket block 27 which is carried by said adjacent operating lever 25.

The driver member 49 of the clutch by which the shaft 79 of the operating mechanism D for the rearward cutting means B is driven by belt and pulley transmission 82, the drive pulley 83 of which is fixed upon an exteriorly projecting end portion of the cutting mechanism drive shaft 38 of the heretofore described power transmission means. The driver member 49 of the clutch by which the shaft 79 of the operating mechanism C for the forward cutting means A is actuated by belt and pulley transmission 84 driven by the driver clutch member of said operating mechanism D.

The one revolution clutch of each operating mechanism C and D for the respective cutting means A and B is controlled by its own tripping mechanism which times the operation thereof in properly synchronized relation to the operation of the rack rod conveyer mechanism. The respective tripping mechanisms are located on opposite sides of a cam device for operating the same; said cam device being actuated by the driven shaft 17 of the rack rod conveyer. This cam device comprises a carrier plate 85 which is fixed on said driven shaft 17 of the rack rod conveyer. Carried by the carrier plate 85, and attached thereto by slot and bolt fastening means 86 so as to be subject to rotative adjustment thereon, is a trip cam member 87 which is provided on its periphery with a radially projecting tripper member 88.

Each tripping mechanism comprises a bell-crank lever 89 which is pivotally supported in connection with a bracket 90 that is mounted on the adjacent side wall 15 of the framework above the trip cam member 87. This bell-crank lever 89 possesses a dependent arm 91 having at its end a nosing 92 which bears against the periphery of the trip cam member 87, and an outwardly extending lateral arm 93. The lateral arm 93 of the bell-crank lever 89 is connected by an upwardly extending link 94 to the horizontal arm 95 of a detent lever 96, the vertical arm 97 of which normally engages and restrains the lever arm 56 of the clutch which is secured by the tripping mechanism. Said detent lever 96 is pivotally supported adjacent to said clutch by a bracket 98 that extends outwardly from the adjacent side wall 15 of the framework.

The cutting means A and B and the respective operating mechanisms and controls therefor operate alike, and consequently description of one will likewise apply to the other. For example, in operation the cutting mechanism B and its operating mechanism and control D performs as follows:

When the one-revolution clutch 49—53 thereof is inactive, and the shaft 79 actuated thereby is stopped, the cam lobes 80 are so positioned with respect to the cutter blade operating levers 25 that the latter occupy outswung positions whereby the cutter blade 29 is retracted to its normal initial position, in which position said cutter blade is uptilted to operatively engage its cutting edge with the bottom face of the die plate 13 (see Fig. 3). After a rack rod R has been carried into engagement with the emitted rear row of paste strings, and looping of said paste strings over said rack rod has progressed to the point where cutting away of the strings from the die plate 13 becomes necessary, the rotation of the cam member 87 brings the tripper member 88 thereof into passing engagement with the nosing 92 of the bell-crank lever arm 91 so as to outswing said arm 91 and thus upswing the bell-crank lever arm 93. The upswing of said bell-crank lever arm 93 is transmitted through link 94 to the horizontal arm 95 of detent lever 96, and thereby outswings the vertical arm 97 of the latter away from the clutch lever 56. Resultant release of clutch lever 56 actuates the clutch, whereupon the trip mechanism returns by gravity to normal initial position as the tripper member 88 of this cam member 87 passes on, and consequently the vertical arm 97 of detent lever 96 returns to initial position, ready to again arrest the clutch lever arm 56 so as to release the clutch as soon as one revolution of the clutch driven shaft 79 is completed.

The revolution of the shaft 79 rotates the cam lobes 80 against the cutter blade operating levers 25, whereby to swing the latter inwardly and thus cause the cutter blade 29 to traverse the rear row of die apertures 14 of die plate 13, so as to cut away the paste strings issued therefrom (see Fig. 9). By the time the cam lobes 80 complete their thrust against the operating levers 25 by which the cutting stroke of the cutter blade 29 is induced, and begin to move away therefrom, the trailing cam lobes 81 have approached and engaged the tail piece 28 of the cutter blade bracket blocks 27, whereby to upswing said tail pieces and thus downswing the cutter blade 29 away from the die plate 13, while the cutter blade is being retracted to normal initial position (see Fig. 10).

