A. KIPNISS AND M. P. NEUMANN.

MACHINE FOR MAKING METAL BINDING FOR SUITCASES.

APPLICATION FILED JULY 27, 1918.

1,317,581.

Patented Sept. 30, 1919.

2 SHEETS—SHEET 1.

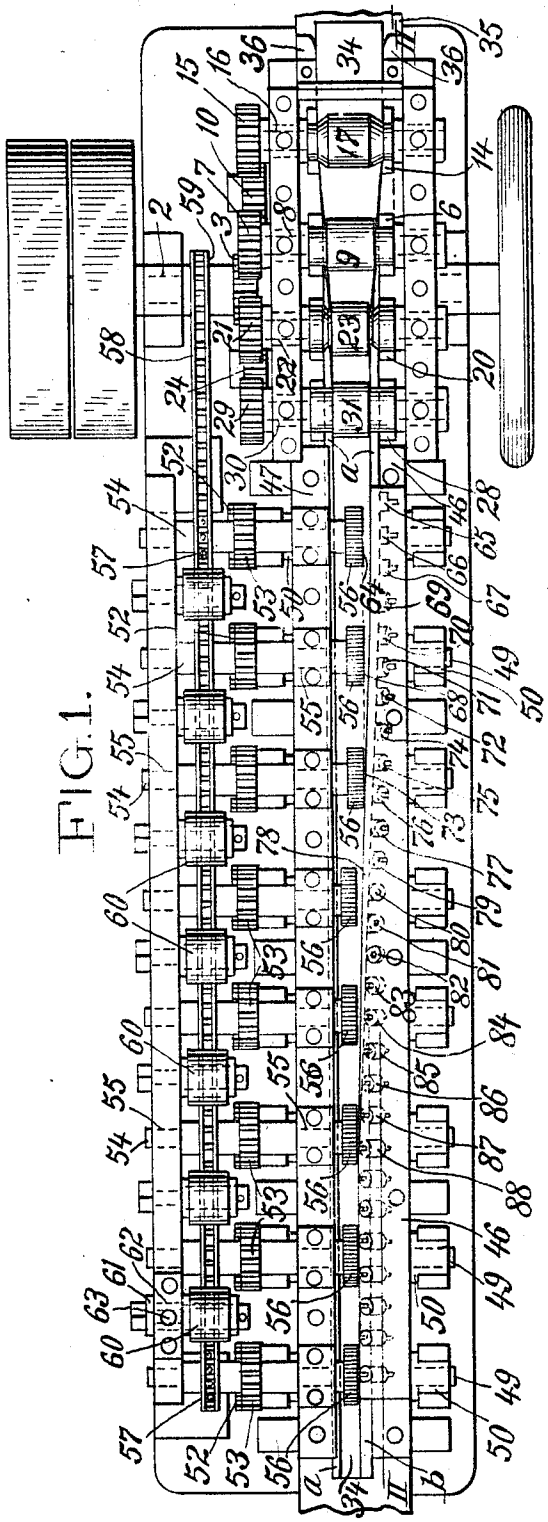


FIG. 1.

