(No Model.) 4 Sheets—Sheet 1.

A. GILLESPIE.

VERTICAL FLOUR BOLT.

No. 536,513. Patented Mar. 26, 1895.

Fig. I.

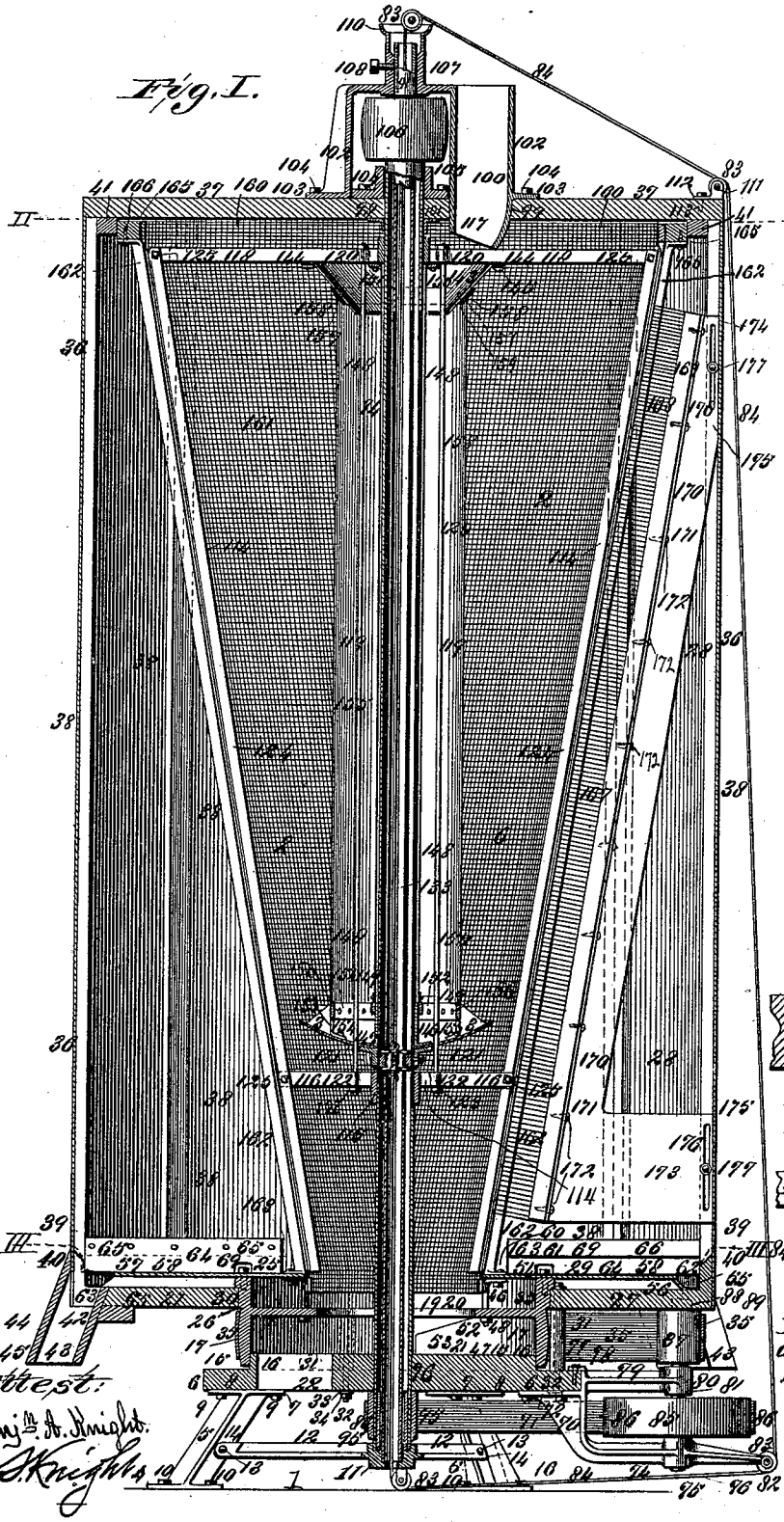


Fig. VI.

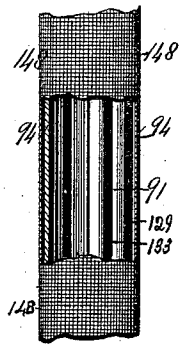
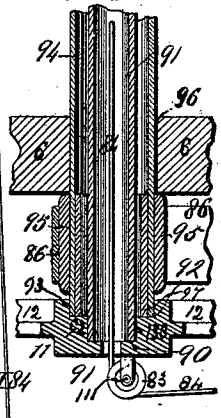


Fig VII



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E. A. Knight.

