

C. A. WEIRICH.
SHEET METAL FORMING MACHINE.
APPLICATION FILED APR. 6, 1915.

1,154,951.

Patented Sept. 28, 1915.

3 SHEETS—SHEET 1.

Fig. 1.

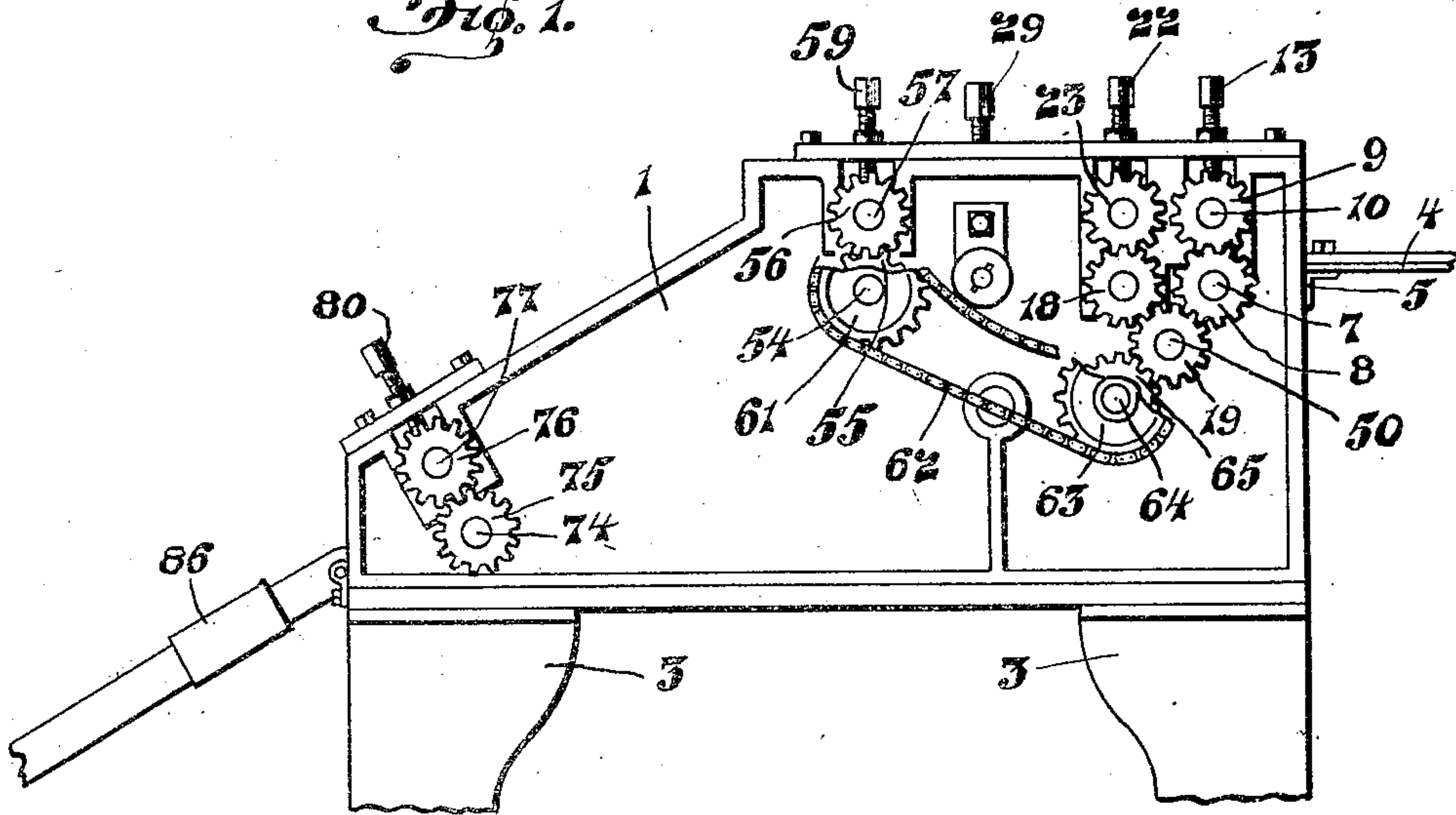


Fig. 2.

