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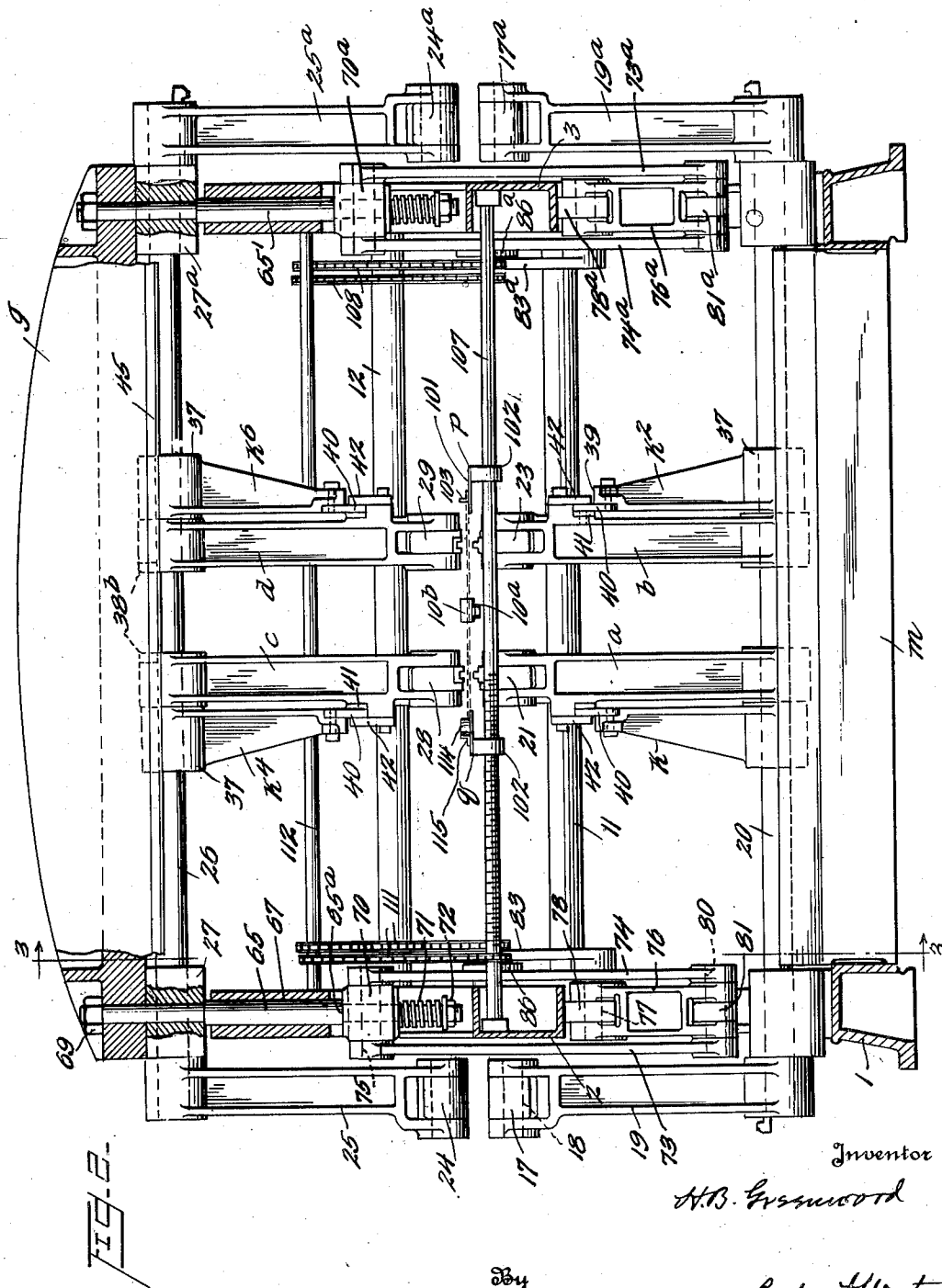
H. B. GREENWOOD

1,978,157

MACHINE FOR CREASING SHEET MATERIAL

Filed June 5, 1933

7 Sheets-Sheet 2



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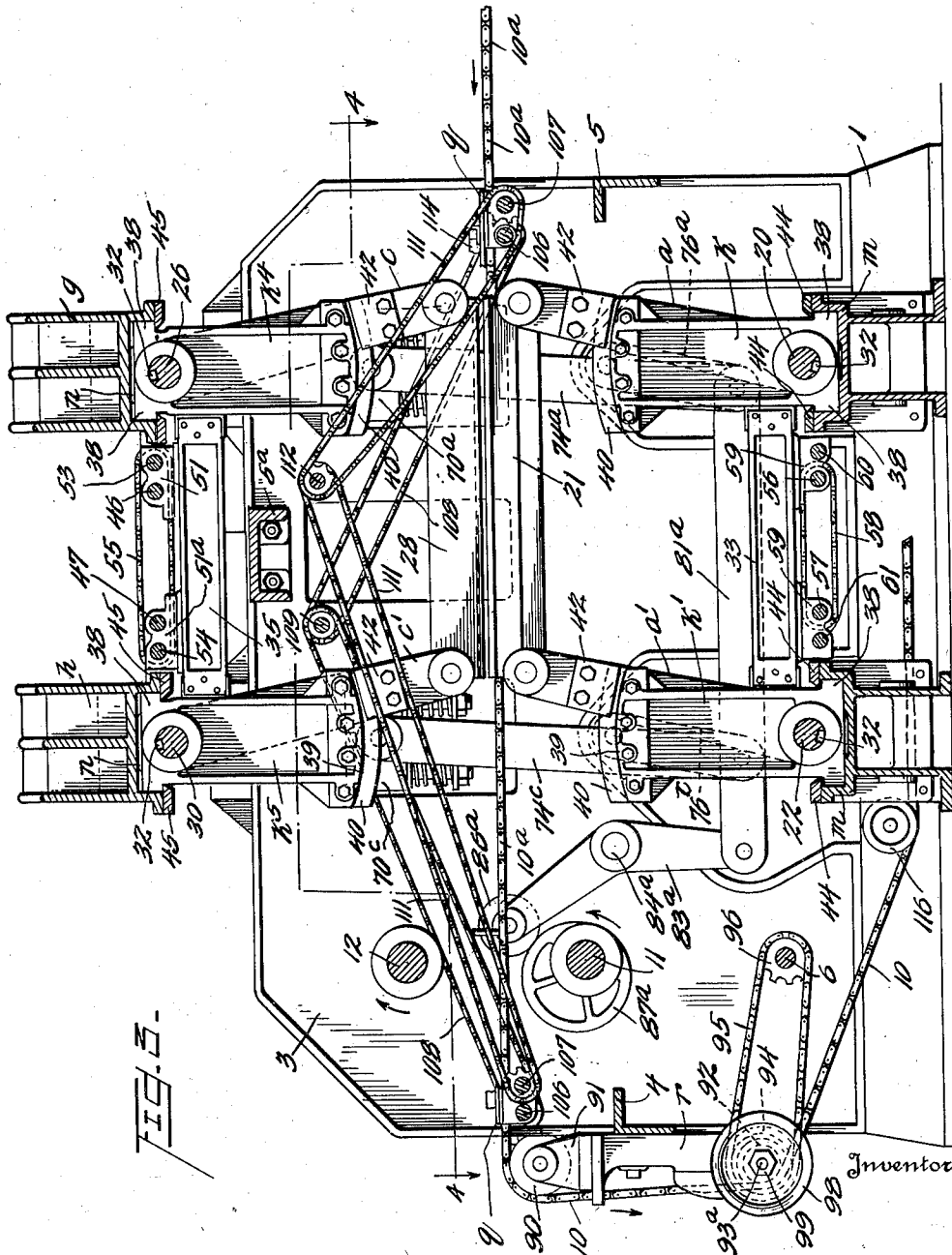
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7 Sheets-Sheet 3