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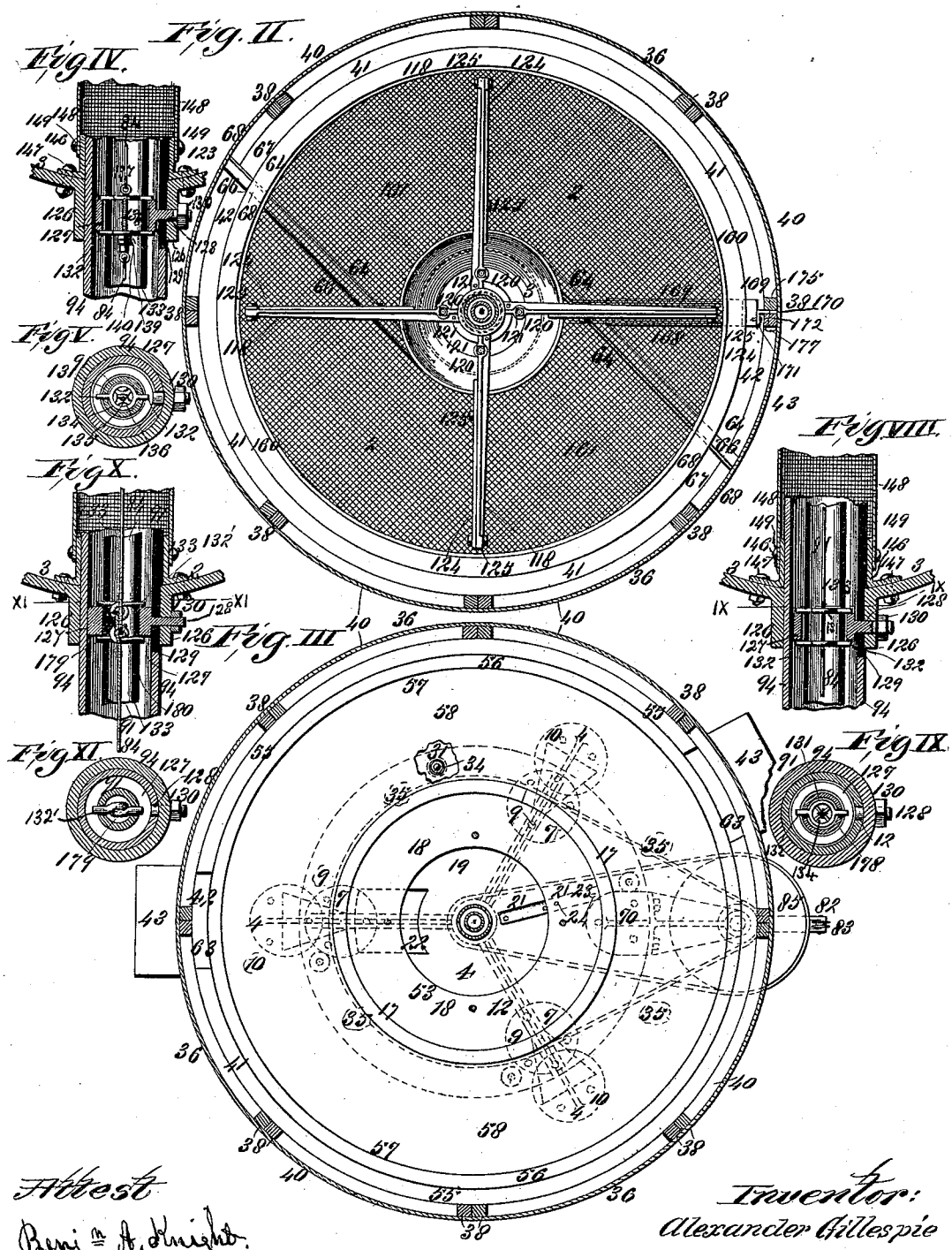
Attys.

(No Model.) 4 Sheets—Sheet 2.

A. GILLESPIE.

VERTICAL FLOUR BOLT.

No. 536,513. Patented Mar. 26, 1895.



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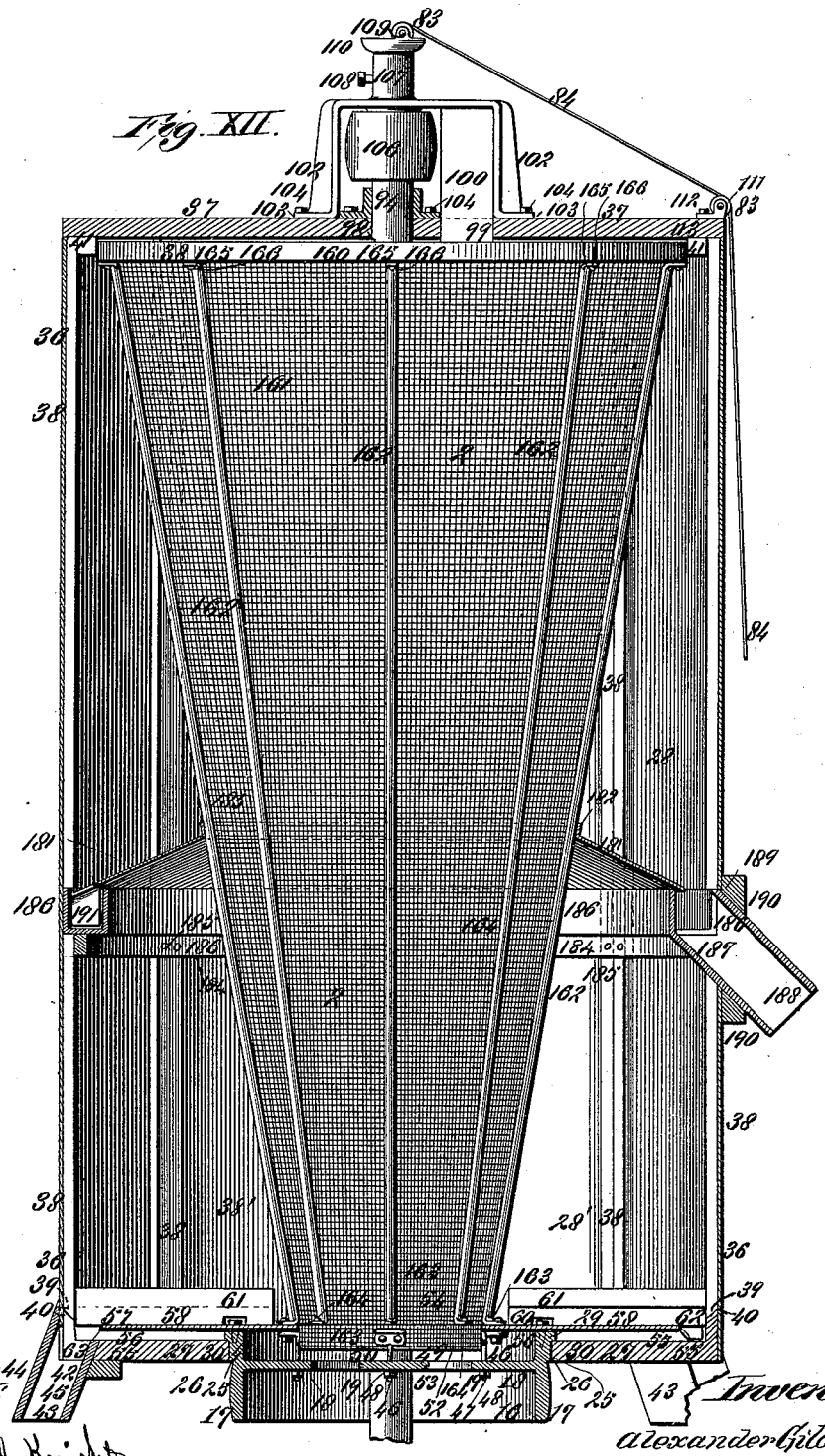
(No Model.) 4 Sheets—Sheet 3.