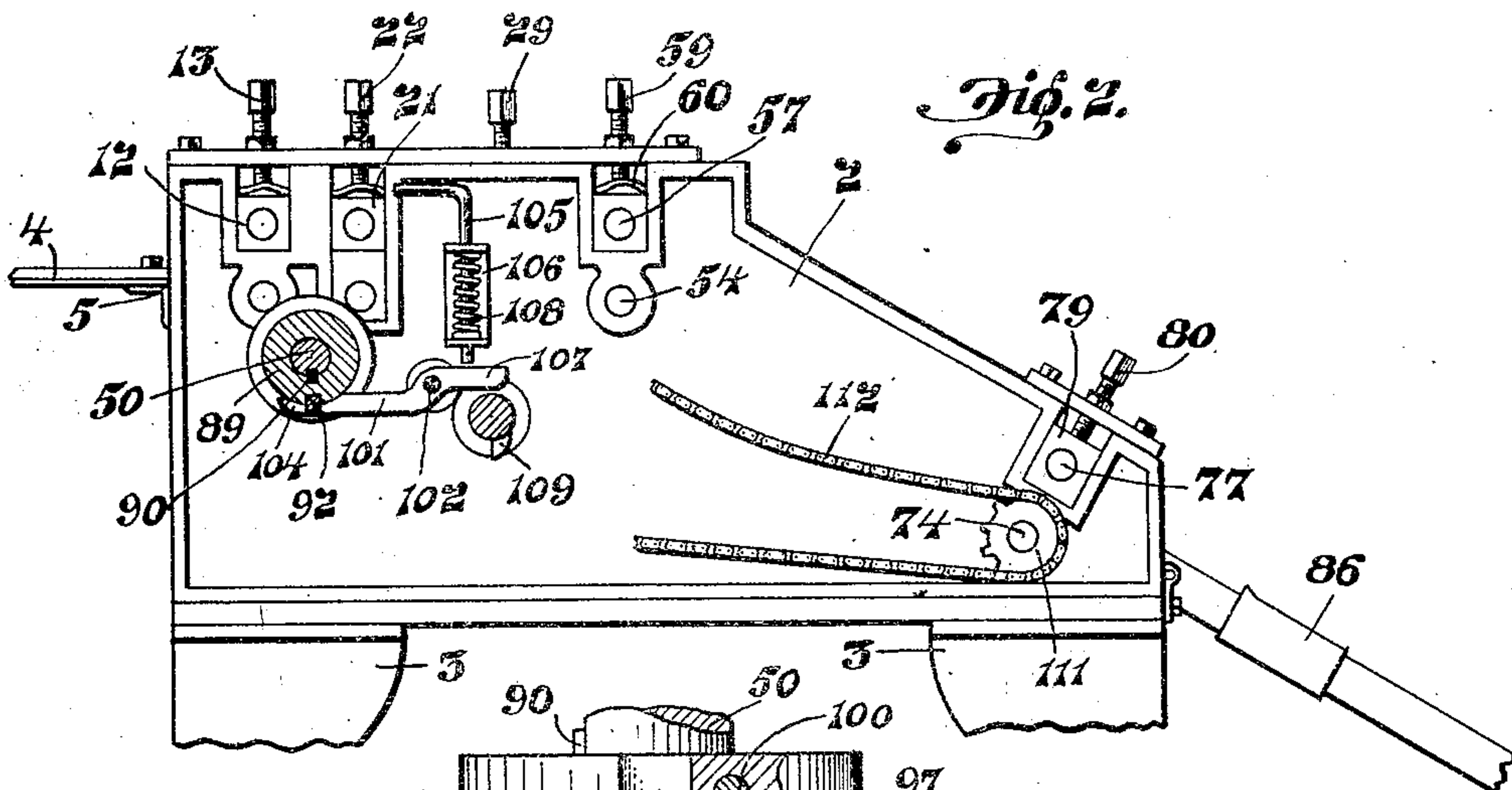
