Oct. 24, 1939. W. J. CAMPBELL 2,177,474

SLICING MACHINE

Filed Feb. 17, 1938 4 Sheets-Sheet 1

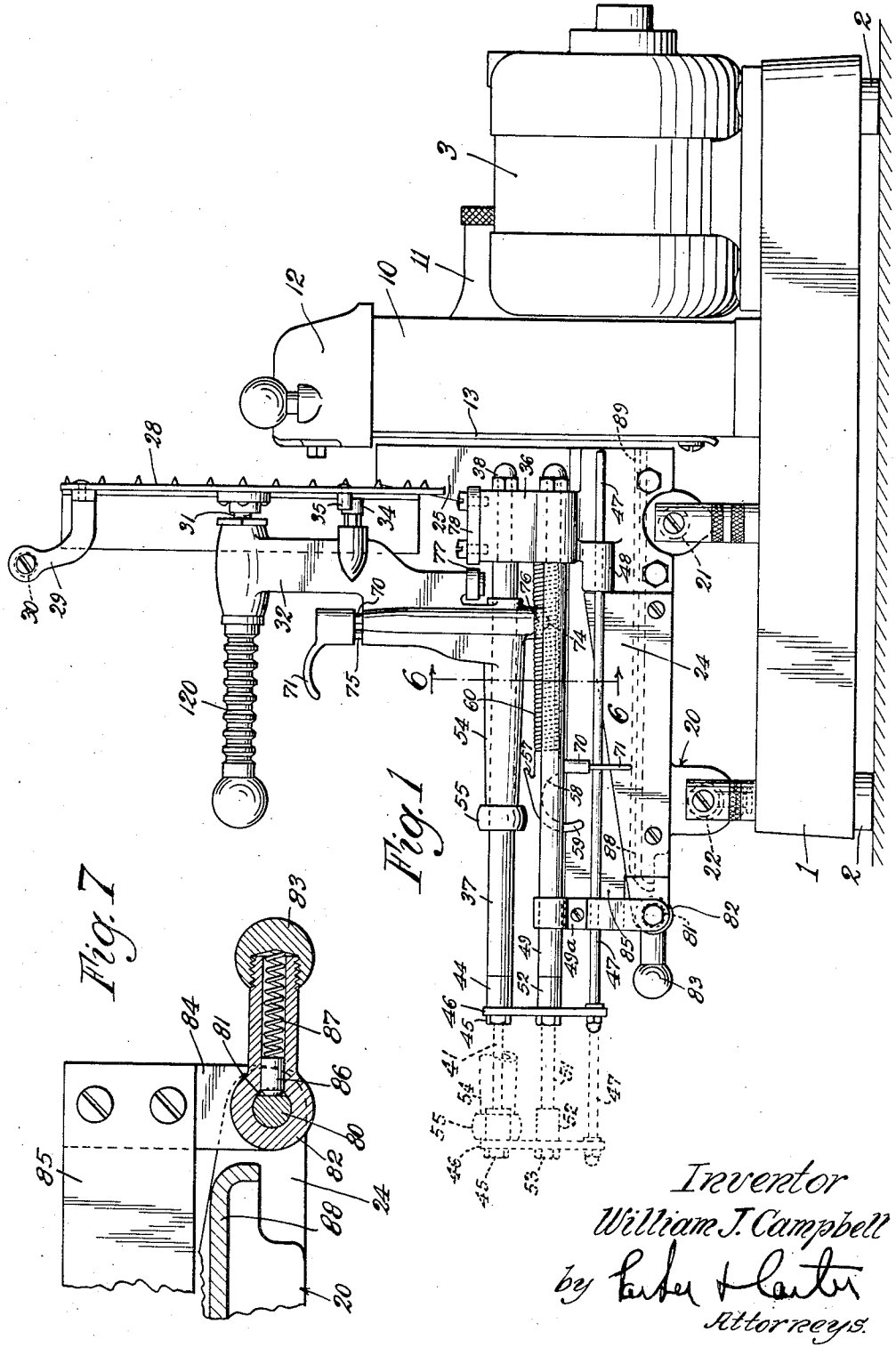


Fig. 1