A. GILLESPIE.

VERTICAL FLOUR BOLT.

No. 536,513. Patented Mar. 26, 1895.

Fig. XII.



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VERTICAL FLOUR BOLT.

No. 536,513. Patented Mar. 26, 1895.

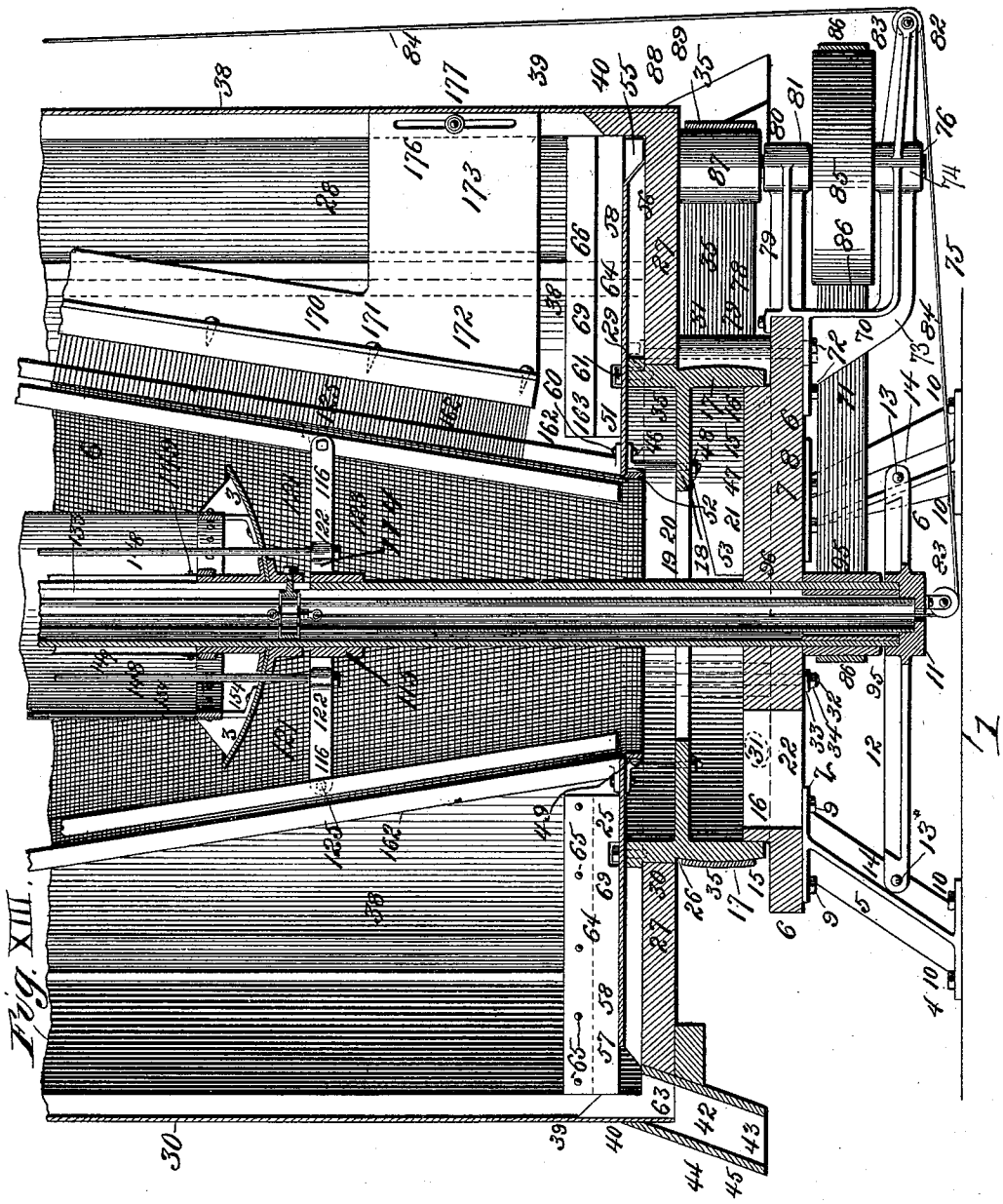

Fig. XIII.

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UNITED STATES PATENT OFFICE.

ALEXANDER GILLESPIE, OF ST. LOUIS, MISSOURI.

VERTICAL FLOUR-BOLT.

SPECIFICATION forming part of Letters Patent No. 536,513, dated March 26, 1895.

Application filed June 25, 1894. Serial No. 515,557. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER GILLESPIE, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Vertical Flour-Bolts, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a vertical flour bolt that rotates horizontally, which superficially is in the form and position of an inverted frustum of a cone, and has within it a rotary concave feed-disk, which is vertically adjustable to accord with the variable condition of material in course of bolting, with means for effecting said adjustment of the feed, and the respective elevation and depression of said feed disk; without having to stop the rotary movement of the flour bolt; and the invention consists in features of novelty hereinafter fully described and pointed out in the claims.

Figure I is a vertical section of my flour bolt. Fig. II is a transverse section taken on line II—II Fig. I. Fig. III is a transverse section taken on line III—III, Fig. I. Fig. IV is an enlarged, detail vertical section, of the rotary drive tube, the stationary center bearing tube, the rotary feed disk, the elevator and its connections. Fig. V is an enlarged, transverse section of the same. Fig. VI is an enlarged detail view, part in vertical section and of the stationary center bearing slotted tube, and the vertically adjustable fabric cover. Fig. VII is an enlarged detail section of the elevator device. Fig. VIII is an enlarged, detail, vertical section, and shows a modification of the elevator device. Fig. IX is an enlarged transverse section taken on line IX—IX, Fig. VIII. Fig. X is an enlarged, vertical, detail section, showing another modified form. Fig. XI is an enlarged, transverse section, taken on line XI—XI. Fig. XII is a modification in which a radially downwardly inclined cut-off is secured horizontally around the periphery of the bolt, and Fig. XII is a detail vertical section of the lower part of my flour bolt on an enlarged scale.

Referring to the drawings:—1 represents a mill floor, on which may be set up the vertical flour bolt 2, with the vertically adjustable rotary feed disk 3.