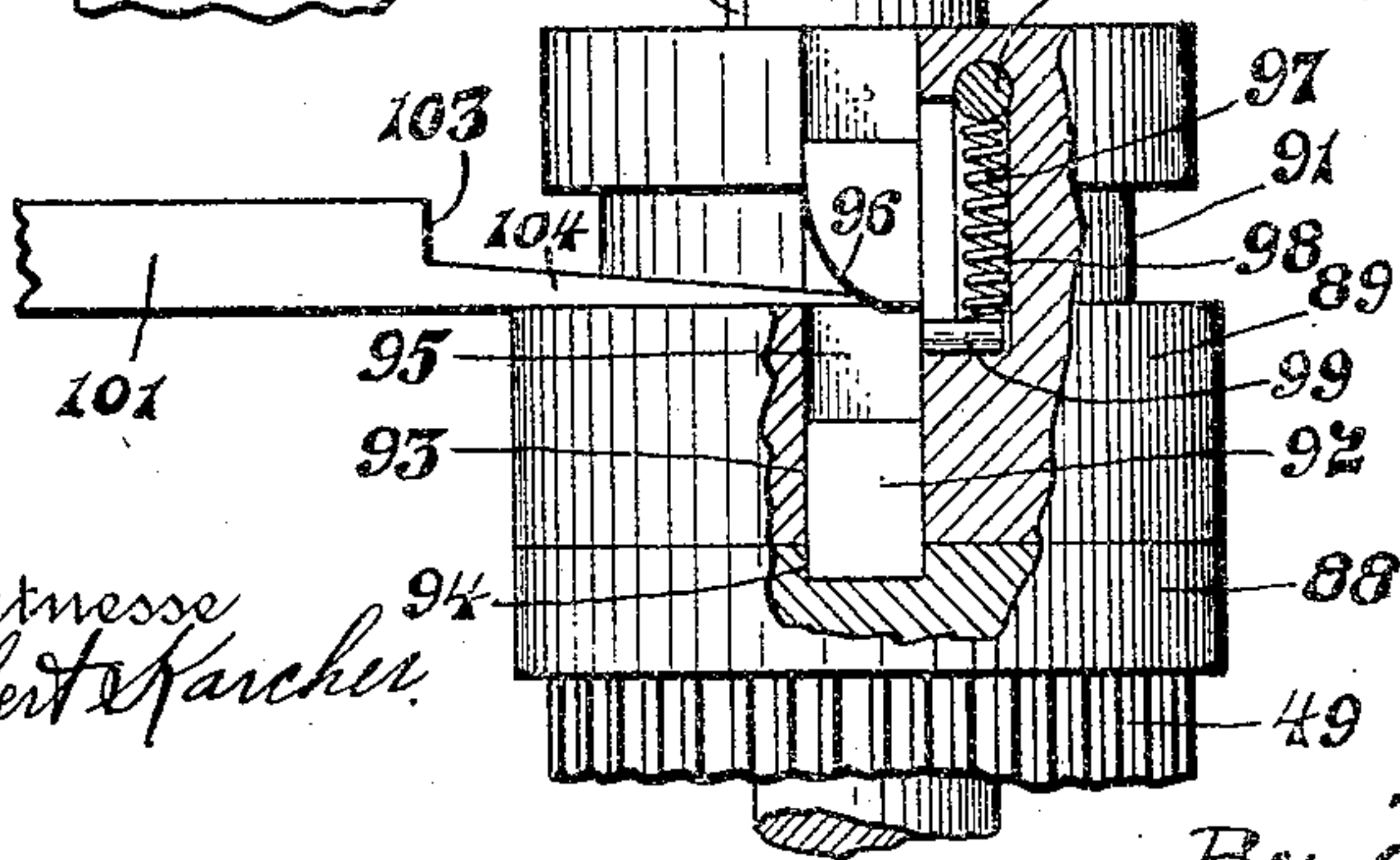