Fig. 7

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Fig. 2

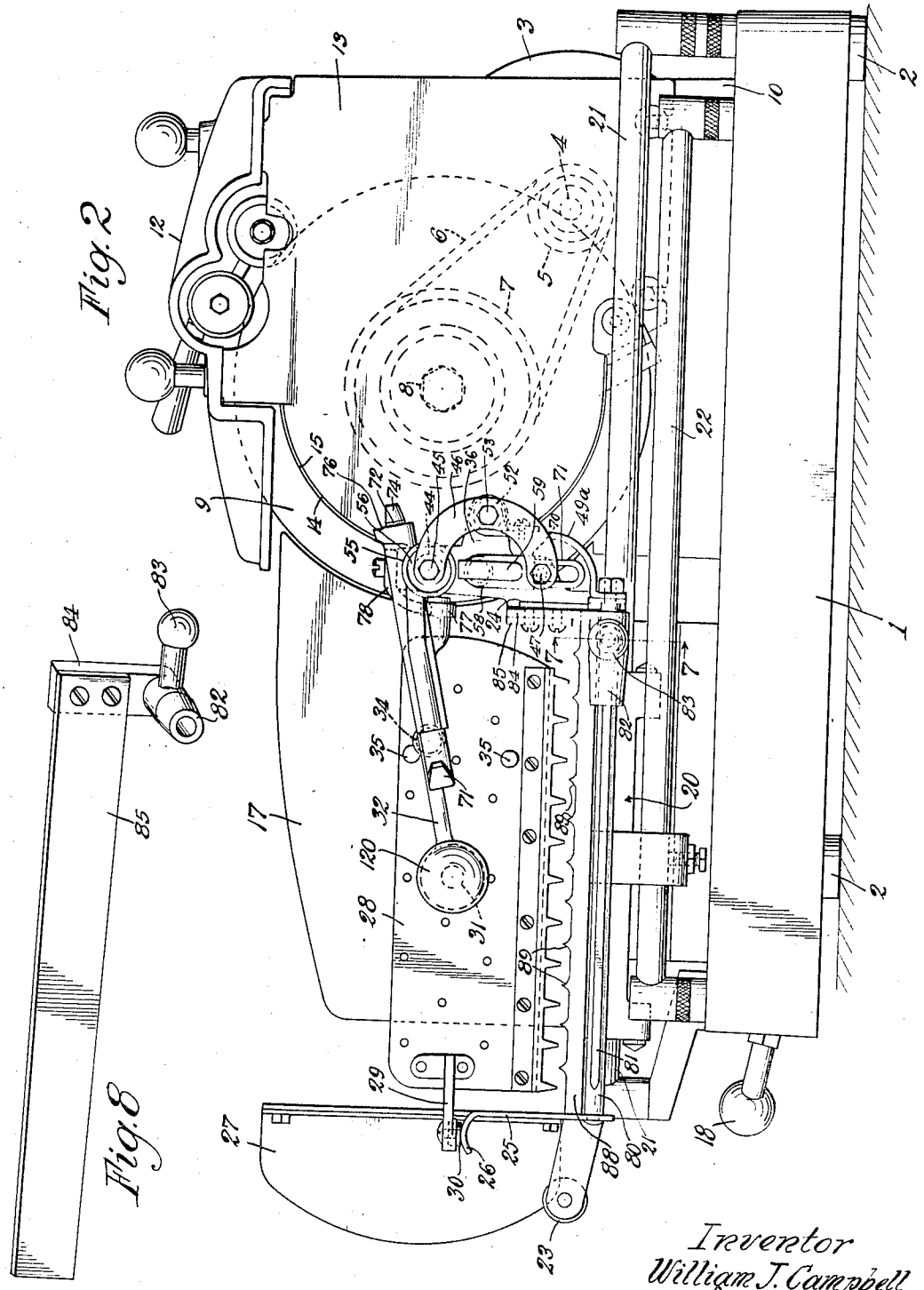


Fig. 8