4 represents the feet of the inclined brace legs 5, of the stationary table 6. The perforated holder flanges 7, that surmount said legs are secured to the lower side of the table top 8, by the screw-bolts 9, and the perforate, flanged feet 4, are secured to the mill floor by the screw bolts 10.

11 represents the center bearing brace block, the respective perforate ended spider arms 12 of which are secured by rivets or bolts 13 to the inner flanges 14 of the respective inclined brace legs 5.

15 represents a circular flange rim that integrally surmounts the top 8 of said table 6, the peripheral surface of which flange rim constitutes a loose bearing 16, around which the inner base of the major cylindric pulley 17 turns. 18 indicates an internal brace plate within and integral with said major cylindric pulley which brace plate is provided with a circular open port 19, directly beneath the outlet 20, for the passage from the base of the vertical bolt, of the middlings and other unbolted material, as it descends onto said table top 8, on which it is pushed around by the rotating scraper 21, within the flange 15, until it reaches the open port 22 in said table top through which it is finally discharged. The perforate holder flange 23 of said scraper is secured to the internal brace plate 18 by the rivets or bolts 24. A surmounting integral extension 25 of said cylindric pulley 17, provides a peripheral bearing for the same, within the circular open guide seat 26 in the middle of the stationary floor 27 of the cylindric bolting chamber 28, in which chamber the vertical flour bolt 2 is housed. The peripherally projecting flange head 29 of said surmounting extension of said pulley 17, projects at a right angle over the edge of said circular open guide seat 26, in said stationary floor 27, so as to provide a hanger bearing 30 from which said cylindric pulley hangs pendent and freely turns.

31 represents tube spacing pillars that are mounted around such parts of the screw bolts 32, that intervene between said top 8 of the table 6, and said stationary floor 27 of the bolt chamber 28, through which said bolts pass and in which they are secured by the washers 33 and the screw nuts 34, and said tube spacing pillars 32, hold said stationary

floor 27 at the required elevation above said table top 8, to allow the free rotary movement of said cylindric pulley 17 and of the drive action of the band 35 that works said pulley.

36 represents the vertical cylindric sides of the bolting chamber 28, which are preferably of sheet metal, and which are secured to the stationary floor 27, and to the ceiling 37 of said chamber, and 38 is a series of vertical posts, the bevel feet 39 of which rest on the circular bevel face rim 40 of the stationary floor 27, and at certain intervals couple together or stretch between said rim of the stationary floor 27, and said ceiling 37 of said bolting chamber, and hold its vertical cylindric periphery in its drum shape position, the bevel feet 39 of said posts being secured by any suitable means to the circular bevel faced rim 40 that integrally surmounts at its periphery the stationary floor 27, and the heads of said posts aid to support said ceiling 37 of said bolt chamber 28. 41 is a bearer loop that underlies, and may be secured to said ceiling by any suitable means, the periphery of which loop is in contact with the inside of the upper ends of said series of coupling posts 38, which are preferably in twin sections as shown in Figs. II and III.

42 represents the discharge ports from the bolting chamber 28, through the stationary floor 27, and *via* the pendent discharge spouts 43, to any barrel, sack or other suitable receptacle. 44 is a slide that is worked in its seat 45 in one of said discharge spouts, by which means said spout may be closed for the time being, when it is required to use one only of said discharge outlets from the bolt chamber.

46 represents angle holder bolts, the screw feet 47 of which are screw seated in the internal brace plate 18 of the cylindric pulley 17, and which holder bolts are reinforced in their attachment to said brace plate 18, by the underlying and surmounting screw nuts 48. 49 are strap heads of said holder bolts which are secured by screw bolts to the foot hoop 52, around the tail discharge port 53 of my vertical bolt, and 54 are secondary strap heads that project peripherally at a right angle from the strap heads 49.

55 represents a circular collector trough, that rests on the stationary floor 27, close within its said upwardly projecting rim 40, against which rim the outer vertical side of said trough closely fits, and the upper edge of its inner, inclined side 56, is surmounted by the circular discharge edge 57 of the rotary table 58. The said rotary table has a central circular opening that fits close around the bolt screen covered foot hoop 52 of the vertical bolt, and is mounted on the secondary strap heads of the holder bolts 46, to which it is secured by the screw nutted bolts 60, and said table also rests on the aforesaid flange heads 29, of the surmounting extension 25 of the cylindric pulley 17, and is secured thereto by the screw bolts 61, and as said table rapidly rotates it precipitates by centrifugal force, bolted flour that has descended thereon toward and much of it over its periphery into the circular collection trough.

62 represents one or more trough scrapers or wipers that are integral with or otherwise securely attached to and project from the periphery of said rotary table, and rotate therewith, and are constantly, (while the bolt is in operation,) pushing round the flour in the circular collector trough 55, until it reaches one of the open discharge ports 63, immediately above their corresponding discharge ports 42 that pass through the stationary floor 27, through which corresponding ports the flour passes into the aforesaid discharge spouts 43.

64 represents two stationary table scrapers or wipers, that are secured by rivets 65 to carrier bars 66, which are securely fastened to the vertical cylindric sides 36 of the bolt chamber 28, in the position shown in Figs. I and II, so that as the rotary table 58 rotates the remainder of the bolted flour that has not previously been discharged by centrifugal force from its periphery into the circular collector trough 55 is wiped off into said collector trough as the table reaches at either side the respective open discharge ports 63, and passing through the corresponding discharge port immediately beneath in the stationary table and *via* the final discharge spout 43, into any suitable depository set to receive it. There is a respective open port 69 through the under side of each of the stationary scrapers 64 to allow during the rotation of the table, for the free passage of its attachment bolts 61.

160 represents the large head hoop that constitutes the upper rim of the horizontally rotating vertical flour bolt 2, that has its peripheral top bearing within the aforesaid bearer hoop 41, which latter besides constituting said peripheral bearing also provides an intervening reinforce hold between said top rim, and the series of vertical posts 38, and thus secures a double reinforced top peripheral bearing for the flour bolt and that at a sufficient distance from the inclosing wall of the bolt chamber to allow for the settling movement of the bolted materials.