Fig. 7.



Witness
Robert Karcher.

Inventor
Clarence Q. Weirich.

By J. W. Bond
Attorney

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3 SHEETS—SHEET 2.

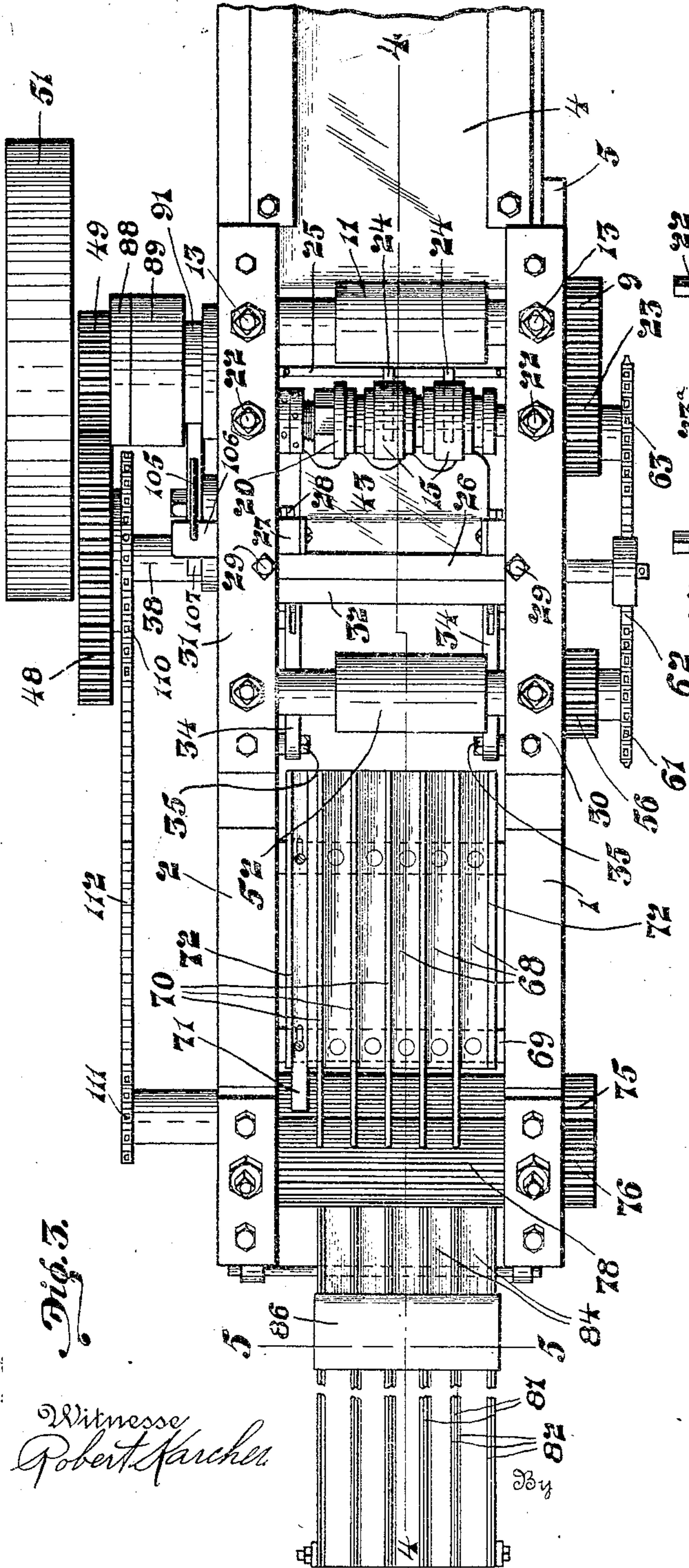


Fig. 5.

Witness
Robert Karcher

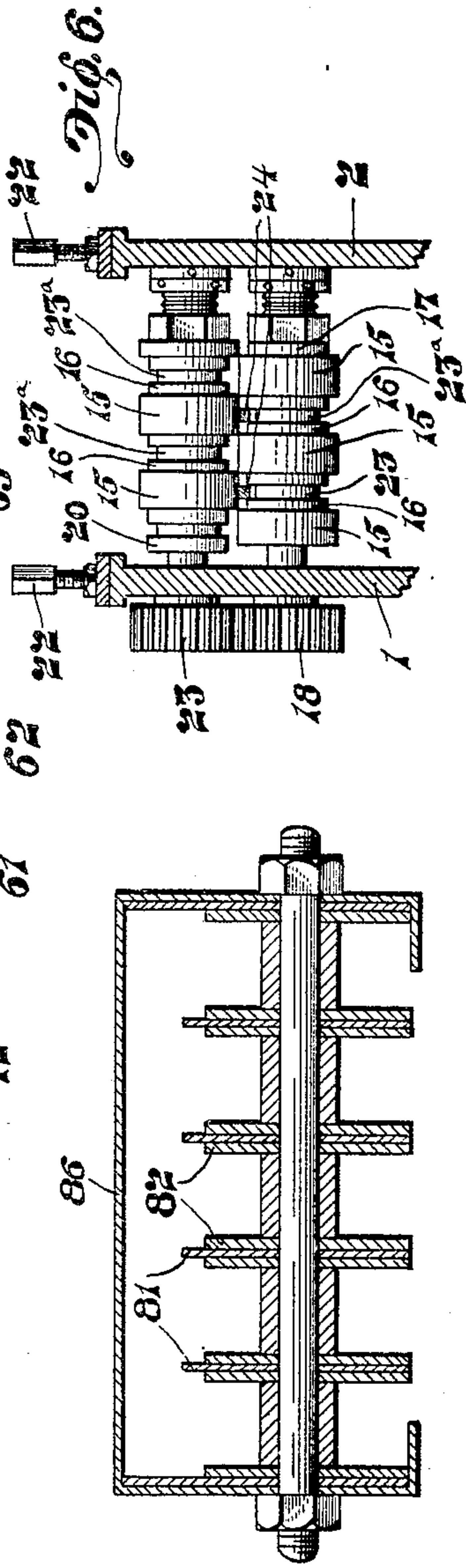


Fig. 6.