In the operation of the rack rod loading mechanism, the rack rod conveyer 21 is brought to rest whereby to dispose a rack rod R behind the forming forward row of paste strings, which, due to the timed alternated operation of the cutting means A and B, is completed in advance of the completion of the rearward row of paste strings. At the proper time, the conveyer 21 is started by activation of the one-revolution clutch 49—53 of the power transmission means, whereby the rack rod positioned thereby will be moved forward against said forward row of paste strings. The forwardly moved rack rod contacts the paste strings at the approximate mid-parts of the length thereof and, as said rack rod is moved upwardly and outwardly, said paste strings will be looped over and upon the same. After the rack rod has been advanced and raised to a predetermined point, the trip cam member 87, which rotates in company with the moving conveyer 21, will cause its tripper member 88 to engage and actuate the tripping mechanism which controls operation of the forward cutting means A, whereby the latter will operate to cut away said forward row of paste strings from the die plate 13, thus permitting the trailing end portions thereof to drop, and thereby complete the looping of the strings over the rack rod, so as to be loaded thereon. In the meantime, emission of the rearward row of paste strings to proper length is completed and the movement of the conveyer 21 has carried a following rack rod R into engagement therewith, whereby continued advance of the

conveyer similarly causes said rearward row of paste strings to be looped over said rack rod, whereupon the continued accompanying advance of the trip cam member 87 will cause its tripper member 88, at the proper time, to engage and actuate the tripping mechanism which controls the operation of the rearward cutting means B. Operation of said cutting means B cuts away and drops the trailing end portions of said rearward row of paste strings from the die plate 13 to complete the loading of the rack rod therewith. The movement of the conveyer 21, as controlled by the one-revolution clutch of the power transmission means, continues until another rack rod R is positioned to engage the next formed forward row of paste strings, whereupon the conveyer 21 is stopped for a rest or dwell period of sufficient duration to allow paste string emission to progress to the point ready for repetition of the above described cycle of rack rod loading operations when the one-revolution clutch of the power transmission means is again tripped and activiated.

It will be noted that the trip cam member 87 can be rotatively adjusted, whereby to desirably predetermine the time of the tripping effect of its tripper member 88 in relation to the amount of advance and lift of the conveyer moved rack rods being loaded, so that the paste strings will be cut away from the die plate 13 at the most advantageous moment.

Extending from the upper discharge end of the rack rod conveyer 21 is an outgoing discharge conveyer means 99, preferably of the sprocket and chain type, upon which the loaded rack rods R are deposited by said loading conveyer 21. This discharge conveyer means is driven by the jack shafts 20, and said jack shafts are in turn driven by chain and sprocket transmission means 100, the drive sprockets 101 of which are fixed on the ends of the conveyer drive shaft 17 so as to be rotated thereby. The drive of said discharge conveyer means 99 is so designed that it operates the same at a linear speed in excess of the linear speed of the rack rod conveyer 21, whereby to quickly clear the discharged rack rods from the hooks 23 of the latter. Said discharge conveyer means may lead directly to and so as to deliver the loaded rack rods into drier apparatus or rooms.

It will be understood that various changes could be made in the above described apparatus, its mechanisms and parts within the scope of the herefollowing claims. It is, therefore, intended that all matter described in the foregoing specification and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a long alimentary paste production apparatus including a rack rod conveyer means for cooperation with a die from which paste strings are extruded in a linear row and further including cutting means cooperative with said die for cutting away therefrom extruded paste strings, a power actuated cutting means drive shaft, a driven shaft to actuate said conveyer means, a conveyer means drive shaft, means for driving the driven shaft of said conveyer means from said conveyer means drive shaft including a one-revolution clutch comprising a power actuated driving member and a driven member fixed on said conveyer means drive shaft, means for timing the operation of said clutch and thereby the movement of said conveyer means, power driven

means for actuating said timing means, additional one-revolution clutch means driven from said power actuated cutting means drive shaft for operating the cutting means, clutch trip means for controlling the operation of said additional one-revolution clutch means, and a trip cam member rotated by the driven shaft of the conveyer means for controlling said last mentioned trip means whereby to coordinate the operation of the cutting means with the movement of the conveyer means.