161 represents the bolting cloth cover, which may be of either silk, or wire, according to the nature of the material required to be bolted, and which bolting cover is secured to and peripherally held by the minor foot hoop 52 at bottom, and is secured to and held by the major head hoop 160 at top.

A series of stretcher posts 162 have perforate foot flanges 163 at their lower ends, four of which, that come in surmounting line with the secondary strap heads 54 beneath the rotary table 58 are secured thereto and to said table by the screw-nutted bolts 60, the remainder of said foot flanges being secured to foot hoop 52 by screw bolts, their perforate head flanges 165 being secured by screw bolts 166 to the head hoop 160.

The attachment flange 71 of the pulley

mount bracket 70 is secured by screw bolts 72 to the under side of the stationary table top 8 and its upper angle flange 77 is secured by screws 78 to the upper side of said table top. The major elbow 73 hangs pendent from said table top and projects horizontally to the journal bearer 74 integral therewith, from which it extends to the journal bearing lugs 82, in which runs one of the four sheave pulleys 83, that carry and guide the elevator rope 84, at its divergent turns. Said elevator rope is preferably made of steel wire, but may be of any other suitable material. The vertical pulley shaft 75 has its foot bearing 76 in said journal box 74 and on which vertical shaft are tightly mounted and therefore simultaneously rotate the large band pulley 85 that is driven by the band 86, and the small hand pulley 87, that drives the aforesaid band 35, and by means of said band drives the aforesaid cylindric pulley 17 that connects with and turns the vertical bolt 2. The said vertical rotary shaft has its secondary bearing 81 in the journal box 80 that is sustained by the minor journal arm 79 of said holder bracket 70, intermediate between said pulleys 85 and 87, and its upper bearing 88 in the journal box 89 that is inlaid in the under side of the aforesaid stationary floor 27.

The aforesaid center bearing brace block 11, the counter brace spider arms 12 of which are secured to the brace legs 5 that support the stationary table 6, has the provision within it of a right angle stepped bore 138 being of increased caliber above each of the two circular mounting steps and thus in its initial bore of its smallest caliber at the base provides an entrance passage for the elevator rope 84 as shown in Fig. I, and as more clearly seen in the enlarged detail vertical section shown in Fig. VII, each succeeding surmounting angle step of increased caliber mounts an additional element or elements as described below which are there respectively seated without any undue interference with each other. One of the sheave pulleys 83 with its fork bearings is secured by any suitable means to the base of said center bearing brace block, in position to direct the requisite angle turn of the elevator rope 84 on its entrance into and exit from the hollow center of said center bearing brace block, the narrow entrance bore of which is alone occupied by said elevator rope.

90 represents the lower circular mount step within said center bearing brace block 11, which is formed by the increased caliber bore of the tube opening within said block sufficiently to form a close housing for the foot of the stationary center bearing tube 91, the base of which stands on said lower circular mount step and the periphery around said foot is inclosed and tightly held within the second expansion bore of increased caliber.

92 represents the upper circular mount step within said center bearing brace block, which is formed by the third increased caliber bore between said step and the top of said block, the caliber of said upper bore being sufficient to provide a free bearing 93 for the foot of the tubular drive shaft 94, and its internal reinforcing shoe 97, around the foot of the stationary center bearing tube 91.

95 represents a collar pulley which is tightly seated around the tubular drive shaft, on horizontal line with the driven pulley 85, which its mounted band 86 drives. The aforesaid table top 8 is provided with a circular opening which constitutes a secondary guide bearing 96 for said tubular drive shaft in which it turns.

98 represents a circular opening through the center of the ceiling top of the bolt chamber 28 through which the said tubular drive shaft 94, rises and in an adjacent opening 99 the mouth of the feed spout 100 is seated. 101 is a flange collar freely bearing around said tubular drive shaft immediately beneath the ceiling from which it hangs pendent.

102 represents a metallic flanged holder frame, the perforate foot attachment plate 103 of which is secured to the top of the bolt housing chamber by bolts 104. The feed spout 100 is integral with said flanged holder frame. 105 is a flange bearing collar around said tubular drive shaft above said foot plate. 106 is a drum pulley tightly seated on the top of said tubular drive shaft, which connects with any suitable power. The top of the aforesaid stationary center bearing tube 91, projects above the top of said drum pulley 106 through and out of contact with which it freely passes, and is housed within the surmounting integral tube 107 of said metallic flange holder frame 102, and 108 is a set screw that is screw seated in said tube 107 and when secured home, tightly holds said stationary center bearing tube from both longitudinal and rotary displacement. The upper sheave pulley 83 that carries the elevator rope 84 is mounted in the bearer lugs 109 that integrally project above the cup flange 110 of the surmounting tube 107. The sheave pulley 83 that carries and redirects the elevator rope over the periphery of the bolt housing chamber 28, is mounted in the journal bearing lugs 111 of the holder bracket 112 that is attached by the screw bolt 113.

114 represents the rotary spider frame constituted of the lower hub 115, tight mounted on the tubular drive shaft below the downward limit of my vertically adjustable rotary feed disk 3, the integral foot arms 116 that project radially from said hub, the upper hub 117, tightly mounted on said tubular drive shaft above the upward limit of said vertically adjustable rotary feed disk, the integral shoulder arms 118 that project from said upper hub, the vertical guide rods 119, that are seated above in the perforate swell seats 120 in said shoulder arms 118, pass through free guide bearer holes 121, in said rotary free disk, and are seated below in perforate swell seats 122 in said foot arms, beneath which their projecting screw tips are held by the

nuts 123, and the rotary beater bars 124 that are screwed respectively to the perforate tips of the radial arms 118 and 116, by the screw nutted bolts 125.

126 represents the foot flange of my vertically adjustable rotary feed disk, which has loose longitudinally adjustable bearing around said tubular drive shaft.

127 is a longitudinally adjustable elevator ring, seated between the periphery of the stationary center bearing tube 91 and the convex interior of the tubular rotary drive shaft 94, and 128 is a screw key bolt that projects integrally from one side of said elevator ring through an elongated vertical slot 129 that is provided in one side of the tubular drive shaft and through and projects sufficiently beyond said foot flange 126 to seat the screw nut 130 that fastens the attachment.