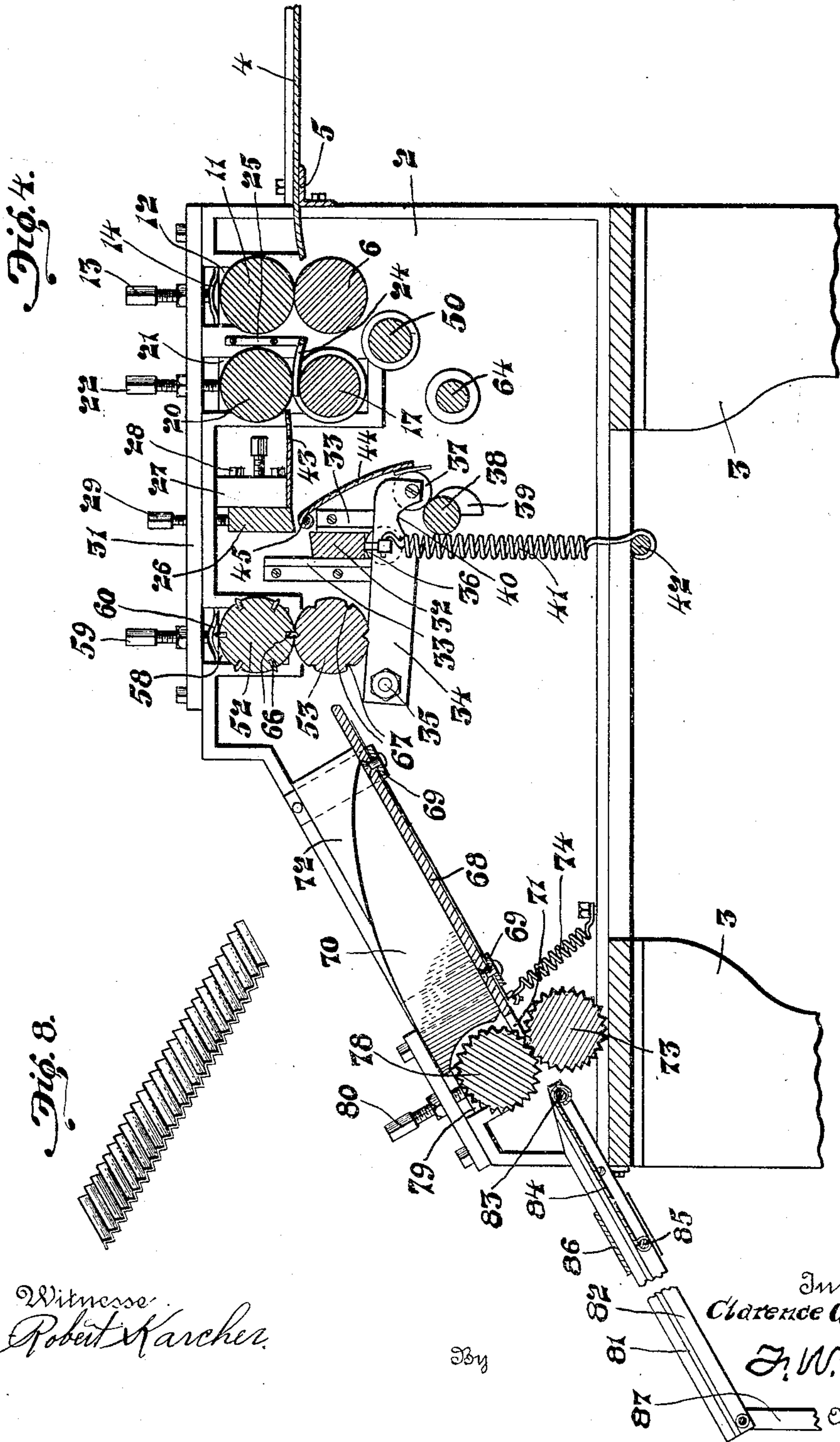
Inventor
Clarence A. Weirich.
F. W. Bond
Attorney

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3 SHEETS—SHEET 3.



Witness
Robert Karcher.

By

Inventor
Clarence A. Weirich.

J. W. Bond

Attorney

UNITED STATES PATENT OFFICE.

CLARENCE A. WEIRICH, OF CANTON, OHIO.

SHEET-METAL-FORMING MACHINE.

1,154,951.

Specification of Letters Patent.

Patented Sept. 28, 1915.

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To all whom it may concern:

Be it known that I, CLARENCE A. WEIRICH, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Sheet-Metal-Forming Machine, of which the following is a specification.

My invention relates to sheet metal forming machines and has more especial reference to a machine adapted to cut metal sheets into strips of a predetermined size and corrugate the strips thus cut.

The object of my invention is to provide a sheet metal forming machine which will automatically cut metal sheets into strips of a predetermined size and corrugate the strips in a single operation.

A further object is to provide a machine of this character into which sheets of various sizes may be fed and which will automatically discard the scrap cut from the sheets and discharge the finished strips into a separate receptacle.

With these objects in view the invention consists in the novel construction and arrangement of parts, hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of construction may be made, within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing: Figure 1 is a side elevation of a machine constructed in accordance with my invention. Fig. 2 is an elevation of the opposite side of the machine, parts being broken away for the purpose of illustration. Fig. 3 is a top plan view of a machine on an enlarged scale. Fig. 4 is a longitudinal section on the line 4—4, Fig. 3. Fig. 5 is a transverse section on the line 5—5, Fig. 3. Fig. 6 is a transverse sectional view showing the splitting rolls. Fig. 7 is a detail view of the clutch. Fig. 8 is a detail perspective view of one of the corrugated strips formed in this machine.

Similar numerals of reference indicate corresponding parts through the several views of the drawings.

The side frames 1 and 2 are supported upon suitable legs 3.

A table 4 is supported at the front of the machine upon a suitable bracket 5 carried upon the side frames 1 and 2, said table ex-

tending in between the side frames to a point adjacent the feed rolls. The lower feed roll 6 is journaled in the side frames and provided with a reduced portion 7 which extends through the side frame and a pinion 8 is mounted thereon, said pinion meshing with a pinion 9 carried upon the reduced portion 10 of the upper feed roll 11. The upper feed roll is mounted in slidable bearings 12 of the usual construction which are adjusted by means of the customary screw 13 and a pressure spring 14 is interposed for the purpose of normally holding the rolls together and allowing a slight movement of the upper rolls to accommodate any varying thickness in the sheets.