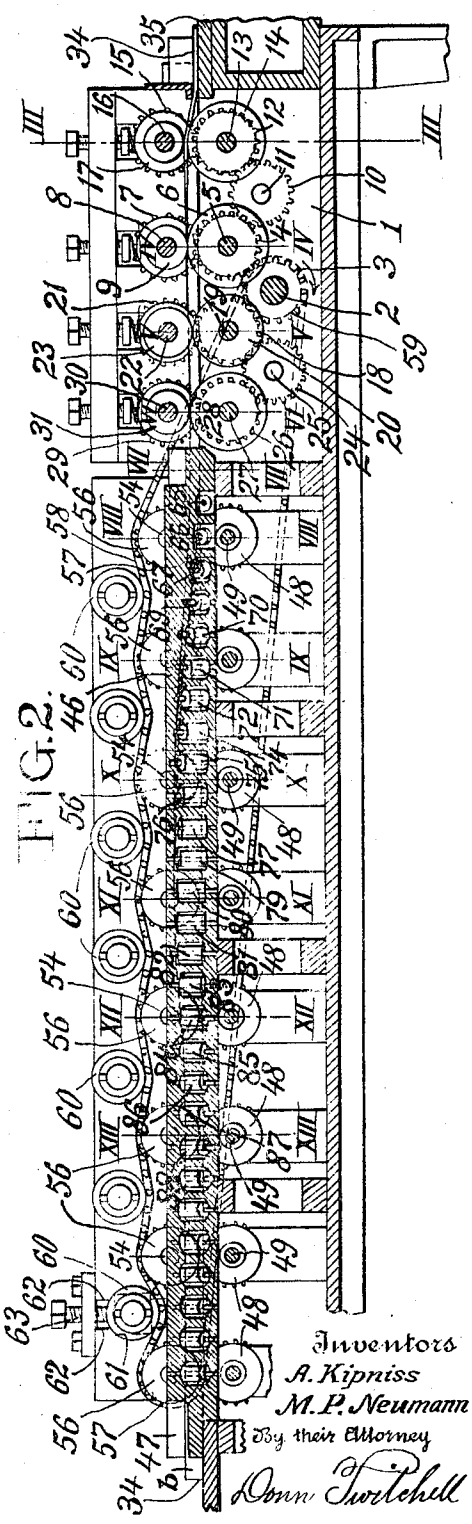


FIG. 2.

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2 SHEETS—SHEET 2.

FIG. 3.

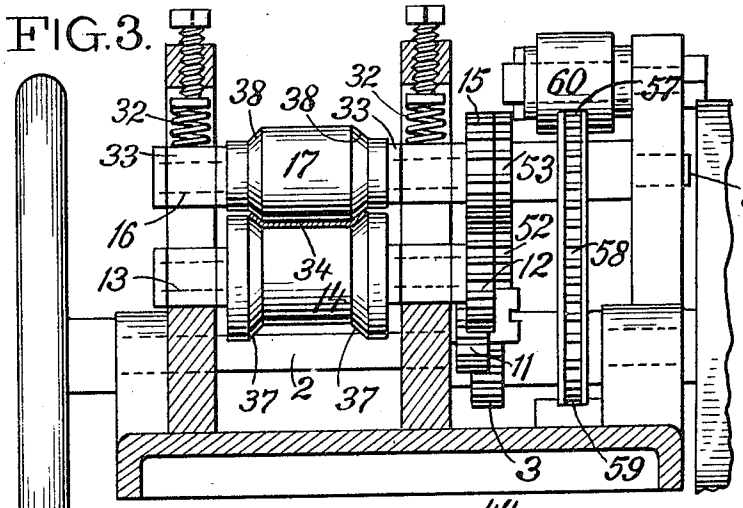


FIG. 4.

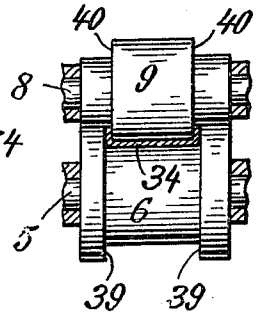


FIG. 5.

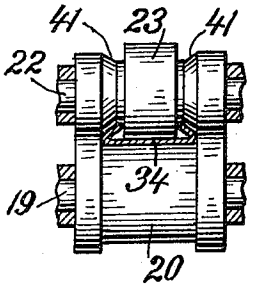


FIG. 7.

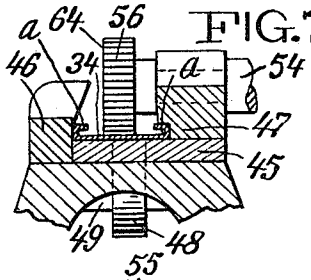


FIG. 6.

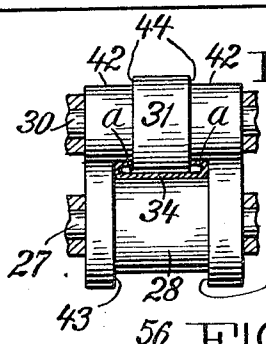


FIG. 8.

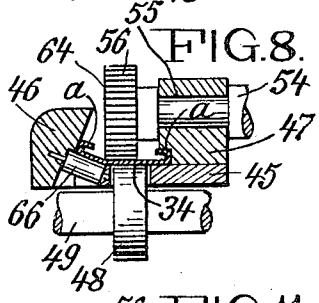


FIG. 9.

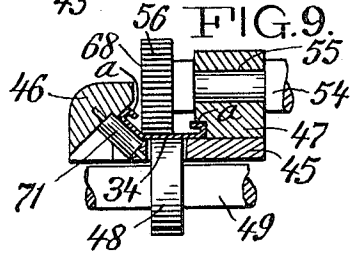


FIG. 10.