131 represents the center bearing rings, that act as center bearing guides within the stationary center bearing tube 91, and 132 are two integral stay pins that project from said center bearing rings through the elongated slots 133 on opposite sides of said center bearing tube and project sufficiently beyond the tube to effect a stay hold respectively above and below said longitudinally adjustable elevator ring 127. 134 represents cross star braces that are respectively integral with each other and with said center bearing rings, and 135 are screw bolt holes through the center of said cross stars, in which is seated the coupling screw bolt 136, to the eyelet head 137 of which the upper end of the elevator rope 84 is spliced or fastened. The screw nut 139 is screw seated on the projecting lower end of said bolt and the eyelet headed screw jam nut 140 is also screw seated beneath said nut and the reverse end of said elevator rope 84 is spliced or fastened to the eyelet of said jam nut thus completing an endless operative elevator connection.

143 represents the guide hopper or chute into which the feed spout 100 discharges. The said hopper is mounted around the tubular drive shaft 94, immediately beneath the shoulder arms 118 of the rotary spider frame 114, to which surmounting arms the perforate attachment lugs 144, that project from the upper periphery of said hopper are secured by the screws 145.

146 represents a short bearer tube, the perforate foot flange of which is secured to the rotary feed disk by the screw nutted bolts 147, and 148 is a canvas or other pliable tube that is secured at bottom to and around near the summit of said bearer tube, by the rivets 149 and at top to the under side of the shoulder arms 118 by the clamp holder ring 150 and its attachment bolts 151. The said pliable tube is to guard the open elongated slots in the tubular drive shaft and in the stationary center bearing tube from the inroads of material on its way to the rotary feed disk.

152 represents a perforate holder hoop, the pendent angle foot lugs 153 of which rest on and are secured to the rotary convex feed disk 3 by the rivets 154. The said holder hoop is elevated by said foot lugs sufficiently above the rotary concave feed disk, to leave abundant room between said hoop and rotary feed disk for the centrifugal projection of the feed on its way to the bolt.

155 represents a canvas or other flexible guide tube that confines the feed from radial escape, during its descent from the guide hopper to the rotary feed disk, the bottom of which flexible tube is secured to said perforate holder hoop 152 by rivets 156, and the upper end of said flexible tube is secured by rivets 157 to the perforate inclined holder hoop 158, which upper holder hoop is secured to the under side of the guide hopper 143 by the rivets or bolts 159.

It will be seen that by peripherally spreading the bolted bottom attachment of four of the stretcher posts so that they connect directly with the rotary table 58 and with the projecting angle flange heads 54 of the holder bolts 46 and indirectly through the lower angle flanges of said holder bolts with the periphery of the foot hoop 52, while the foot flanges of the other stretcher posts connect with the upper edges of said foot hoop a strong brace connection and hold is secured to said parts, and a fulcrum hold is also secured on the inner edge of the rotary table that firmly holds its outer periphery from depression.

167 represents the vertically adjustable bolt cleaner brush, which is underhung in the working presentation of its bristles 168 to the same extent in reversal as the periphery of the bolt it cleans is overhung. Thus being vertically adjustable, its working pressure on the bolting cloth can be increased or diminished. 169 is the holder back of said brush in which the butt ends of its bristles are embedded and held. 170 is an L-shaped metal angle bracket, the perforated angle face 171, of which is secured to said holder back by the screws 172 or by any other suitable means. 173 is an integral rearwardly extending arm at the bottom of said angle bracket that holds the bottom of the brush in its projected position, and 174 is the cutaway inclined top of said bracket, that aids to provide a long abutting hold against the vertical cylindric inclosing side 36 of the bolting chamber, and provides an elongation of the upper portion of its adjustable seat 175 between the twin sections of one of the vertical posts 38, and also narrows its proportions in conformity with its reduced quarters in its extreme elevation. The rear edge of said extension arm 173 abuts against said cylindric inclosing side 36 of the bolting chamber, and occupies the lower portion of the vertically adjustable seat 175 between the twin sections of one of said vertical posts 38. Elongated slots 176 through said bracket 170 are respectively provided adjacent to the top of said bracket near its inclined abutting rear edge, and parallel therewith and through the extension arm

173 adjacent to the bottom of said bracket, near and parallel to its abutting edge. 177 are respective set screws that work in said twin sections of said vertical post and pass through said respective elongated slots, and after the elevation or depression as the case may be, of said brush, in the first case to tighten the brush pressure on the periphery of the bolt and in the latter case to reduce said pressure, by turning said set screws said brush is held to its required adjustment.

In Figs. VIII and IX are shown a modification of the means of attaching the elevator rope 84 to the rotary disk connections which may be alike in all its parts to those shown in Figs. IV and V, except that the coupling screw bolt 136 is dispensed with and the elevator rope 84 is respectively wound round and athwart the respective cross star braces 134 of the respective center bearing rings 131 and thus make respective holder ties 178 to said parts, to hold their integral stay pins 132 in contact above and below with the elevator ring 127 that adjusts the elevation of the rotary feed disk 3.

In Figs. X and XI is shown another modification of the holder attachments of the elevator rope in which the center bearing rings 131, shown in Figs. IV, V, VIII and IX are dispensed with and two stay pins 132, which engage above and below with the elevator ring 127 have integral coil eyelets 179 in their center, within the stationary center bearing tube 91, through which eyelets the elevator rope is double folded making a double coil coupling 180 of the adjacent eyelets that secures their stay pins 132 in contact with the elevator ring 127 and securely attaches the elevator rope that works the same.

In Fig. XII is shown a modification in which a downwardly inclined cut off rotary table 181 having surmounting attachment flanges 182, is secured by any suitable means to the respective stretcher posts 162 of the rotary bolt.

184 represents a circular supporting ring that is secured on a horizontal line to the inner sides of the series of the dual vertical posts 38 by the screw bolts 185, and 186 is a circular trough that is mounted on said supporting ring 184, within the vertical cylindric sides 36, of the bolt chamber 28. The said circular trough is provided with an open port 187 which connects with the discharge spout 188, that passes through the spout seat 189, of said cylindric side 36 and delivers the highest grade of flour into any suitable receptacle. 190 is a holder bracket suitably secured to said cylindric side 36 around the discharge spout which it aids to support.