A pair of splitting rolls are located adjacent the feed rolls and in a position to receive the sheets as they pass from the feed rolls and split the same into the desired width. Each of the splitting rolls is provided with alternate collars 15 and restricted portions 16 of a width equal to the desired width of the strips to be cut and the collars of each splitting roll register with the restricted portions of the other splitting roll, thus performing a splitting action when the sheets are passed between said rolls, splitting the sheets into strips of a width equal to the collars on the splitting rolls. The lower splitting roll 17 is journaled in the side frames 1 and 2 and is provided upon one extremity with a pinion 18, which meshes with the idler 19, said idler also meshing with the pinion 8. The upper splitting roll 20 is journaled in sliding bearings 21 which are adjustable vertically by means of bolts 22. A pinion 23 is provided upon one extremity of the upper splitting roll, said pinion meshing with the pinion 18 upon the lower splitting roll. A substantially narrow, annular groove 23^a is centrally located in each of the restricted portions 16 of the splitting rolls and a series of guide fingers 24, carried upon a bar 25 extending transversely between the side flanges, extend into said grooves for the purpose of guiding the sheets from the feed rolls into the splitting rolls.

A fixed shear blade 26 is located beyond the splitting rolls and is preferably mounted upon the blocks 27 by means of screws 28, said blocks being carried in the side frames of the machine.

A screw 29 is passed downwardly through each of the horizontal flanges 30 and 31 of

the side frames 1 and 2 respectively, said screws bearing upon the upper edge of the shear blade 26 for the purpose of holding said blade rigid during the shearing action.

5 The reciprocating shear blade 32 is slidably mounted between the vertical guides 33 and is arranged to be moved upwardly into engagement with the fixed shear blade 26 as will be hereinafter explained.

10 An arm 34 is pivoted to each of the side frames 1 and 2 as at 35 and each of said arms is provided with a roller 36 which bears upon the lower edge of the reciprocating shear blade.

15 A roller 37 is provided upon the extremity of each of the arms 34, said rollers normally resting upon the shaft 38 and adapted to be engaged by the cams 39 provided upon said shaft.

20 Each of the arms 34 is provided with a recess 40 adapted to receive the cams 39 as they are moved into the raised position, thus allowing a quick return of the reciprocating shear blade.

25 A tension spring 41 is connected to the reciprocating shear blade and attached in any suitable manner to the frame of the machine, preferably to a rod 42 connected between the side frames.

30 A guide plate 43 is located between the fixed shear blade and the splitting rolls for the purpose of guiding the strips of metal beneath the fixed shear blade. For the purpose of assisting in guiding the strips to the

35 shears and also in order to provide a guide for carrying the scrap away from the shears a plate 44 is pivoted upon a shaft 45 extending transversely through the machine beneath the fixed shear blade. The lower extremity of the plate 44 rests upon the rollers

40 47 on the arms 34 and as said arms are moved into their raised position the plate 44 will be swung toward the lower splitting roll, thus forming a guide for assisting the

45 strips to the shear blades and also forming a chute upon which the scrap from the shears will be carried out of the machine.

The shaft 38 is journaled in suitable bearings in the side frames 1 and 2 and is provided upon one extremity with a gear 48

50 which meshes with a pinion 49 upon a drive shaft 50, a drive pulley 51 being also mounted upon the drive shaft for the purpose of imparting rotary motion to said shaft.

55 Upper and lower feed rolls 52 and 53 respectively are located beyond the shears in a position to receive the strips as they are sheared and pass them on to the chute which carries them on to the corrugating rolls.

60 The lower feed roll is journaled in the side frames 1 and 2 and the shaft 54 thereof is provided with a pinion 55 which meshes with a pinion 56 mounted upon the shaft

65 57 of the upper roll which is journaled in sliding bearings 58 mounted for vertical

movement within the side frames, set screws 59 being provided for the purpose of adjusting said bearings and the usual spring 60 being provided in order to normally hold the upper roll in engagement with the lower 71 roll and to provide for any slight variation in the thickness of the sheets. A sprocket wheel 61 is mounted upon the shaft 54 and is connected by means of a sprocket chain 62 with a sprocket wheel 63 mounted upon 75 the shaft 64, a pinion 65 being also mounted upon said shaft 64 and meshing with the pinion 19 upon the drive shaft 50.

In some instances it is desirable to punch the strips at spaced intervals and for this 80 purpose the upper roll 52 is provided with pins 66 which are removably placed around the periphery thereof, said pins being adapted to register with the conical depressions 67 in the lower roll 53 as said rolls rotate. 85

When it is desired to produce the strips without punching the pins 66 may be removed from the upper roll 52. As the strips pass from the rolls 52 and 53 they are deposited upon a chute which carries them to 90

suitable corrugating rolls. This chute is preferably formed of a series of narrow plates 68 which are held in an inclined position and mounted upon the brackets 69 95 which are carried between the side frames and partitions 70 are secured between the edges of each of said plates. A finger 71 is

secured to the brackets 69 adjacent the vertical walls 72, the extremity of said finger being located in juxtaposition to the lower 100 corrugating roll 73, a spring 74 being provided for normally holding said finger in contact with said corrugating roll.