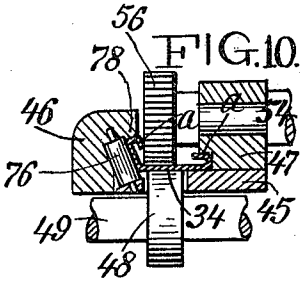


FIG. 11.

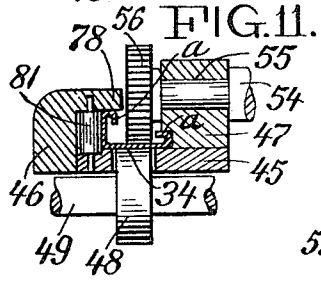


FIG. 12.

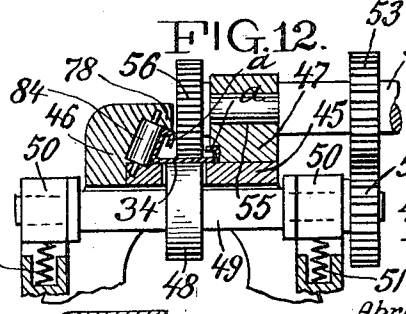


FIG. 13.

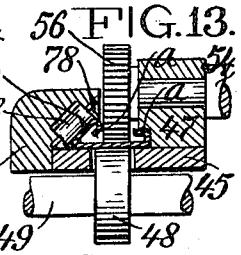


FIG. 14.

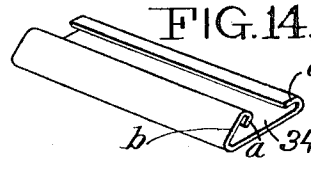
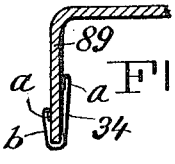


FIG. 15.



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UNITED STATES PATENT OFFICE.

ABRAHAM KIPNISS AND MAX PAUL NEUMANN, OF BROOKLYN, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO AMERICAN STEEL FRAME & BAND IRON CO., INC.

MACHINE FOR MAKING METAL BINDING FOR SUITCASES.

1,317,581. Specification of Letters Patent. **Patented Sept. 30, 1919.**

Application filed July 27, 1918. Serial No. 247,032.

To all whom it may concern:

Be it known that we, ABRAHAM KIPNISS, a citizen of the United States, and a resident of the borough of Brooklyn, city of New York, in the county of Kings and State of New York, and MAX PAUL NEUMANN, a citizen of the United States, and a resident of the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented a certain new and useful Machine for Making Metal Binding for Suitcases, of which the following is a specification.

This invention relates to a machine for shaping sheet metal to a special form known as "metal binding", which binding is used in the manufacture of suit cases and other receptacles.

The object is to provide automatic mechanism adapted to move sheet metal rapidly through the machine and simultaneously bend the metal to the desired form.

The invention consists in combining feed rollers adapted to bend over the edges of a strip of sheet metal, with a series of upper and lower rollers which serve to force said bent-over edged strip forward between lateral guides, a portion of said strip together with one of said bent-over edges being thereby forced over a series of anti-friction rollers which have a gradually increasing inclination from the side edges of certain of said upper rollers whereby said portion of said strip is bent up to a position nearly at a right angle to the plane of the strip.

The invention further consists in providing a fixed guide against which the edge of said bent portion of the bent-over edged strip bears, together with a series of anti-friction rollers which are successively inclined from a position at right angles to the plane of the strip to an acutely inclined position relative thereto, so that forward movement of said strip causes said bent portion of the strip to be further bent to an acute angle to the plane of the strip.

In the accompanying drawings:

Figure 1 is a plan view of the machine, showing the passage therethrough of a strip of sheet metal, and the operation of bending the same to form the metal binding.

Fig. 2 is a longitudinal section on the line II—II of Fig. 1.

Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13, are transverse sections on correspondingly numbered section lines of Fig. 2.

Fig. 14 is a perspective view of the strip of sheet metal after it has been bent by passage through the machine.

Fig. 15 is a detail view showing the strip further bent when applied as metal binding to a suit case.

Journaled in the frame 1 of the machine, is a driving shaft 2, to which is secured a gear wheel 3. Gear wheel 3 is in mesh with a gear wheel 4, secured to a shaft 5, to which a roller 6 is secured. In mesh with gear wheel 4 is a gear wheel 7, secured to a shaft 8, to which a roller 9 is secured. Also in mesh with gear wheel 4 is a gear wheel 10, which is journaled on a fixed shaft 11. In mesh with gear wheel 10 is a gear wheel 12, secured to a shaft 13, to which a roller 14 is secured. Gear wheel 12 is in mesh with a gear wheel 15, secured to a shaft 16, to which a roller 17 is secured.