The inclined cut off 181 receives all the highest grade of bolted flour, the product of the upper section 28 of the bolt, above said cut off, and the rotary movement, downward inclines and centrifugal force exerted by its rotary movement quickly precipitate said bolted flour over the inner vertical side of said circular trough 186, and a pendent trough scraper 191, that is integral with said rotary incline cut off 181, continuously scrapes around the flour discharged into the circular trough 186 and precipitates it through the open port 187 into the discharge spout 188, which delivers it into any suitable receptacle. The seconds that pass through the lower portion of the bolt into the lower section of the bolt chamber 28 are separately discharged therefrom by the means previously described and indicated where said modified cut off 181 is not in use and the bolt chamber is therefore all in one.

The operation of the device has been almost sufficiently described during the introduction and description of the various working parts. Now it is well known that the condition of the material requiring to be bolted varies in accordance with the dry and mature condition of the wheat at time of grinding, its freedom from smut and from musty and sprouted grains and other causes, as for instance also the respective flinty nature of some species of the wheat family and the soft pulverulent nature of others both in white and red wheats.

To make an adjustable, even distribution and at the same time rotary force feed to the bolting surface that is capable of effecting the perfect bolting of all the pure flour in the material supplied without increasing the extent of the bolting surface to that degree that dustings will also be forced through the bolt, I have invented the above described vertical inverted frustum shaped bolt, with a vertically adjustable rotary concave feed disk, which feed disk is vertically adjustable, without stopping the bolt, to respectively increase or diminish the operative surface of said bolt to insure the passage through it of the pure flour in the material fed without the mixture of dustings that ensues when too large a bolting surface is used, the said rotary feed disk being respectively elevated and depressed by means of an endless elevator rope carried in its circuit by a system of guide pulleys.

I have shown in Fig. I the rotary feed disk at its lowest station where from the peculiar condition of the material, or when re-bolting the dust product to obtain the residue of pure flour therefrom, the smallest available bolt surface can be utilized to insure the freedom from dust in the bolting product; but in the average run of the material the rotary feed disk is required to be elevated by the operator drawing on the elevator rope 84 until said feed disk is stationed at from two thirds, three quarters or four fifths of the way between said lowest limit and its highest limit immediately close below the guide hopper 143 or to any intervening elevation in accordance with the condition of the material and sometimes in extreme cases of purity of the product fed and where the feed is heavy the rotary feed disk may be raised to its upper

limit, and the whole extent of the bolt surface utilized, without any large amount of dust being forced through the lower portion of the bolt. The said dust falls through the open port 19 at the foot of the bolt, onto the stationary table 6 from which it is swept by the rotary scraper 21 through the open port 22. The pure bolted flour at the same time falls on the rotary table 58, that rotates with the bolt, and by centrifugal force is precipitated from the rim of said rotary table into the stationary circular collector trough 55, from which it is brushed or scraped by the pendent extension scraper 62 that projects from, is integral with and rotates with said rotary table 58, and discharges the pure bolted flour through the open port or ports (as the case may be) in said trough and coincident ports in the stationary floor 27 and pendent discharge spouts 43 into any required receptacle. Now when the power is about to be applied to the drum pulley 106, that is fast mounted on the top of the tubular drive shaft 94, the operator by means of the elevator rope 84 vertically adjusts the position of the rotary concave feed disk to what previous to trial he may consider approximately accords with the condition of the bolting material that he is about to operate on. Supposing that said material is in good condition, the said feed disk may probably be elevated about three quarters or four fifths of the distance from its lowest limit as shown in Fig. I to that of its highest limit in close proximity to the open discharge port of the guide hopper 143. Now it will be seen that as described in the introduction of the several parts, that as said rotary feed disk is adjusted in either elevation or depression, the canvas or other pliable tube 148 around the tubular drive shaft 94, respectively rises and lowers therewith, thereby preventing the passage of the flouring material through the elongated slot 129 into the rotary drive tube 94 and through the elongated slots 133 into the stationary center bearing tube 91. It will also be seen that coincidently with said adjustment of said feed disk, the outer flexible guide tube 155, respectively rises and lowers with said disk, the base of said flexible tube being held aloof from interference with said rotary feed disk by its pendent holder ring 150 with its foot lugs 153, and said flexible guide tube is also held from collapsing by the four guide rods 119. The miller or operator then turns on the material through the feed spout 100 and guide hopper 143, *via* said flexible guide tube 155, to the rotary concave disk, which rotating rapidly by centrifugal force drives it in a horizontal feather ring against the bolt. While the also rapidly rotating beaters 124 of the spider frame keep up the forcible centrifugal current against the bolting material as by attraction of gravitation, it descends within the vertical inverted frustum shaped bolt. As the pure flour is heavier than the dust, (in which latter term is included all the elements of a lower grade than said pure flour) the centrifugal current acts with more projectile force against the heavy pure flour than against the light dust, and tends to drive the heavier ingredient to and through the bolt, while against the lighter dust, but a slight evanescent centrifugal force can be attained and the lighter material has not the ability to occupy the space already dominantly held by the heavier flour. Consequently as long as there is sufficient pure flour by the projectile operation thereon of the centrifugal current engendered by the rapidly rotating feed disk, and beaters of the spider frame, to dominantly occupy and use all of that portion of the bolt that is level with and beneath the line of its initial centrifugal precipitation, the only escape for the dust is that specially prepared for it as above described through the bottom of the bolt; but on the other hand if the pure flour has all found bolting passage before reaching the bottom of said bolt, then the dust will much of it pass through the lower unoccupied portion of said bolting surface, and greatly lowers the standard of the flour, with which it mixes.

One of the important features of my invention is by means of my vertically adjustable rotary concave feed disk to utilize to the full and the most effectively the amount of bolting surface required and by the vertical adjustment of said rotary feed disk to reduce the area for the time being of the bolting surface to that which is utilized by the passage of the pure flour, and so also vice versa, to enlarge the area of bolting surface used by the elevation of said rotary feed disk when it is found that a certain amount of pure flour is being precipitated beneath with the dust.

By the use of my vertically adjustable rotary feed disk, the skillful miller can while the bolting is in progress readily discover whether the bolt is effecting to the full the measure of good work it is capable of and also whether on the other hand the purity of the bolt is up to the required standard, and if as stated it is lacking either in its work or in the quality of the work, that lack can be corrected without even stopping the bolt, by the respective raising or lowering of the rotary feed disk by means of the elevator bolt 84, as above described.