The corrugating roll 73 is journaled in the side frames 1 and 2 and the shaft 74 there- 105 of is provided with a pinion 75 meshing with a pinion 76 mounted upon the shaft 77 of the upper corrugating roll 78 which is journaled in slidable bearings 79, slidably mounted in the side frames, a bolt 80 being 110 provided for adjusting the bearings of the upper corrugating roll.

An inclined separator is located beyond the corrugating rolls and in a position to receive the corrugated strips as they are re- 115 ceived from said rolls, said separator comprising a series of spaced plates 81, said plates being spaced from each other a distance equivalent to the width of the strips which are formed in the machine. Clamped 120

against each side of each plate 81 is a plate 82, the upper edges of the plates 82 forming tracks upon which the strips are supported as they pass away from the machine. Any 125 strips which are of less width than the distance between the plates 82 being discharged between said plates, thus allowing only strips of the proper size to be discharged from the extremity of the separating device.

This device is supported at its upper ex- 130

5 tremity upon a rod 83 and a series of guide plates 84 are supported between said rod 83 and a rod 85 located between the extremities of the separating device, a channel member 86 being located around the separating device at this point for the purpose of guiding the strips received from the corrugating rolls through the separating device and also steadying the strips. The lower extremity 10 of the separating device is supported upon suitable legs 87.

15 The feeding and splitting rolls must rotate intermittently and the movement of the shear must be timed to correspond with the movement of these rolls and in order to accomplish this a timing mechanism is provided which will be hereinafter described. The drive pulley 51 and gear 49 are connected together in any suitable and well 20 known manner and the gear 49 formed integral with the loose clutch member 88, all of said parts being loosely mounted upon the shaft 50.

25 The fixed clutch member 89 is fixedly connected to the shaft 50 by means of a key 90 and is formed with an annular groove 91 intermediate its extremities. The locking member 92 is slidably mounted in a longitudinal slot 93 in the fixed clutch member, a 30 recess 94 being provided in the loose clutch member for the purpose of receiving the extremity of said locking member.

35 The locking member 92 is provided with a slot 95, one face of which is rounded at 96. An expansion spring 97 is located in a suitable channel 98 formed in the fixed clutch member engaging with a pin 99 carried by the locking member, and a pin 100 carried by the fixed clutch member, thus tending to 40 hold the locking member in engagement with the loose clutch member as illustrated in Fig. 7 of the drawings.

45 A lever 101 is pivoted at 102 upon the side frame 2, the extremity of said lever being provided with a shoulder 103 and with a tapered finger 104 adapted to engage with the rounded edge 96 of the locking member. A spring pressed rod 105 is slidably carried in a bracket 106 and is held in contact with the extremity 107 of the lever 101 50 by means of a compression spring 108.

55 A cam 109 is provided upon the shaft 38, said cam being adapted to contact with the extremity 107 of the lever 101 as the shaft 38 rotates, thus throwing the finger 104 of said lever out of engagement with the locking member 92.

60 A sprocket wheel 110 is carried upon the shaft 38 and is connected to a sprocket wheel 111 upon the shaft 74 of the lower corrugating roll by means of a sprocket chain 112, thus continuously driving the corrugating rolls.

65 The operation of the device is as follows: The sheets desired to be cut into strips and

corrugated, and, if desired punched, are placed upon the table 4 and fed between the feed rolls 6 and 11 which carry said sheets through the splitting rolls splitting the sheets into strips of the desired width and 70 feeding them into the shears. The device is so timed that as the strips have passed through the shears, a proper distance, the shaft 50 will have rotated into a position bringing the locking member 92 upon the 75 fixed clutch member into engagement with the finger 104 of the lever 101, the face 96 of the locking member engaging with the tapered face of the finger, thus drawing the locking member out of engagement with the 80 recess 94 in the loose clutch member the shoulder 103 upon the lever engaging with the side face of the locking member as shown in Fig. 2 of the drawings bringing the feed rolls and splitting rolls to a stop at which 85 time the shears are operated cutting the strips the proper length. As the shaft 38 rotates, the cam 109 will then engage the extremity 107 of the lever throwing the 90 finger 104 out of engagement with the locking member 92 allowing the locking member to again engage the recess 94 of the loose clutch member and causing the feed rolls and splitting rolls to again rotate, the strips being passed through the feed rolls 52 and 95 53 and upon the vibrating chute 68, the vibration imparted to this chute by means of the finger 71 contacting with the lower corrugating roll 73, causing the strips to be easily separated and dropped into their 100 place, each strip sliding between two of the partitions 70. The strips then pass through the corrugating rolls where they are corrugated and the finished strips as shown in Fig. 8 of the drawings are discharged upon 105 the inclined plate 84 and passed from the machine upon the inclined tracks 82, any strips of scrap which are too narrow for use being dropped between the tracks 82.