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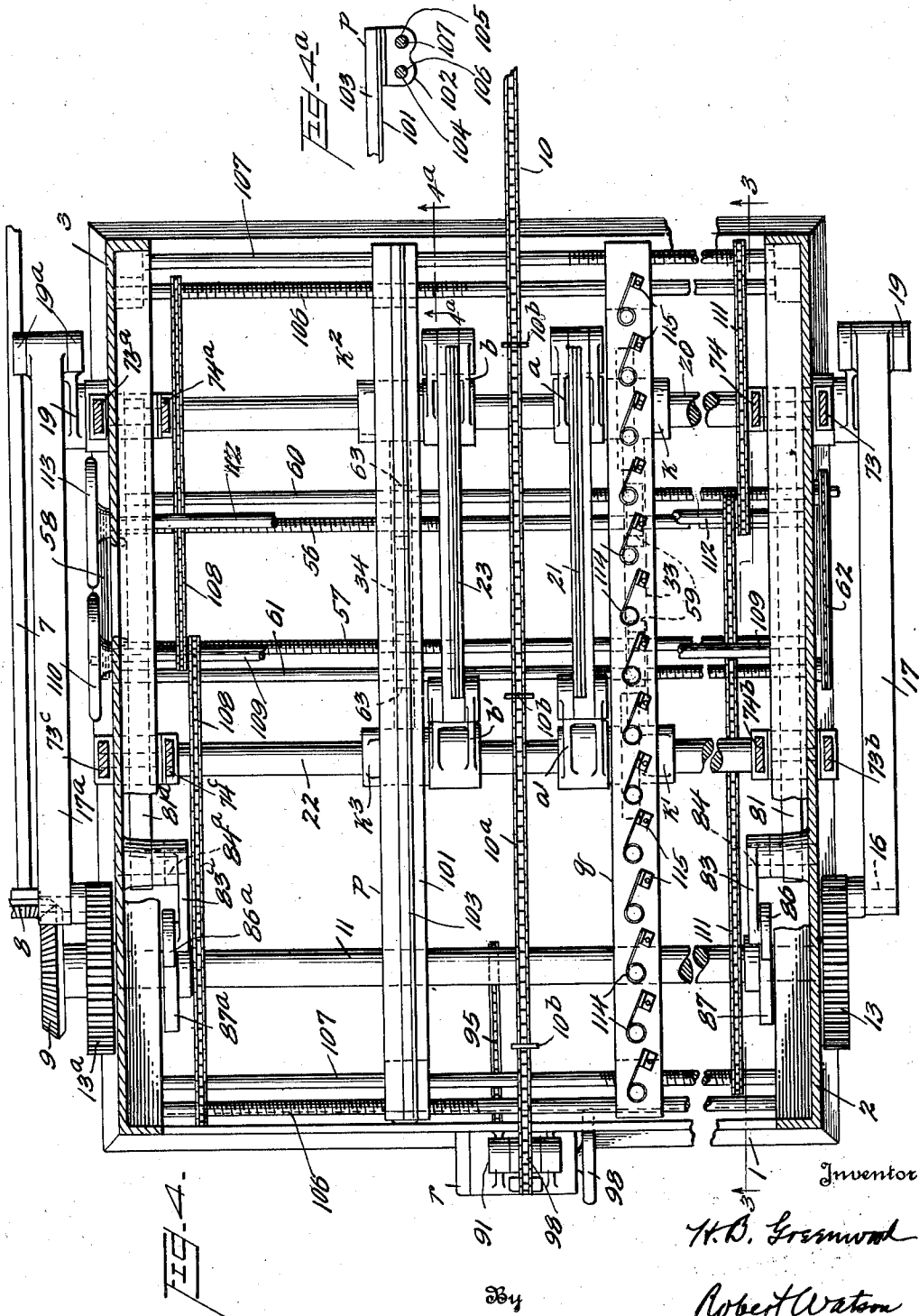
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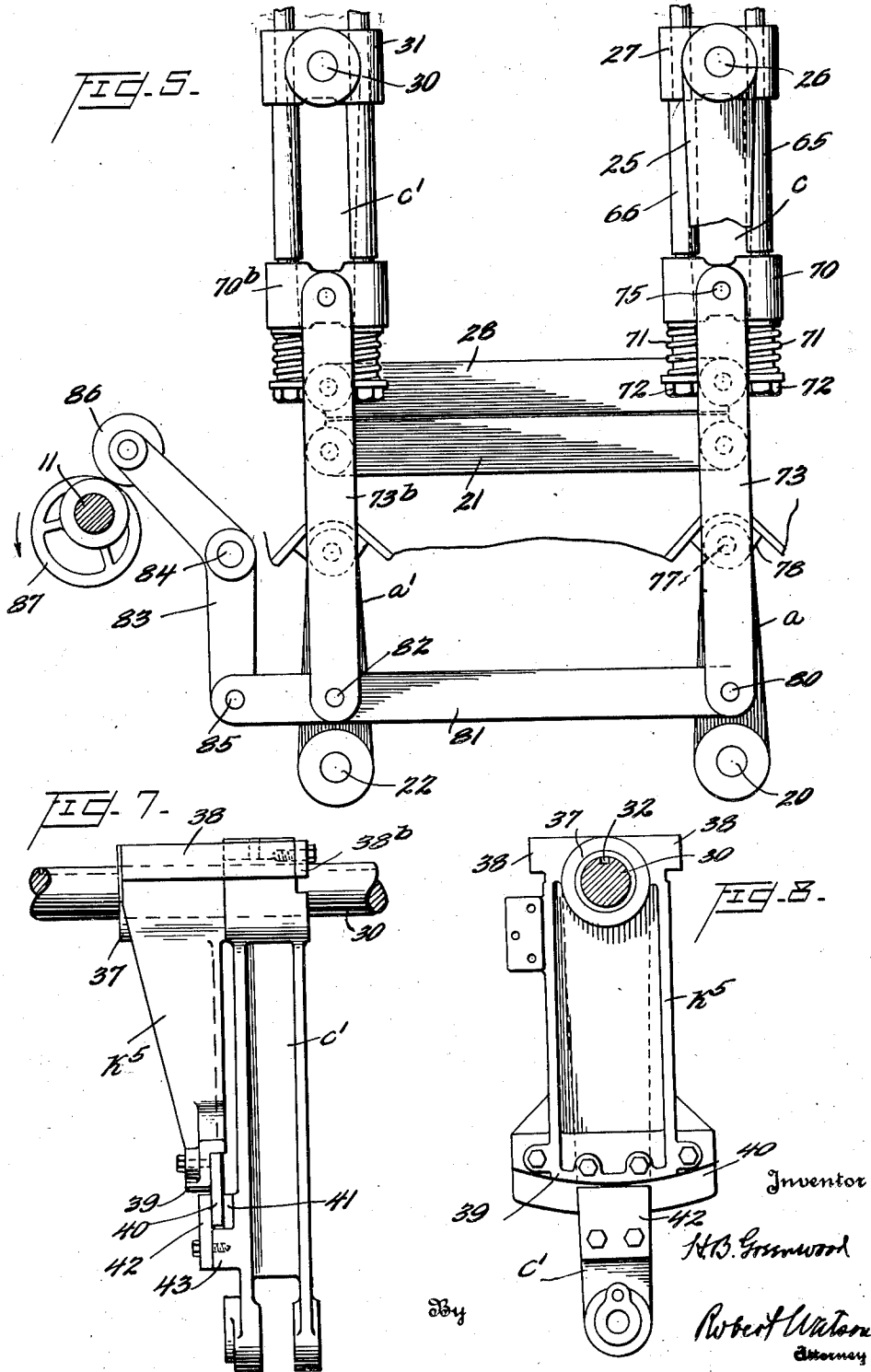
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7 Sheets-Sheet 5