2. In long alimentary paste production apparatus including a rack rod conveyer means for cooperation with a die from which paste strings are extruded in a linear row and further including cutting means cooperative with said die for cutting away therefrom extruded paste strings, a power actuated cutting means drive shaft, a driven shaft to actuate said conveyer means, a conveyer means drive shaft, a transmission shaft intermediate said power actuated cutting means drive shaft and said conveyer means drive shaft, means to drive said transmission shaft from the cutting means drive shaft, means for driving the driven shaft of said conveyer means from said conveyer means drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on the conveyer means drive shaft, means to operate the driving member of said clutch from said transmission shaft, clutch trip means to control engagement of the driving member with the driven member of said clutch, means for timing the operation of said clutch trip means, means for operating said timing means from said transmission shaft, additional one-revolution clutch means driven from said cutting means drive shaft for operating the cutting means, trip means for controlling the operation of said additional one-revolution clutch means, and a trip cam member rotated by the driven shaft of the conveyer means for controlling said last mentioned trip means whereby to coordinate the operation of the cutting means with the movement of the conveyer means.

3. In long alimentary paste production apparatus including a rack rod conveyer means for cooperation with a die from which paste strings are extruded in a linear row and further including cutting means cooperative with said die for cutting away therefrom extruded paste strings, a power actuated cutting means drive shaft, a driven shaft to actuate said conveyer means, a conveyer means drive shaft, a transmission shaft intermediate said power actuated cutting means drive shaft and said conveyer means drive shaft, means to drive said transmission shaft from the cutting means drive shaft, means for driving the driven shaft of said conveyer means from said conveyer means drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on the conveyer means drive shaft, means to operate the driving member of said clutch from said transmission shaft, releasable detent means for holding the driving member of said clutch disengaged from the driven member thereof, means to trip said detent means whereby to release said clutch members for engagement, means for timing the operation of said detent means, means driven by said transmission shaft for operating the timing means, a driven shaft to actuate said cutting means, additional one-revolution clutch means for operating the driven shaft of said cutting means, said additional clutch means also comprising a driving

member and a driven member fixed on said cutting means driven shaft, means to operate said additional clutch driving member from said cutting means drive shaft, additional releasable detent means for holding the driving member of said additional clutch means disengaged from the driven member thereof, additional trip means cooperative with said last mentioned detent means whereby to release the members of said additional clutch means for engagement, and a trip cam member rotated by the driven shaft of the conveyer means for controlling said additional trip means whereby to coordinate the operation of the cutting means with the movement of the conveyer means.

4. In a long alimentary paste production apparatus including a rack rod conveyer means for cooperation with a die from which paste strings are extruded in a linear row and further including cutting means cooperative with said die for cutting away therefrom extruded paste strings, a power actuated cutting means drive shaft, a conveyer means drive shaft, a transmission shaft intermediate said power actuated cutting means drive shaft and said conveyer means drive shaft, means to drive said transmission shaft from the cutting means drive shaft, a driven shaft to actuate said conveyer means, means for driving the driven shaft of said conveyer means from the conveyer means drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on the conveyer means drive shaft, means to operate the driving member of said clutch from the transmission shaft, releasable detent means for holding the driving member of said clutch disengaged from the driven member thereof, means to trip said detent means whereby to release said clutch members for engagement, a rotatable trip cam for actuating said trip means, a ratchet wheel for rotating said trip cam, a pivoted rocker arm carrying a pawl for driving said ratchet wheel, a crank wheel operated by said transmission shaft and connected by a link to said rocker arm, means to adjust the connection of said link with said rocker arm whereby to vary the amplitude of rocker arm oscillation and thus to time the rotation of said trip cam to thereby control periodic operation of the conveyer means.