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SLICING MACHINE

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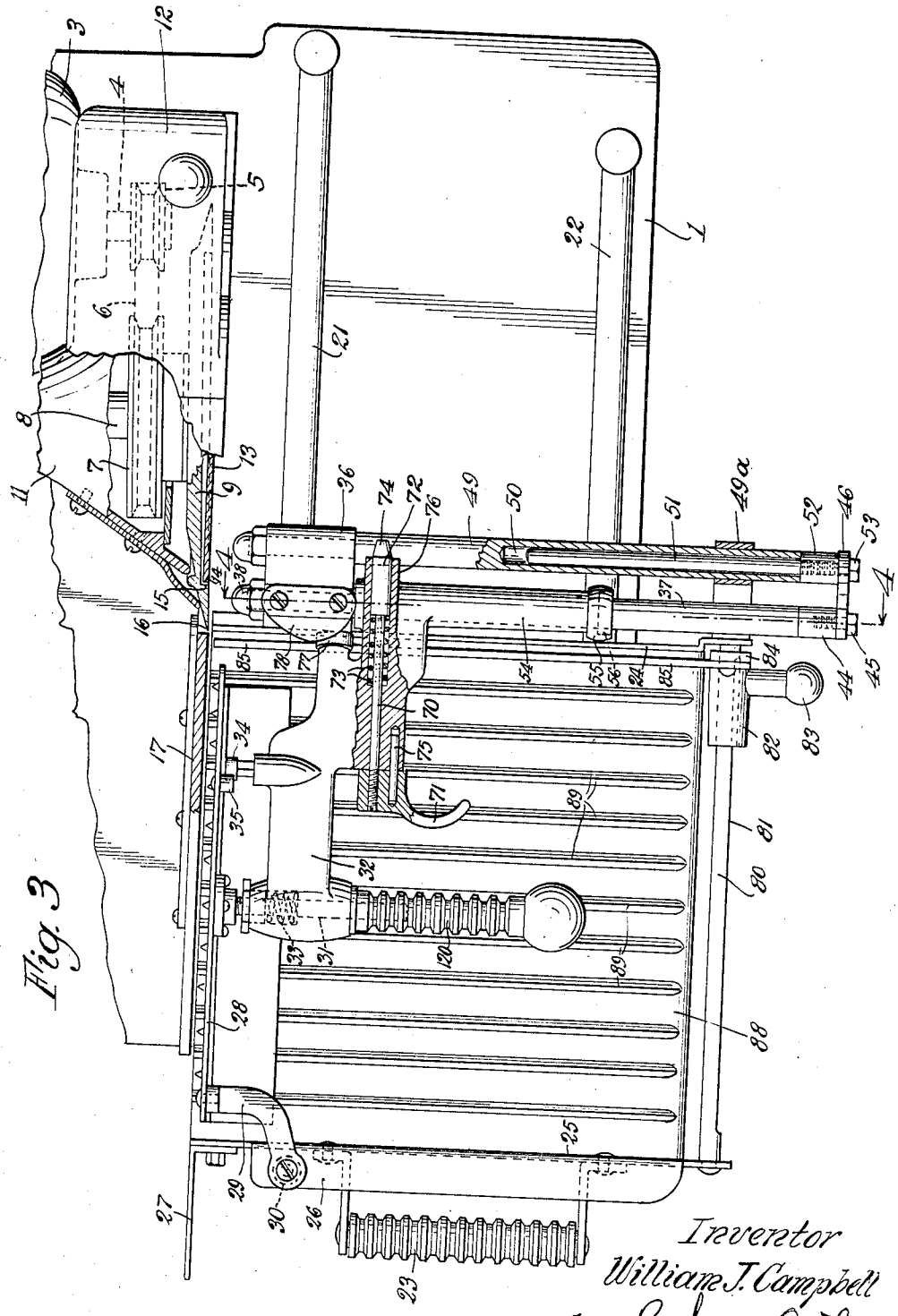