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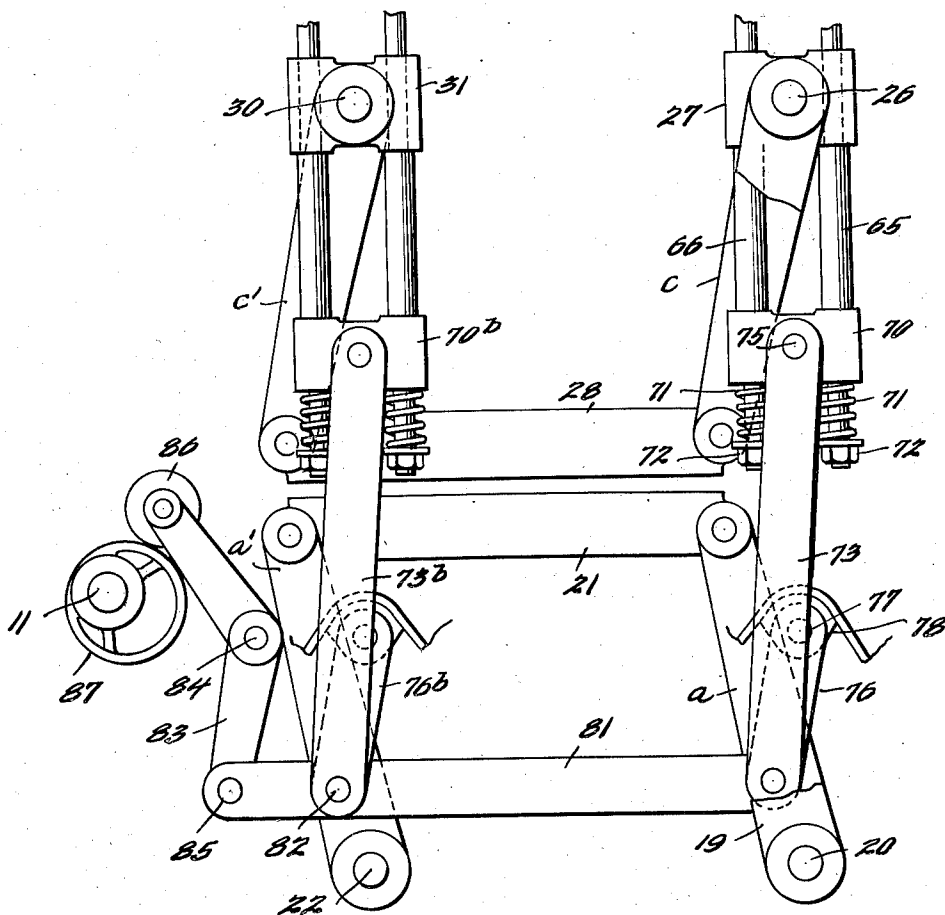
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MACHINE FOR CREASING SHEET MATERIAL