I claim as my invention—

1. A vertical flour bolt, in combination with a vertically adjustable rotary feed disk, substantially as shown and described.

2. A vertical flour bolt, in combination with a vertically adjustable concave rotary feed disk, and an elevator cord that adjusts the elevation of said rotary feed disk: substantially as shown and described.

3. A vertical flour bolt, in combination with the tubular drive shaft 94, provided with the elongated slots 129, the longitudinally adjustable elevator ring 127, having the screw key bolt 128 that works in said longitudinal slot, the longitudinally adjustable rotary feed disk 3, the integral stay pins that clutch said ele-

vator ring above and below and the elevator rope secured to said pins: substantially as shown and described.

4. The combination of the vertical flour bolt, the tubular drive shaft, the guide hopper 143, the vertically adjustable rotary concave feed disk and the flexible guide tube 155, that guides the feed from said guide hopper to said feed disk: substantially as and for the purpose set forth.

5. The combination of the vertical flour bolt, the tubular drive shaft, the guide hopper 143, the holder hoop 157 around said guide hopper, the rotary concave feed disk, vertically adjustable on said tubular drive shaft, the holder hoop 152, the pendent foot 153, that couples said hoop to said rotary feed disk, and the flexible guide tube 155 connected to said hoops 152 and 157: substantially as shown and described.

6. The combination of the vertical flour bolt, the tubular drive shaft, the rotary spider frame mounted on said drive shaft, and having the beater bars 124, the guide hopper 143, the rotary concave feed disk vertically adjustable on said drive shaft, the elevator rope 84 by which said feed disk is vertically adjusted, and the flexible guide tube 155, substantially as and for the purpose set forth.

7. The combination of the vertical flour bolt, the tubular drive shaft, the rotary spider frame mounted on said drive shaft and having the radial arms 116 and 118, the beater bars 124, the vertical guide rods 119 secured to said radial arms, the guide hopper 143, the rotary concave feed disk having the foot flange 126, vertically adjustable on said rotary shaft, the said rotary shaft provided with the elongated slot 129, the longitudinally adjustable elevator ring 127, having the screw key bolt 128, secured to said foot flange of said rotary and vertically adjustable feed disk, the flexible tube 148 and the flexible guide tube 155, substantially as shown and described.

8. The combination of the vertical bolt, the center bearing braced block 11, the stationary center bearing tube 91 mounted on said block and provided with the elongated slots 133, the tubular drive shaft 94, provided with foot bearing in said block and provided with the elongated slot 129, the longitudinally adjustable elevator ring 127, having the screw key bolt 128 that works in said slot 129, the vertically adjustable rotary feed disk having a foot flange 126 with longitudinal bearings on said tubular drive shaft, the center bearing rings 131 having the integral stay pins 132, and the cross star screw perforate braces, the coupling screw bolt 136 with its eyelet head, the screw nut 139 and screw jam nut 140 with its eyelet head, and the elevator rope 84: substantially as shown and described.

9. The combination of the vertical flour bolt, the bolt chamber incasement, the metallic flange holder frame 102, the feed spout 100, the center bearing block 11, provided with the right angle step bore 138, the stationary center bearing tube 91 mounted on one step in said block and its top fastened by the set screw 108, said tube provided with the elongated slots 132, the tubular drive shaft 94 provided with the elongated slot 129 and having a free bearing mounted on another step in said block, the drum drive pulley 106 that surmounts said drive shaft, the rotary concave feed disk having the pendent flange 126, the vertically adjustable elevator ring 127 having the screw key bolt 128, that is mounted in said pendent flange of the rotary feed disk and is vertically adjustable with said feed disk, the center bearing rings 131 with their integral stay pins 132 and the center cross star braces, the sheave pulleys 83, the elevator rope 84 mounted on said pulleys and that is secured to said cross star braces of said center bearing rings and its integral stay pins, the flexible tube 148, the guide hopper 143, and the flexible guide tube 155: substantially as shown and described.

10. The combination of the surrounding inclosure of the bolt chamber 28, the vertical bolt, the center bearing block 11, the stationary center bearing tube 91, the tubular drive shaft 94, the drive drum pulley 106, the guide hopper 143, the rotary spider beater frame mounted on said shaft, the rotary concave feed disk mounted and vertically adjustable on said drive shaft, the flexible guide tube 155, said vertical bolt having the foot hoop 52, the cylindric pulley 17 secured to and pendent from said foot hoop, the circular collector trough 55, provided with the open port 63, the rotary table 58, the trough scraper 62, the discharge spouts 43, the stationary scrapers 64, the stationary table 6 provided with the open dust discharge port 22, the rotary scraper 21, the shaft holder bracket 70, the vertical pulley shaft 75, the pulleys 85, 87 and 95 and the transmission pulley bands 35, and 86: substantially as described.

11. The combination of the surrounding inclosure of the bolt chamber 28, the floor 27 of said chamber having the surmounting bevel faced flange rim 40, the series of dual bevel foot posts 38 that stretch from said bevel face flange rim to the top 37 of said inclosure, and tight against its cylindric vertical side, which they brace in position, the vertically adjustable bolt cleaner brush 167, having metal angle bracket 170, having the perforate angle face 171 secured by screws 172 to said holder back 169, and the base extension arm 173 and the cutaway inclined top 174 of said bracket provided with the elongated slots 176 in which work the set screws 177, that permit the vertical adjustment of the under-hung brush against the over-hung bolt: substantially as described.

12. The combination of the surrounding inclosure of the flour bolt chamber 28, the vertical flour bolt, having the external stretcher posts 162 the circular supporting ring 184, secured on a horizontal line to the inner sides of the series of dual vertical posts 38 by the

screw bolts 185: the circular trough 186 provided with the open port 187 and mounted on said supporting ring within and against the vertical cylindric sides 36 of said bolt chamber 28, the discharge spout 188: the inclined cut off rotary table 181 with its surmounting attachment flanges 182 secured by the screw clamps 183 to said stretcher posts 162, and the scraper 191, integrally pendent from one side of the outer edge of said inclined rotary table: substantially as shown and described.

ALEXANDER GILLESPIE.

In presence of—
BENJN. A. KNIGHT,
GEO. E. EBERSOLE.