Fig. 3

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SLICING MACHINE

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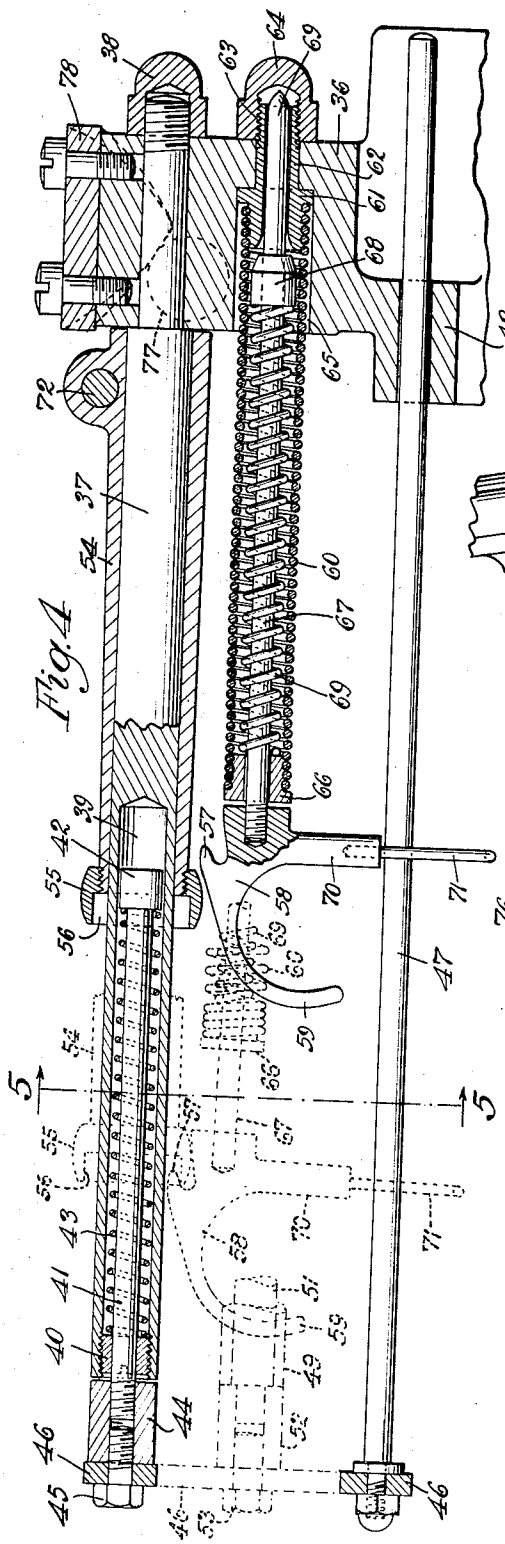


Fig. 4

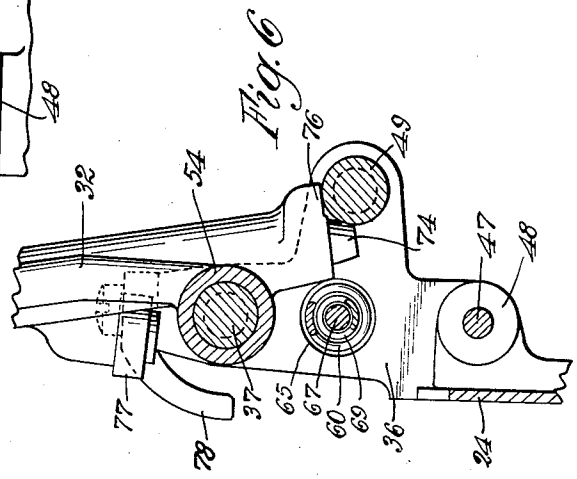


Fig. 6

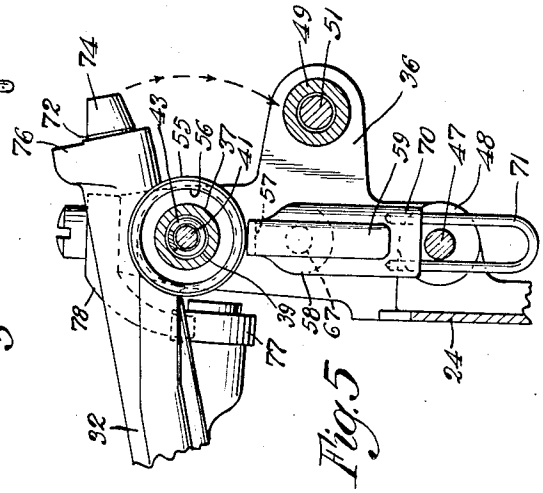


Fig. 5

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UNITED STATES PATENT OFFICE

2,177,474

SLICING MACHINE

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Application February 17, 1938, Serial No. 190,968

7 Claims. (Cl. 146—102)

My invention relates to an improvement in slicing machines and has for one purpose the provision of improved guide means for guiding a feed device toward and away from the cutting plane.