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7 Sheets-Sheet 6

FIG. 6-



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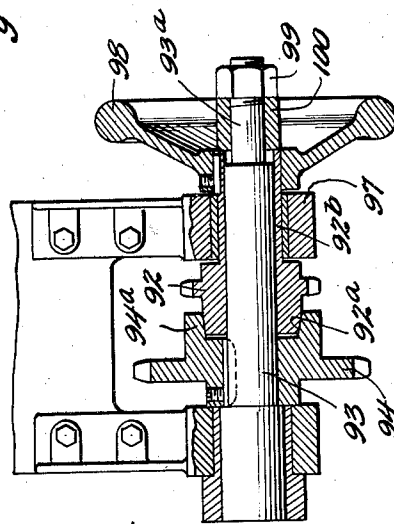
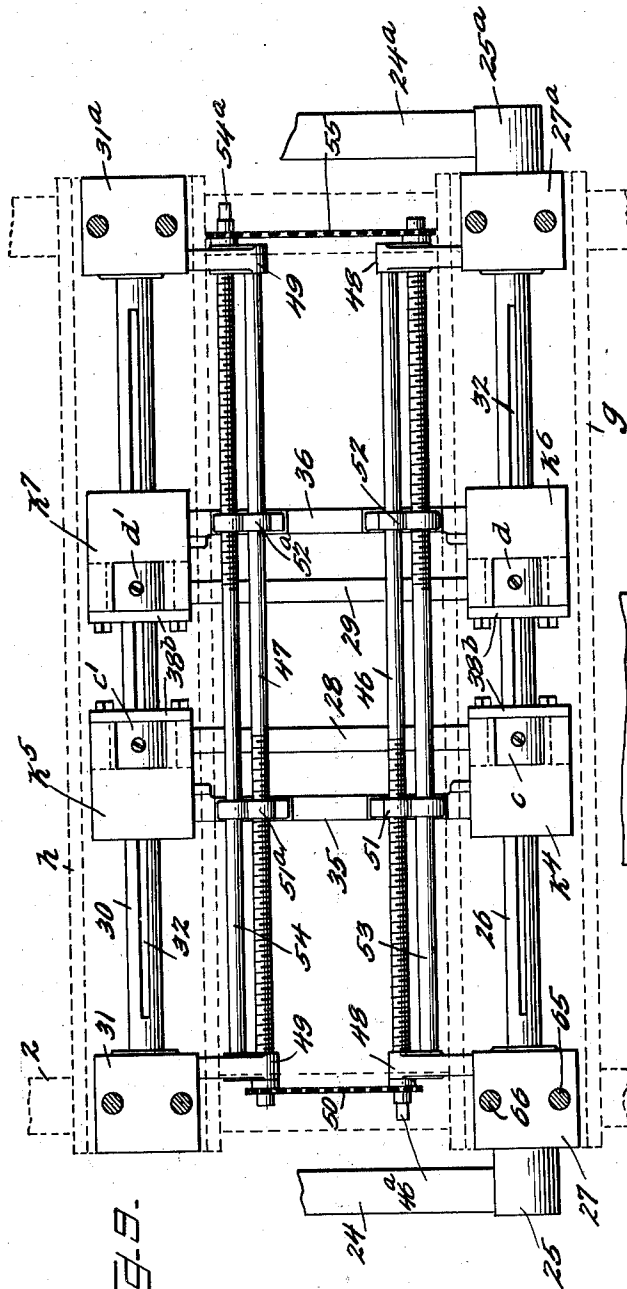
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MACHINE FOR CREASING SHEET MATERIAL

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UNITED STATES PATENT OFFICE

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MACHINE FOR CREASING SHEET MATERIAL

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Application June 5, 1933, Serial No. 674,450

10 Claims. (Cl. 93—58)

This invention relates to a mechanism for creasing box blanks and particularly blanks made of fibre board, which is dense and difficult to crease by the use of creasing wheels. This mechanism is one unit of a combined machine for slotting, creasing and printing box blanks, the slotting and printing units being omitted from the drawings.

In accordance with the present invention, the blanks to be creased are carried in a horizontal path through the central part of the machine, by a suitable conveyer, between upper and lower pairs of creasing bars which are mounted on rocker arms projecting from upper and lower pairs of rock shafts. These rock shafts are rocked in unison, causing the creaser bars to move alternately forward with the conveyer and then backward. During the forward movements the creaser bars engage and crease the blanks and during the backward movements the upper rock shafts and the rocker arms and creaser bars carried thereby are lifted so that the bars cannot engage the blanks. The creasing pressure is applied to the blanks principally through the weight of the parts associated with the upper rock shafts. The machine embodies means for supporting the rocker arms laterally and guiding their free ends so that the upper and lower creaser bars will register accurately, and it includes various necessary adjusting devices for adjusting the guides for the blanks and the rocker arms and creaser bars laterally to suit blanks of different widths, and means for adjusting the conveyer to correctly position the blanks with respect to the creaser bars.

In the accompanying drawings,

Fig. 1 is a side elevation of the creasing machine;

Fig. 2 is an end elevation of the same, looking from right to left in Fig. 1, parts of the mechanism being omitted and parts broken away, and the frame being in section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section on the line 3—3 of Figs. 2 and 4, the guides for the sheet material being omitted;

Fig. 4 is a horizontal section about on the line 4—4 of Fig. 3; Fig. 4a shows a detail of one of the guides for the sheet material;

Fig. 5 is a detail view showing the creaser bars and operating mechanism in side elevation, the bars being in creasing position;

Fig. 6 is a similar view showing the creaser bars in their forward positions;

Fig. 7 is a detail view showing one of the bar creaser rocker arms and its support;

Fig. 8 is a side elevation of the same, looking from left to right in Fig. 7;

Fig. 9 is a top plan view of the central part of the machine, the cross-beams being removed and indicated in dotted lines, showing the means for adjusting the upper creaser bars laterally, and,

Fig. 10 is a section on the line 10—10 of Fig. 1 showing the means for adjusting the feed chain to the movements of the creaser bars.