110 Although the drawings and above specification disclose the best mode in which I have contemplated embodying my invention I desire to be not limited to the details of such disclosure, for, in the further practical application of my invention, many changes in 115 form and construction may be made, as circumstances require or experience suggests, without departing from the spirit of the invention, within the scope of the appended claims. 120

I claim:

1. A machine of the character described, comprising side frames, feed rolls journaled in said side frames, splitting rolls journaled in said side frames, beyond said feed 125 rolls, a shear mounted between said side frames beyond said splitting rolls, a second pair of feed rolls journaled in said side frames beyond said shear, an inclined chute mounted between said side frames beyond 130

said second feed rolls, means for intermittently operating said shear and means for intermittently operating all of said rolls in unison.

5 2. A machine of the character described, comprising side frames, feed rolls journaled in said side frames, splitting rolls journaled in said side frames beyond said feed rolls, a shear mounted between said side frames
10 beyond said splitting rolls, a second pair of feed rolls journaled in said side frames beyond said shear, an inclined chute mounted between said side frames beyond said
15 second feed rolls, means for intermittently operating said shear and means for intermittently operating all of said rolls in unison, and corrugating rolls journaled in said side frames at the lower extremity of said chute.

20 3. A machine of the character described, comprising side frames, feed rolls journaled in said side frames, splitting rolls journaled in said side frames beyond said feed rolls, a fixed shear blade mounted between said side
25 frames beyond said splitting rolls, a movable shear blade mounted for reciprocation between said side frames and adapted to coact with said fixed shear blade, a second pair of feed rolls journaled in said frames
30 beyond said shear blade, means for intermittently operating said movable shear blade, means for rotating said feed rolls and splitting rolls in unison, and means for intermittently stopping said rolls during
35 the operation of said shear blade.

4. A machine of the character described, comprising side frames, feed rolls journaled in said side frames, splitting rolls journaled in said side frames beyond said feed rolls, a
40 fixed shear blade mounted between said side frames beyond said splitting rolls, a movable shear blade adapted to coact with said fixed shear blade and mounted for reciprocation between said side frames, a second
45 pair of feed rolls journaled in said side frames beyond said shear blade, a cam shaft mounted between said side frames, means for continuously rotating said cam shaft, cams mounted upon said cam shaft and
50 adapted to intermittently operate said movable shear blade and means for intermittently operating said rolls in unison.

5. A machine of the character described, comprising side frames, feed rolls journaled
55 in said side frames, splitting rolls journaled in said side frames beyond said feed rolls, a fixed shear blade mounted between said side frames beyond said splitting rolls, a movable shear blade adapted to coact with said
60 fixed shear blade and mounted for reciprocation between said side frames, a second pair of feed rolls journaled in said side

frames beyond said shear blade, a cam shaft mounted between said side frames, means for continuously rotating said cam shaft, 65
cams mounted upon said cam shaft and adapted to intermittently operate said movable shear blade, means for operating said rolls in unison and means for intermittently stopping said rolls during the operation of 70
said movable shear blade.

6. A machine of the character described, comprising side frames, feed rolls journaled in said side frames and adapted to feed
75 sheets into the machine, splitting rolls journaled in said side frames beyond said feed rolls and adapted to split said sheets longitudinally into strips, a fixed shear blade mounted between said side frames beyond
80 said splitting rolls, a movable shear blade adapted to coact with said fixed shear blade, means for intermittently operating said movable shear blade at a predetermined time for the purpose of cutting the strips
85 received from the splitting rolls into strips of a predetermined length, a second pair of feed rolls journaled in said side frames beyond said shears and adapted to receive the strips from said shears, means for rotating all of said rolls, means for automati- 90
cally stopping all of said rolls during the operation of said shear, an inclined chute located beyond said second named feed rolls, and adapted to receive the strips from said feed rolls, longitudinal partitions located 95
upon said chute and means for vibrating said chute for the purpose of causing the strips to fall between said partitions.

7. A machine of the character described, comprising side frames, feed rolls journaled 100
in said side frames, splitting rolls journaled in said side frames beyond said feed rolls, a shear mounted between said side frames beyond said splitting rolls, punching rolls journaled in said side frames, beyond said 105
shear, means for operating said shear at predetermined intervals, means for rotating all of said rolls, means for automatically stopping all of said rolls during the operation of said shear, a chute located beyond 110
said punching rolls, longitudinal partitions provided upon said chute, means for vibrating said chute, corrugating rolls journaled in said frames beyond said chute, means for continuously rotating said corrugating 115
rolls and a separator located beyond said corrugating rolls.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

CLARENCE A. WEIRICH.

Witnesses:

J. H. BISHOP,
SYLVIA BORON.