Another purpose is the provision of improvements in extensible guides for work pusher members employed with slicing machines.

Another purpose is the provision of improved laterally adjustable guiding means for guiding work on the work carriage of a slicing machine.

Another purpose is the provision of yielding means for mantaining a substantially uniform thrust on the work in connection with a spring feed for slicing machines.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is an end elevation;

Figure 2 is a front elevation;

Figure 3 is a plan view with parts broken away and parts in section;

Figure 4 is an enlarged section on the line 4—4 of Figure 3;

Figure 5 is a section on the line 5—5 of Figure 4;

Figure 6 is a section on the line 6—6 of Figure 1;

Figure 7 is a section on the line 7—7 of Figure 2; and

Figure 8 is a detail.

Like parts are indicated by like symbols throughout the specification and drawings. Referring to the drawings, 1 generally indicates any suitable base for the slicing machine which may have yielding supporting pads 2 if desired. 3 generally indicates a motor suitably mounted on the base 1 and having a motor shaft 4 upon which is a pulley 5. 6 is a driving belt passing around said pulley and extending also about a driven pulley 7 on the knife shaft 8. 9 indicates a knife. It will be understood that when the motor shaft 4 is rotated it thereby rotates the knife 9.

The details of the housing of the knife and the motor do not of themselves form part of the present invention but I have illustrated an upstanding housing portion 10 having a rearwardly extending sleeve 11 in which any suitable bearing means for the shaft 8 are positioned. 12 is any suitable and preferably removable cover and 13 is a guard plate located forwardly of the knife and having an arcuate edge 14 penetrating into the aperture 15 in the front face of the knife 9. It will be noted that the axis of rotation of the knife is slightly tilted from the perpendicular in relation to the guard plate 13 but lies in a horizontal plane. Thus the forward cutting edge or arc of the knife is positioned forwardly of the body of the plate 13 as at 16.

Any suitable gauge plate 17 may be employed, the details of which do not of themselves form any part of the present invention. It may be actuated for example by the exterior control handle 18 through an intermediate mechanism not herein described or shown in detail. The actuating mechanism for the gauge plate 17 may be housed within the base 1.

20 generally indicates a work carriage structure which is mounted in any suitable manner on parallel tracks 21, 22 which in turn are positioned on the base 1 and serve as a supporting and guiding means for the carriage 20. The carriage 20 has a manual handle 23 whereby it may be manually oscillated or reciprocated along the tracks 21, 22. The carriage also has at each side upstanding generally parallel side elements 24, 25 generally perpendicular to the cutting plane or the plane defined by the movement of the carriage across the face of the cutting knife. The side element or wall 25 is shown as having an outwardly and downwardly recurved portion 26 the purpose of which will later appear. 27 is any suitable guard structure for protecting the hand of the operator from contact with the edge of the knife.

I find it preferable to provide a pusher or feeder member which is guided for movement on the carriage 20 toward and away from the cutting plane and which therefore may serve as means for thrusting the work against the gauge plate 17 whereby to obtain slices of uniform thickness and to permit rapid as well as uniform slicing. I therefore employ a pusher plate 28 herein shown as having an outward extension 29 carrying a bearing member 30 slidably resting upon the upper portion of the flange 26 of the side wall member 25. The pusher plate 28 is provided with a shaft 31 which is rotatably received in the supporting arm 32, which has a handle 120. 33 is any suitable spring or yielding means for preventing unintended rotation of the plate 28 in relation to the arm 32 while permitting desired rotation when sufficient force is applied. 120 is any suitable handle for the supporting arm.

34 is an abutment mounted on the member 32 adapted to engage the opposed abutment 35 on the plate 28 whereby to limit the relative rotation

in one direction when the parts are in the position in which they are shown in Figure 2. The parts are so proportioned as to permit the plate 28 under those circumstances to take the generally horizontal position in which it is shown in Figure 2.