Referring to the drawings, 1 indicates the base of the machine, upon which are mounted parallel side frames 2 and 3, suitably connected together at various points as by the end bars 4 and 5 and cross-piece 5^a, Fig. 3. A drive shaft 6, Figs. 1 and 3, is mounted in suitable bearings in the lower part of the side frames near the delivery end of the machine, and this shaft is operated by a shaft 7, Fig. 4, extending from the slotting and printing units (not shown) and connected to the shaft 6 through bevel gears 8 and 9. The blanks which are to be operated upon are carried through the machine by an endless conveyer chain 10 the upper stretch 10^a of which passes horizontally through the machine midway between the side frames. This chain is operated from the drive shaft 6, as hereinafter explained. Above the shaft 6 are two shafts 11 and 12, one directly above the other and both extending transversely through the machine, and on these latter shafts are inter-meshing gears 13 and 14, respectively, of the same diameter, as shown in Fig. 1. Similar inter-meshing gears are arranged on the opposite ends of these shafts, one of these, 13^a corresponding to the gear 13, being shown in Fig. 4. As shown in Fig. 1, the shafts 11 and 12 are driven by a gear 6^a on the driving shaft 6 which meshes with an idle gear 15, which, in turn, meshes with the gear 13. It will be understood that the mechanism at one side of the machine for operating the creaser bars, as illustrated in Fig. 1, is duplicated on the opposite side of the machine.

Referring to Fig. 1, the gear 13, has an eccentric pin 16 which is connected by a link 17 to a pin 18 at the upper end of a lever 19 which is secured to a rock shaft 20 journaled in the lower part of the machine. The corresponding link and lever at the opposite side of the machine are shown at 17^a and 19^a, respectively, in Figs. 2 and 4. Two rocker arms *a* and *b*, Figs. 2, 3 and 4, are keyed to the shaft 20 and project upwardly from the shaft. The rocker arm *a* is connected by a creaser bar 21 to a similar arm *a'* keyed to a rock shaft 22 which is journaled in the lower part of the frame parallel with the shaft 20. The rocker arm *b*,

which is parallel to the arm a , is connected by a creaser bar 23 to a rocker arm b' , keyed to the shaft 22 and extending upwardly parallel with the arm a' , as shown in Figs. 2 and 4.

5 It will be evident from this description that as the gears 13—13^a rotate, the shaft 20 will be rocked and the rocker arms a and b thereon will move the creaser bars 21 and 23 back and forth, the latter causing the rocker arms a' and b' and the shaft 22 to rock.

10 The gear 14 on the shaft 12 (and the corresponding gear, not shown, on the opposite end of the shaft), through links 24 and 24^a (Figs. 1, 2 and 9) actuate parallel levers 25 and 25^a which are keyed to and depend from a rock shaft 26, mounted in vertically movable bearings 27 and 27^a, directly over the shaft 20. These bearings are connected to a cross-beam g , as hereinafter described. The shaft 26 carries two depending rocker arms c and d , and creaser bars 28 and 29, respectively, connect the lower ends of these arms with corresponding arms c' and d' on a shaft 30 which is mounted in vertically movable bearings 31 and 31^a secured to the ends of a cross-beam h . The shaft 30 is directly over the shaft 22. The rocker arms on the several shafts are all alike and are set so that the upper creaser bars will always be opposite to and parallel with the lower creaser bars and, by reason of the gearing and connections described, all of the bars will move endwise back and forth in unison.

Each of the rock shafts 20, 22, 26 and 30 is provided with a long key-way 32 and each rocker arm has a key entering the key-way in the shaft on which the arm is mounted. Each pair of rocker arms a — a' , b — b' , c — c' and d — d' , and its connecting creaser bar, is adjustable longitudinally of the rock shafts independently of the other pairs and their connecting creaser bars. Each rocker arm is guided in its rocking movements and supported laterally by a support which is movable longitudinally of the shaft on which the arm is mounted. These supports are all alike and are connected in pairs. Thus, supports k and k' , connected by a cross-piece 33, are shown adjacent the lower rocker arms a and a' , respectively, and supports k^2 and k^3 connected by a cross-piece 34, are shown adjacent the lower arms b — b' , respectively. Similarly, supports k^4 and k^5 , connected by a cross-piece 35, are arranged adjacent the upper rocker arms c and c' , respectively, and supports k^6 and k^7 (Figs. 2 and 9), connected by a cross-piece 36, are arranged adjacent the upper rocker arms d and d' , respectively.

Each arm support, as shown best in Figs. 7 and 8, comprises an oblong casting having near one end a bearing 37 through which a rock shaft extends, and having laterally projecting shoulders 38 at said end. The opposite end of the casting is arcuate in form, as shown at 39, and to this end is bolted an arcuate guide plate 40 which projects beyond said end. This arcuate guide fits into a groove on the adjacent arm formed by a flat bearing surface 41 on the arm and a plate 42 which is bolted to a projection 43 on the arm and engages the front face of the arcuate guide plate. The shoulders 38 are extended beyond the body of the support on opposite sides of the hub of the adjacent rocker arm, and the extensions are connected by a cross-piece 38^b (Figs. 7 and 9), these parts serving to connect the upper end of the arm to the support, but leaving the arm free to rock.

As shown in Fig. 3, channelled guides m are arranged transversely of the machine beneath the rock shafts 20 and 22 and the ends of the supports

k and k' having the shoulders 38 fit in these channels and metal strips 44, secured to the sides of the channels and projecting over the shoulders, hold the supports against rocking movement. The supports adjacent the rocker arms b and b' are similarly arranged in these channels. The supports for the rocker arms on the upper rocker shafts 26 and 30 have their shoulders 38 fitting within channels n extending longitudinally on the under side of the cross-beams g and h and metal strips 45, secured to the sides of the channels, project under the shoulders and prevent rocking movement of the supports.