5. In a long alimentary paste production apparatus including a rack rod conveyer means for cooperation with a die from which paste strings are extruded in a linear row and further including cutting means cooperative with said die for cutting away therefrom extruded paste strings, a power actuated cutting means drive shaft, a conveyer means drive shaft, a transmission shaft intermediate said power actuated cutting means drive shaft and said conveyer means drive shaft, means to drive said transmission shaft from the cutting means drive shaft, a driven shaft to actuate said conveyer means, means for driving the driven shaft of said conveyer means from the conveyer means drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on the conveyer means drive shaft, means to operate the driving member of said clutch from the transmission shaft, releasable detent means for holding the driving member of said clutch disengaged from the driven member thereof, means to trip said detent means whereby to release said clutch members for engagement, a rotatable trip cam for actuating said trip means, a ratchet wheel for rotating said trip cam, a pivoted rocker arm carrying a pawl for driving said ratchet wheel, a crank wheel operated by said transmission shaft and connected by a link to said rocker arm, means to adjust the connection of said link with said rocker arm whereby to vary the amplitude of rocker arm oscillation and thus to time the rotation of said trip cam to thereby control periodic operation of the conveyer means, additional one-revolution clutch means driven from said power actuated cutting means drive shaft for operating the cutting means, clutch trip means for controlling the operation of said additional one-revolution clutch means, and a trip cam member rotated by the driven shaft of the conveyer means for controlling said last mentioned trip means whereby to coordinate the operation of the cutting means with the movement of the conveyer means.

6. In a long alimentary paste production apparatus including a rack rod conveyer means for cooperation with a die from which paste strings are extruded in a linear row and further including cutting means cooperative with said die for cutting away therefrom extruded paste strings, a power actuated cutting means drive shaft, a conveyer means drive shaft, a transmission shaft intermediate said power actuated cutting means drive shaft and said conveyer means drive shaft, means to drive said transmission shaft from the cutting means drive shaft, a driven shaft to actuate the conveyer means, means for driving the driven shaft of said conveyer means from the conveyer means drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on the conveyer means drive shaft, means to operate the driving member of said clutch from the transmission shaft, releasable detent means for holding the driving member of said clutch disengaged from the driven member thereof, means to trip said detent means whereby to release said clutch members for engagement, a rotatable trip cam for actuating said trip means, a ratchet wheel for rotating said trip cam, a pivoted rocker arm carrying a pawl for driving said ratchet wheel, a crank wheel operated by said transmission shaft and connected by a link with said rocker arm, means to adjust the connection of said link with said rocker arm whereby to vary the amplitude of rocker arm oscillation and thus to time the rotation of said trip cam to thereby control periodic operation of the conveyer means, a driven shaft to actuate said cutting means, additional one-revolution clutch means for operating the driven shaft of said cutting means, said additional clutch means also comprising a driving member and a driven member fixed on said cutting means driven shaft, means to operate the driving member of said additional clutch means from said cutting means drive shaft, additional releasable detent means for holding the driving member of said additional clutch means disengaged from the driven member thereof, additional trip means cooperative with said last mentioned detent means whereby to release the members of said additional clutch means for engagement, and a trip cam member rotated by the driven shaft of the conveyer means for controlling said additional trip means whereby to coordinate the operation of the cutting means with the movement of the conveyer means.

7. In a long alimentary paste production apparatus including a rack rod conveyer mechanism for cooperation with a die from which paste strings are extruded in two parallel linear rows and further including a pair of cutting mecha-

nisms respectively operative from opposite sides of the die to respectively cut away from the latter the respective rows of extruded paste strings, power operated drive shaft to actuate the cutting mechanisms, a driven shaft to actuate said conveyer mechanism, a conveyer mechanism drive shaft, means for driving the driven shaft of said conveyer mechanism from the conveyer mechanism drive shaft including a one-revolution clutch comprising a power actuated driving member and a driven member fixed on said conveyer mechanism drive shaft, means for timing the operation of said clutch and thereby the movement of said conveyer mechanism, power driven means for actuating said timing means, additional one revolution clutches for respectively actuating the respective cutting mechanisms, said additional clutches having driving members and means to drive the same from the power actuated drive shaft for the cutting mechanisms, trip mechanisms to respectively control said respective additional clutches, and a trip cam member rotated by the driven shaft of the conveyer mechanism and operative intermediate said trip mechanisms whereby to successively actuate the same and thereby coordinate the operation of said cutting mechanisms one with the other and with the movement of the conveyer mechanism.