36 generally indicates a bracket fixed upon the carriage structure 20. Normally fixed in relation to the member 36 is a rod 37. It may be removed by removal of the nut 38. The outer end of the rod is cored out as at 39. Screw-threaded into the outer end thereof is a guiding plug or bearing member 40. Slidable in the bearing 40 is a small solid rod 41 which has a piston or guide 42 at the inner end thereof. Compressed between the sleeve 40 and the piston 42 is the coil spring 43 which normally tends to move the rod 41 toward the right, referring to the parts in the position in which they are shown in Figure 4. 44 is a spacer screw-threaded to the outer end of the rod 41 which serves as an abutment means for limiting the inward movement of the rod 41 in response to the expansion of the spring 43.

Secured to the outer end of the member 44 as by the screw 45 is a generally arcuate plate 46, the purpose of which will later appear. Secured at another point to the member 46 is a pilot rod or guide rod 47 which extends through a bearing sleeve 48 which may be formed in or integral with the bracket member 36. The length of the parts is such that the inner end of the rod 47 never clears the bearing 48.

Mounted at another point in the member 36 is a rod 49 also fixed in relation to the member 36 and cored out at its outer end as at 50. Slidable in the cored portion 50 is a guide rod 51 the outer end of which is also secured to the plate 46 through the intermediary of the spacer 52 and the screw 53. If desired, the rod 49 may be supported adjacent its free end by an additional bracket 49a.

Slidable upon the rod 37 and also rotatable thereabout is the sleeve 54 which is integral with the arm 32 in which the pusher plate 28 is mounted. This sleeve is provided at its outer end with an abutment ring 55 having an inner cavity 56 adapted to receive the engaging hook or lug 57 of the spring connector 58. 59 is any suitable finger ring or handle whereby the connector 58 may be drawn out against the compression of its supporting and actuating spring 60 sufficiently far to permit the lug 57 to engage in the cavity 56.

The member 58 is connected to the member 55 by a compound spring structure as follows. 60 is an expansion spring which tends to remain in the compressed or closed position in which it is shown in Figure 4. It is connected at one end to a sleeve 61, a reduced portion 62 of which is screw-threaded as at 63 to receive the securing nut 64. The enlarged portion of the member 61 is received in a cavity 65 of sufficient size to permit room for the inner end of the spring 60. The outer end of the spring 60 is secured to a sleeve 66 and normally tends to move the said sleeve toward the member 36 toward the position in which the parts are shown in Figure 4.

Passing through the sleeve 66 is the pin 67 which has at its inner end a piston-shaped abutment 68 and which has a guiding portion 69 slidable within the sleeve 61 and the reduced portion 62 thereof. The pin 67 at its outer end is secured to the member 68. Surrounding the pin 67 and adapted to be compressed between the sleeve 66 and the abutment 68 is the inner spring 69. This spring normally tends to expand and tends to thrust the member 68 inwardly toward the member 36 whereby the member 58 and the lug 57 are normally moved to the limit of their possible movement toward the member 36. The member 58 is also provided with a downward extension 70 provided with a fork or U-shaped member 71 which straddles the rod 47 whereby undesirable rotation of the spring 69 is prevented and also undesired downward flexure of the spring 60.

While I may have a variety of relationships between the two springs, I find it desirable to have the force of the springs so proportioned that the outer spring 60 will give before the spring 69. In other words, the first result of manual movement of the member 58 outward away from the member 36, whether it is secured to the sleeve 55 or not, is to cause an expansion of the spring 60 against its normal tendency to expand. It will be understood that I may however so proportion the springs that both of them will be in simultaneous operation. In any event, I provide a compound spring structure whereby an overstrain on either spring is prevented and whereby a spring thrust excursion of substantial length on the part of the pusher plate 28 is made possible without any substantial strain on the springs or without any great difference between the force exerted by the springs at various points in the spring thrust excursion of the pusher plate and work toward the cutting plane.

It will be observed that whereas the rod 37 is fixed I provide an expansion device for my guiding means which includes the movable rods 41, 47 and 51 which are linked together by the plate 46. They are normally held in non-extended position by the spring 43. If the pusher structure is pulled out far enough it will engage the member 46 and thrust the three said rods out against the spring 43. In such case, and when the pusher structure is at its greatest possible recession from the cutting plane, it is actually yieldingly thrust back toward the cutting plane by the conjoint action of the springs 43, 60 and 69. When the extension structure returns to its inner limit, the spring 43 ceases to function and the remaining two springs continue to thrust the work toward the cutting plane.