As shown in Figs. 1, 3 and 9, the supports k^4 and k^5 , the rocker arms c and c' and creaser bar 28, are adjustable as a unit along the upper rock shaft by means of two parallel adjusting shafts 46 and 47, the former journaled in lugs 48 projecting from the bearings 27 and 27^a and the latter journaled in similar lugs 49 projecting from the bearings 31 and 31^a. These shafts are connected to turn in unison by a sprocket chain 50 engaging sprocket wheels on the shafts. One of the shafts, 46, has an angular end 46^a to which a wrench may be applied to turn the shaft. The shafts 46 and 47 have threaded portions extending through threaded openings in blocks 51 and 51^a, respectively, secured to the cross-piece 35 which connects the supports k^4 and k^5 , and they have plain portions which extend through openings in blocks 52 and 52^a on the cross-piece 36 which connects the supports k^6 and k^7 . It will be evident that by applying a wrench to the shaft 46 and turning the same, the shafts 46 and 47 will operate, through the threaded engagements with the blocks, to move the supports k^4 and k^5 and the rocker arms c and c' simultaneously along the rock shafts to adjust the creaser bar 28 toward and from the central line of the machine.

For adjusting the supports k^6 and k^7 and the rocker arms d — d' and creaser bar 29, a pair of shafts 53 and 54 are mounted in the lugs 48 and 49, and these are connected by a sprocket chain 55. The shaft 53 has a threaded portion which engages a threaded opening in the block 52 and a plain portion which passes through an opening in the block 51, and the shaft 54 has a threaded portion engaging a threaded opening in the block 52^a and a plain portion which extends through an opening in the block 51^a. By applying a wrench to the angular end 54^a of the shaft 54 and turning the same, it will be evident that this shaft and the shaft 53 will turn in unison and cause the supports k^6 , k^7 , rockers d and d' and the creaser bar 29 to move toward or from the central line of the machine, according to the direction in which the adjusting shafts are turned.

The lower supports, rocker arms and creaser bars, are laterally adjustable in the same manner as the upper members. Thus, adjusting shafts 56 and 57, journaled in the sides of the frame and connected by sprocket chain 58, have threaded portions which engage threaded openings in blocks 59 on the under side of the cross-piece 33 which connects the supports k , k' , and parallel shafts 60 and 61, connected by a sprocket chain 62, have threaded portions engaging threaded openings in blocks 63 on the under side of the cross-piece connecting the supports k^2 and k^3 .

Parallel guide bars p and q , for supporting the fibre blanks as they pass through the machine, are arranged at opposite sides of the conveyer chain and creaser bars, and these guide bars are adjustable toward and from one another, to suit

blanks of different widths, as hereinafter described.

The bearings 27 and 27^a for the upper rock shaft 26 and the bearings 31 and 31^a for the rock shaft 30 are mounted so as to be vertically movable, in order that the upper creaser bars, which are supported by these shafts, may be moved away from the lower creaser bars after a blank has been creased and while the bars are moving rearwardly. The bearings and supporting devices are the same at each end of each shaft. As shown in Figs. 1 and 2, the bearing 27 is mounted upon two parallel rods 65 and 66 which are movable vertically in guide openings 67 and 68, respectively, in the frame. The upper end portions of the rods, which extend through the bearing, are of reduced diameter, to provide shoulders upon which the bearing rests, and these reduced portions extend through the end of the cross-beam *g* and nuts 69, threaded onto the rods, secure the bearing to the cross-beam. The lower end portions of the rods are of reduced diameter and a cross-head 70 is slidably mounted on these lower portions. This cross-head is normally held against the shoulders 65^a and 66^a on the rods by compression springs 71 arranged between the cross-head and adjusting nuts 72 threaded onto the lower ends of the rods. A pair of links 73 and 74, pivotally connected to the cross-head by a pivot pin 75 connect the cross-head with the lower end of a short link 76 which is suspended from a pivot pin 77 in an ear 78 in the lower part of the frame. The axes of the pivot pins 75 and 77 and of the shaft 26 are in the same vertical line. The short link thus supports the links 73 and 74, the cross-head, the guide rods 65 and 66, the bearing 27, one end of the cross-beam *g* and one end of the shaft 26. As shown in Fig. 2, the parts just described are duplicated at the opposite side of the machine, where a short link 76^a, pivoted to an ear 78^a on the frame, supports links 73^a and 74^a, connected to cross-head 70^a, and guide posts which support the bearing 27^a on one end of the cross-beam *g*, one of the guide posts being shown at 65^a.

The devices for supporting the bearings for the shaft 30, and also the cross-beam *h*, which is mounted on said bearings, are the same in all respects as the devices for supporting the shaft 26 and the cross-beam *g*. In Fig. 1, links 76^b and 73^b correspond in structure and function with the links 76 and 73 and the cross-head 70^b corresponds with the cross-head 70. In Fig. 4, links 73^b, 74^b, 74^c and 73^c correspond with links 73, 74, 74^a and 73^a, respectively, and in Fig. 3, links 76^b, and 74^c correspond with links 76^a and 74^a, respectively, and cross-head 70^c corresponds with cross-head 70^a.

Referring to Figs. 1, 2, 4 and 5, the pivot pin 80, which connects the lower ends of the links 73 and 76, also connects these links with one end of a horizontal bar 81 and the pivot pin 82, which connects the lower ends of the links 76^b and 73^b, also connects the latter links with said bar near the opposite end thereof. A bell crank lever 83, pivoted at 84 to the side of the frame, has one end pivotally connected to said bar at 85, and a roller 86 on the opposite end of the lever rests against an eccentric 87 which is secured to and turns with the shaft 11. These parts are duplicated at the opposite side of the machine, as shown in Figs. 2, 3, and 4, the horizontal rod being shown at 81^a, the bell crank lever at 83^a, the roller at 86^a and the eccentric at 87^a.