8. In a long alimentary paste production apparatus including a rack rod conveyer mechanism for cooperation with a die from which paste strings are extruded in two parallel linear rows and further including a pair of cutting mechanisms respectively operative from opposite sides of the die to respectively cut away from the latter the respective rows of extruded paste strings, a power operated drive shaft for the cutting mechanisms, a drive shaft for the conveyer mechanism, a transmission shaft intermediate said drive shafts, means to drive said transmission shaft from the cutting mechanisms drive shaft, a driven shaft to actuate the conveyer mechanism, means for driving the driven shaft of the said conveyer mechanism from the conveyer mechanism drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on said conveyer mechanism drive shaft, means to operate the driving member of said clutch from the transmission shaft, releasable detent means for holding the driving member of said clutch disengaged from the driven member thereof, means to trip said detent means whereby to release said clutch members for engagement, a rotatable trip cam for actuating said trip means, a ratchet wheel for rotating said trip cam, a pivoted rocker arm carrying a pawl for driving said ratchet wheel, a crank wheel operated by the transmission shaft and connected by a link with said rocker arm, means to adjust the connection of said link with said rocker arm whereby to vary the amplitude of rocker arm oscillation and thus to time the rotation of said trip cam to thereby control periodic operation of the conveyer mechanism, additional one-revolution clutches for respectively actuating the respective cutting mechanisms, said additional clutches having driving members and means to drive the same from the power actuated drive shaft for the cutting mechanisms, trip mechanisms to respectively control said respective additional clutches, and a trip cam member rotated by the driven shaft of the conveyer mechanism and operative intermediate said trip mechanisms whereby to successively actuate the same and thereby coordinate the operation of said cutting mechanisms one with the other and with the movement of the conveyer mechanism.

9. In a long alimentary paste production apparatus including a rack rod conveyer mechanism for cooperation with a die from which paste strings are extruded in two parallel linear rows and further including a pair of cutting mechanisms respectively operative from opposite sides of the die to respectively cut away from the latter the respective rows of extruded paste strings, a power operated drive shaft for the cutting mechanisms, a drive shaft for the conveyer mechanism, a transmission shaft intermediate said drive shafts, means to drive said transmission shaft from the cutting mechanisms drive shaft, a driven shaft to actuate the conveyer mechanism, means for driving the driven shaft of the said conveyer mechanism from the conveyer mechanism drive shaft including a one-revolution clutch comprising a driving member and a driven member fixed on said conveyer mechanism drive shaft, means to operate the driving member of said clutch from the transmission shaft, releasable detent means for holding the driving member of said clutch disengaged from the driven member thereof, means to trip said detent means whereby to release said clutch members for engagement, a rotatable trip cam for actuating said trip means, a ratchet wheel for rotating said trip cam, a pivoted rocker arm carrying a pawl for driving said ratchet wheel, a crank wheel operated by the transmission shaft and connected by a link with said rocker arm, means to adjust the connection of said link with said rocker arm whereby to vary the amplitude of rocker arm oscillation and thus to time the rotation of said trip cam to thereby control periodic operation of the conveyer mechanism, respective driven shafts for actuating the respective cutting mechanisms, additional one-revolution clutches to respectively control operation of the respective cutting mechanisms, said additional clutches each comprising a driving member and a driven member, the driven members of said additional clutches being respectively fixed on driven shafts of the respective cutting mechanisms, means to operate the driving members of said additional clutches from the cutting mechanisms drive shaft, additional releasable detent means respectively operative to hold the driving members of respective additional clutches disengaged from the driven members of the latter, additional trip mechanisms respectively cooperative with respective last mentioned detent means whereby to release the members of the respective additional clutches for engagement, and a trip cam member rotated by the driven shaft of the conveyer mechanism and operative intermediate said trip mechanisms whereby to successively actuate the same and thereby coordinate the operation of said cutting mechanisms one with the other and with the movement of the conveyer mechanism.

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