If desired, as above pointed out, I can have the springs 60 and 69 of different strength so that eventually only 60 or 69 alone will be exerting a thrust against the work. In other words, where a maximum spring action is needed at the further recession of the pusher structure, I provide a maximum spring action effected by all three of the springs, which spring action may be progressively reduced as the pusher structure approaches the cutting plane.

The sleeve 54 has movable therein the latch rod 70 with an exterior manual control handle 71 and the latch member 72. A spring 73 normally urges the latch into latching position and the latch is provided with a tapered nose 74 which when it engages the rod 49 is effective to hold the pusher plate in raised position, it being understood that the sleeve 54 is rotatable about the rod 37. A guide pin 75 is provided to prevent unintended rotation of the handle 71. The parts are shown in unlatched position in Figure 5 and in latched position in Figure 6. It will be noted also that when the latch 74 is in the latching position in which it is shown in Figure 6 a boss 76 on the sleeve 54 in which the latch is mounted engages rod 49. The taper 74 is effective to wedge the parts together, as shown in Figure 6.

When the pusher plate assembly is in the forward position in which it is shown for example in Figure 3, a roller 77 which is mounted on the member 32 engages a cam 78, which cam is mounted on the portion 36. The effect of the cam is to cause the pusher plate assembly to move outwardly along the rod 37 when the pusher plate assembly is rotated about said rod 37 in order to prevent engagement of the pusher plate or any part thereof with the knife housing. It is shown in the raised and slightly withdrawn position in Figure 1.

In order to provide the work carriage with means for adjusting its effective width as between the upright walls 24 and 25, I provide an intermediate and laterally adjustable guide as follows. Extending along the outer edge of the carriage is a supporting rod 80 which is supported at each end, for example in end extensions of the walls 24, 25. It is flattened along one side as at 81. Slidable therealong is a sleeve 82 having a manual control handle 83 extending outwardly therefrom and an upward extension 84 upon which is mounted a blade or wall 85 which is parallel with the members 24 and 25. A plunger 86 is thrust as by the spring 87 against the flattened portion 81 whereby the sleeve 82 is normally held in such position as to hold the guide 85 generally horizontal about its lower edge slightly above the upper face of the work supporting bottom 88 of the carriage. This bottom is preferably provided with a plurality of ridges 89 which may extend from front to rear of the carriage or bottom 88 without interruption. They are of such height as to be cleared by the lower edge of the member 85 when it is in the horizontal position. The spring 87 is sufficiently effective to prevent unintended lateral movement of the member 85 while permitting intended movement. However, the operator can swing the member 85 up into inoperative position. When not in use, however, it may normally be positioned as shown in Figure 3 closely adjacent the wall 24.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

I claim:

1. In a slicing machine having a rotary knife and means for rotating it, and a gauge plate and means for actuating it, a carriage and means for guiding it along a path generally parallel with said gauge plate and with the cutting plane of the knife, a work support mounted on said carriage, a rod mounted on said carriage, and generally perpendicular to the cutting plane of the knife, a sleeve rotatable and slidable on said rod, a pusher operatively associated with said sleeve, and means for urging said sleeve toward the cutting plane, including an actuating member movable into and out of actuating connection with said sleeve, and a yielding connection between said member and the carriage including a plurality of springs, and means for simultaneously expanding one of said springs and contracting the other in response to movement of said actuating member outwardly away from the cutting plane.

2. In a slicing machine having a rotary knife and means for rotating it, and a gauge plate and means for actuating it, a carriage and means for guiding it along a path generally parallel with said gauge plate and with the cutting plane of the knife, a work support mounted on said carriage, a rod mounted on said carriage, and generally perpendicular to the cutting plane of the knife, a sleeve rotatable and slidable on said rod, a pusher operatively associated with said sleeve, and means for urging said sleeve toward the cutting plane, including an actuating member movable into and out of actuating connection with said sleeve, said member including a guide stem slidably mounted on said carriage, an abutment on said guide stem, a coil spring surrounding said stem and mounted at one end on the carriage, a sleeve surrounding said stem, to which the opposite end of said coil spring is secured, and an additional spring adapted to be compressed between said sleeve and said abutment and surrounding said guide stem.