The movements of the creaser bars while the machine is in operation are as follows: Assum-

ing the shafts 11 and 12 to be turning in the directions indicated by the arrows in Figs. 1 and 3, when the links 17 and 24 which operate the rock shafts are in the position shown in said figures, the creaser bars will be approximately in the position shown in Fig. 3 and the eccentrics on the shaft 11 will be in the position shown in these figures. During the next half revolution of the shafts, the rocker arms will swing forward in the direction of movement of the feed chain and as they move forward the low parts of the cams are engaged by the rollers, as shown in Fig. 5, and the creaser bars, traveling horizontally at the same speed as the feed chain will be in the position shown in Fig. 5 at the end of the first quarter of a revolution of the shafts 11 and 12. In this position, the creaser bars will apply heavy pressure to the sheet material and crease the same. During the second quarter of a revolution, the creaser bars will swing to the left of the position shown in Fig. 5 into the positions shown in Fig. 6, and the eccentrics will move the bell crank levers to swing the bars 81 and 81^a to the left, as indicated in Fig. 6, and as this will cause the short links 76 and 76^a to swing out of the vertical line, the horizontal bar 81 will be raised and this will cause the links 73 and 73^b to lift the cross-heads and the rock shafts which carry the creaser bars, as well as the beams *g* and *h*, so that the upper bars will be lifted out of engagement with the sheet material. During the next half revolution of the shafts, the roller will ride over the high part of the eccentric while the creaser bars are returning to the right, and this will cause the upper creaser bars to be supported above the plane of the sheet material while they are travelling back to their right-hand positions, and until the bars again start to move forward, when the cams will allow the upper bars to approach the lower bars and crease the material, as before. The weight of the parts which are raised and lowered by the operation of the cams is sufficient to crease the sheet material.

The feed chain 10 which carries the box blanks through the machine has lugs 10^b attached to it at suitable distances apart for engaging the rear ends of the box blanks and moving them through the machine along the guide rails *p* and *q*. It is necessary to adjust the feed chain so that the lugs will bring the blanks successively into position to be engaged by the creaser bars when the latter are brought to the creasing position. The feed chain extends over a sprocket wheel 90, journaled in bearings 91 on a bracket *r* which is secured to the cross-piece 4 at the delivery end of the machine, Figs. 1, 3 and 4, and from this sprocket the chain extends downwardly around a sprocket wheel 92 at the lower end of the bracket and thence rearwardly under an idle sprocket 116 in the lower part of the machine. The sprocket 92 is mounted upon a shaft 93, Fig. 10, and has a tapering hub 92^a which fits into a flaring socket in the hub 94^a of a sprocket 94 which is keyed to said shaft. A friction clutch is thus formed by the hubs of the two sprocket wheels. The sprocket 94 is connected by a drive chain 95 to a sprocket wheel 96 on the drive shaft 6. The sprocket 92 has a sleeve 92^b which extends through the bearing 97 and a hand wheel 98 is secured to this sleeve. The shaft 93 has a reduced part 93^a which extends beyond the hand wheel and this part is threaded to receive a nut 99. A collar 100 is arranged between the nut and the end of the sleeve 92^b. When the nut is

tightened the shaft and the sleeve are pressed in opposite directions, causing the clutch members on the sprocket hubs to engage tightly. When it is desired to adjust the feed chain with respect to the drive chain, the nut 99 is loosened and the sprocket 92 which operates the feed chain can then be disengaged from the sprocket 94 and turned, carrying with it the endless feed chain to adjust the chain so that the lugs 10^b thereon will position the box blanks correctly with respect to the creaser bar movements.

The guide bars *p* and *q* which support the box blanks at their edges while the blanks are being moved through the machine by the feed chain are arranged in opposite sides of the chain and are adjustable toward and from one another to suit blanks of different widths. The guide bar *p*, as shown in Figs. 2, 4 and 4a, comprises a flat metal strip 101 having bearing blocks 102 secured to its under side at its ends and having on its upper side a longitudinally extending angle bar 103 which forms a rail to guide the box blanks at one edge. As shown in Fig. 4a, each bearing block has parallel openings 104 and 105, to receive a pair of adjusting shafts, one opening being threaded, and the other plain. The threaded portions of shafts 106 extend through the threaded openings and the plain portions of shafts 107 extend through the plain openings. These shafts are journaled in the side frames of the machine. The shafts 106 are connected by sprocket chains 108 to sprocket wheels on a shaft 109 on which is mounted a hand wheel 110. By turning the hand wheel the guide bar *p* may be moved toward or from the guide bar *q*.

The guide bar *q* has bearing blocks at its ends, the same as the bearing blocks beneath the guide bar *p*, except that the openings through which the shafts 106 extend are plain while the openings through which the shafts 107 extend are threaded to engage threaded portions of the latter shafts. The shafts 107 are connected by sprocket chains 111 to sprocket wheels on a shaft 112 which is provided with a hand wheel 113. By turning this hand wheel the shafts 107 will be turned and cause adjustment of the guide bar *q* toward or from the guide bar *p*. On the upper side of the guide bar *q* a series of springs 114 is arranged so as to yield laterally and apply a yielding pressure to the edges of the box blanks in order to keep them in contact with the rail 103 on the opposite guide bar *p*. Each spring is secured to the guide bar *q* by a suitable fastening device 115, and from these devices the springs incline rearwardly and toward the opposing guide bar, as shown.

From the foregoing description it will be plain that the guide bars are adjustable to suit different widths of box blanks and that the creaser bars are also adjustable to effect creasing on blanks of different widths and at different positions with respect to the sides of the blanks.

What I claim is:

1. A machine for creasing sheet material comprising side frames, means for moving the material longitudinally through the machine, upper and lower pairs of shafts extending transversely of the machine, cross-beams extending longitudinally over said upper shafts and having bearings at their ends in which said upper shafts are mounted, guides secured to the ends of the cross-beams and vertically movable in the side frames, a pair of rocker-arms depending from each upper shaft, a pair of upstanding rocker-arms on each lower shaft, creaser bars, each pivotally con-

nected to arms on a pair of said shafts, the arms on one upper shaft and one lower shaft being secured to the shaft to rock therewith, means for rocking the arms in unison to cause the creaser bars to move alternately forward with the sheet material and then backward, and means for raising said guides at the end of each forward movement and for lowering the guides at the end of each backward movement of the creaser bars.

2. A machine for creasing sheet material comprising side frames, means for moving the material longitudinally through the machine, upper and lower pairs of shafts extending transversely of the machine, a pair of rocker-arms depending from each upper shaft, a pair of upstanding rocker-arms on each lower shaft, creaser bars each pivotally connected to rocker-arms on a pair of said shafts, cross-beams adjacent said upper shafts and having bearings at their ends in which said upper shafts are mounted, guides secured to the ends of the cross-beams and vertically movable, means for supporting the guides comprising a relatively long link depending from each guide and a short link connected to the long link and pivoted to the frame above the point of connection between the links, means for rocking all of the arms in unison to cause the creaser bars to move alternately forward with the sheet material and then backward, and means for rocking said links to cause an upward movement of the guides at the end of each forward movement of the creaser bars and a downward movement of the guides at the end of each rearward movement of the creaser bars.

3. A machine for creasing sheet material comprising side frames, means for moving the material longitudinally through the machine, upper and lower pairs of shafts extending transversely of the machine, a pair of rocker-arms depending from each upper shaft, a pair of upstanding rocker-arms on each lower shaft, creaser bars each pivotally connected to rocker-arms on a pair of said shafts, cross-beams adjacent said upper shafts and having bearings at their ends in which said upper shafts are mounted, guides secured to the ends of the cross-beams and vertically movable, means for supporting the guides, comprising a relatively long link depending from each guide and a short link connected to the long link and pivoted to the frame above the point of connection between the links, horizontal bars, each connected to the links at one side of the machine, gearing for rocking the arms in unison to cause the creaser bars to move alternately forward with the sheet material and then backward, and means for moving said horizontal bars to cause an upward movement of the guides at the end of each forward movement of the creaser bars and a downward movement of the guides at the end of each rearward movement of the creaser bars.

4. A machine for creasing sheet material comprising side frames, means for moving the material longitudinally through the machine, upper and lower pairs of shafts extending transversely of the machine, a pair of rocker-arms depending from each upper shaft, a pair of upstanding rocker-arms on each lower shaft, creaser bars each pivotally connected to rocker-arms on a pair of said shafts, cross-beams adjacent said upper shafts and having bearings at their ends in which said upper shafts are mounted, guides secured to the ends of the cross-beams and vertically movable, cross-heads slidable on the guides and supporting the same, springs inter-

posed between said cross-heads and the lower ends of the guides, means for supporting the cross-heads comprising a relatively long link depending from each cross-head and a short link
5 connected to the long link and pivoted to the frame above the point of connection between the links, means for rocking all of the arms in unison to cause the creaser bars to move alternately forward with the sheet material and then
10 backward, and means for rocking said links to cause an upward movement of the guides at the end of each forward movement of the creaser bars and a downward movement of the guides at the end of each rearward movement of the
15 creaser bars.

5. In a machine for creasing sheet material, means for moving the material longitudinally through the machine, upper and lower pairs of rock-shafts extending transversely of the machine, two rocker-arms keyed to and slidable
20 upon each shaft, creaser bars each pivotally connected to arms on a pair of said shafts, means for rocking said shafts in unison, supports journaled on the rock-shafts at the sides of the arms, each support having a sliding connection with the adjacent arm near the free end of the latter,
25 and means for preventing rocking movement of the supports.

6. In a machine for creasing sheet material, means for moving the material longitudinally through the machine, upper and lower pairs of rock-shafts extending transversely of the machine, two rocker-arms keyed to and slidable
30 upon each shaft, creaser bars each pivotally connected to arms on a pair of said shafts, means for rocking said shafts in unison, supports journaled on the rock-shafts at the sides of the arms, each support having a sliding connection with the adjacent arm near the free end of the latter,
40 and means for preventing rocking movement of the supports, comprising cross-beams extending parallel with the shafts and having guide-ways engaged by said supports.

7. In a machine for creasing sheet material, means for moving the material longitudinally through the machine, upper and lower pairs of rock-shafts extending transversely of the machine, two rocker-arms keyed to and slidable
45 upon each shaft, creaser bars each pivotally connected to arms on a pair of said shafts, means for rocking said shafts in unison, supports journaled on the rock-shafts at the sides of the arms, each support having a sliding connection with the adjacent arm and being rigidly connected
50

to a support on the opposing shaft of a pair, means for adjusting each connected pair of supports longitudinally of the shafts independently of the other connected pairs of supports and means for preventing rocking movement of the supports. 80

8. In a machine for creasing sheet material, means for moving the material longitudinally through the machine, upper and lower pairs of rock-shafts extending transversely of the machine, two rocker-arms keyed to and slidable
85 upon each shaft, creaser bars each pivotally connected to arms on a pair of said shafts, means for rocking said shafts in unison, supports journaled on the rock-shafts at the sides of the arms, each arm having a guide-way at one side near its free end and the adjacent support having a guide plate engaging said guide-way, and means for preventing rocking movement of the supports. 90

9. A machine for creasing sheet material comprising means for moving the material horizontally through the machine, upper and lower pairs of shafts extending transversely of the machine, a pair of rocker arms depending from each upper shaft, a pair of upstanding rocker arms on each
95 lower shaft, creaser bars each pivotally connected to rocker arms on a pair of said shafts, means for rocking the arms in unison to cause the creaser bars to move alternately forward with the sheet material and then backward, and means
100 for lifting said upper shafts at the end of each forward movement and for lowering them at the end of each backward movement of the bars. 105

10. A machine for creasing sheet material comprising means for moving the material horizontally through the machine, upper and lower pairs of shafts extending transversely of the machine, a pair of rocker arms depending from each upper shaft, a pair of upstanding rocker
110 arms on each lower shaft, creaser bars each pivotally connected to arms on a pair of said shafts, means for rocking the arms in unison to cause the creaser bars to move alternately forward with the sheet material and then backward, comprising a lever depending from one of the upper shafts, a lever projecting upwardly from one of the lower shafts, a pair of intermeshing gears, links connected to the free ends of said levers and eccentrically connected to said
115 gears, and means for lifting the upper shafts at the end of each forward movement and for lowering them at the end of each backward movement of the bars. 120

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