3. In combination with a slicing machine having a knife and means for actuating it, and a work support and means for guiding said work support across the cutting plane of the knife, a pusher on said work support, a guide therefor generally perpendicular to the cutting plane, a sleeve for said pusher rotatable and slidable on said guide, an extension for said guide, yielding means adapted normally to hold it in retracted position, an abutment on said extension adapted to be engaged by said sleeve, a latch member adapted to be secured to said sleeve, spring means interposed between said latch member and the work support, and adapted normally to urge said sleeve toward the inner end of said guide, an additional guide generally parallel with said first mentioned guide, and means associated with said latch and in engagement with said additional guide and adapted to prevent rotation of said latch while permitting its longitudinal movement along the axes of said guides.

4. In combination with a slicing machine having a knife and means for actuating it, and a work support and means for guiding said work support across the cutting plane of the knife, a pusher on said work support, a guide therefor generally perpendicular to the cutting plane, a sleeve for said pusher rotatable and slidable on said guide, an extension for said guide, yielding means adapted normally to hold it in retracted position, an abutment on said extension adapted to be engaged by said sleeve, a latch member adapted to be secured to said sleeve, spring means interposed between said latch member and the work support, and adapted normally to urge said sleeve toward the inner end of said guide, an additional guide generally parallel with said first mentioned guide, and means associated with said latch and in engagement with said additional guide and adapted to prevent rotation of said latch while permitting its longitudinal movement along the axes of said guides, a rod generally parallel with and adjacent said guides, and a lock member mounted on said sleeve and adapted to be engaged with said rod, whereby the sleeve and pusher are held in inoperative position, said rod, said second mentioned guide and the extension of said first mentioned guide being unitarily movable in relation to the work support.

5. In combination with a slicing machine having a knife and means for actuating it, and a work support and means for guiding said work support across the cutting plane of the knife, a pusher on said work support, a guide therefor

generally perpendicular to the cutting plane, a sleeve for said pusher rotatable and slidable on said guide, an extension for said guide, yielding means adapted normally to hold it in retracted position, an abutment on said extension adapted to be engaged by said sleeve, a latch member adapted to be secured to said sleeve, spring means interposed between said latch member and the work support, and adapted normally to urge said sleeve toward the inner end of said guide, an additional guide generally parallel with said first mentioned guide, means associated with said latch and in engagement with said additional guide and adapted to prevent rotation of said latch while permitting its longitudinal movement along the axes of said guides, a rod generally parallel with and adjacent said guides, and a lock member mounted on said sleeve and adapted to be engaged with said rod, whereby the sleeve and pusher are held in inoperative position, said rod, said second mentioned guide, and the extension of said first mentioned guide being unitarily movable in relation to the work support, said abutment including portions to which said rod, said guide and said guide extension are secured.

6. In combination with the work support of a slicing machine, a guide perpendicular to the cutting plane of the slicing machine, a pusher on said work support, a sleeve for said pusher rotatably and slidably mounted on said guide, and means for normally urging said sleeve toward the cutting plane and for providing a progressively increasing resistance to movement of the sleeve away from the cutting plane, including a latch member adapted to be engaged with the sleeve, a normally compressed coil spring, a normally expanded coil spring in parallel therewith, interposed between latch member and work support, and means for expanding the compressed spring and for compressing the expanded spring in response to the outward movement of the sleeve and the latch member away from the cutting plane, including an abutment opposed to adjacent ends of the springs.

7. In combination, in a slicing machine, a knife and means for rotating it, a carriage and means for guiding it across the face and past the cutting edge of the knife, a gauge plate, a pusher on said carriage and means for yieldingly urging it toward said gauge plate, including a flexibly mounted latch member engaging with said pusher, said latch member including a finger engaging handle and a latching lug, and being spring connected to the carriage, an opposed member on said pusher adapted to receive said lug, and guide means for said latch member effective to prevent rotation of said latch member at all normal positions of the latch member in its movement toward and with the pusher.

WILLIAM J. CAMPBELL.