In mesh with gear wheel 3, is a gear wheel 18, secured to a shaft 19, to which a roller 20 is secured. Gear wheel 18 is in mesh with a gear wheel 21, secured to a shaft 22 to which a roller 23 is secured. Also in mesh with gear wheel 18 is a gear wheel 24 which is journaled on a fixed shaft 25. In mesh with gear wheel 24 is a gear wheel 26 secured to a shaft 27, to which is secured a roller 28. Gear wheel 26 is in mesh with a gear wheel 29, secured to a shaft 30, to which a roller 31 is secured.

It will be seen, that by means of the gearing described, rotation of the driving shaft 2 causes rotation of the pair of rollers 14 and 17, pair 6 and 9, pair 20 and 23, and pair 28 and 31. The upper roller of each pair is forced down upon the lower roller by means of springs 32, which bear against sliding boxes 33 in which the shafts of the upper rollers are journaled.

A strip of sheet metal 34 may be placed upon a horizontal support 35, and passed forward between lateral guides 36 and between the upper and lower rollers of each of the series of pairs, whereby forward movement is imparted to the strip.

The first pair of rollers 14 and 17 is provided with coöperating inclined surfaces 37 and 38, adapted for bending the edges of the

strip to obtuse angles from the strip. The second pair of rollers 6 and 9 is provided with coöperating right angular surfaces 39 and 40 adapted for further bending the edges of the strip to right angles therefrom. The third pair of rollers 20 and 23 is adapted for further bending the edges to acute angles from the strip, this being accomplished by means of inwardly inclined surfaces 41 formed on the upper roller 23. The fourth pair of rollers is adapted for further bending the edges so that they stand parallel with the strip, thereby forming the folds *a*. This is accomplished by means of cylindrical surfaces 42 formed on the upper roller 31, the folds *a* being forced between guiding shoulders 43 and 44 formed on said pair of rollers.

The strip having the edges bent in the manner described and moved forward by means of the feed rollers, passes onto a horizontal supporting bar 45; and between lateral guide bars 46 and 47 against which the two edges of the bent-over edged strip bear.

Located at short distances apart throughout the length of support 45 are rollers 48 which support the strip 34, slightly above the support 45. Each roller is secured to a shaft 49 journaled in bearings 50, which are moved upward by means of springs 51. Secured to each shaft 49 is a gear wheel 52 in mesh with a gear wheel 53 forming part of a shaft 54 which is journaled in bearings 55. Attached to each shaft 54 is a wheel 56, the periphery of which is provided with a roughened surface which bears upon the side of the strip 34 that may be passing between it and a roller 48 underneath.

Secured to each shaft 54 is a chain wheel 57 over which rides the upper run of an endless chain 58 which is driven by means of a chain wheel 59 secured to the driving shaft 2. A series of idle pulleys 60 serve to hold the chain in engagement with the teeth of chain wheels 57. One of the pulleys 60 is mounted on a slide 61, which is free to move in guides 62 and adjusted by means of a screw 63, so that slack in the chain may be taken up when necessary to secure engagement of the chain with the chain wheels 57.

It will be evident that rotation of the driving shaft 2 in the direction indicated by the arrow will cause rotation of the shaping feed-rollers, and the series of pairs of rollers 48 and 56 in a direction to cause continued forward movement of the strip 34 between the lateral guide bars 46 and 47.

As shown in Fig. 7, the side edge 64 of the first upper roller 56 stands a short distance from the bent-over edge of the strip that bears against the guide bar 46.

A series of antifriction rollers 65, 66 and 67, are placed below this portion of the strip and are inclined upward from the side edge 64 of upper roller 56, the roller 65 being slightly inclined from the plane of the strip, roller 66 being inclined more than roller 65, and roller 67 being inclined more than roller 66. While the rollers 48 and 56 move the strip forward, the portion of the strip riding on the differently inclined antifriction rollers 65, 66 and 67, is forced up against the edge 64 of the upper roller 56, thereby causing a crease to be formed in the strip, as shown in Fig. 8. The side edge 68 of the second upper roller 56 stands in line with the side edge 64 of the first upper roller 56, and a series of antifriction rollers 69, 70, 71 and 72, placed below the portion of the strip extending to guide bar 46 are successively inclined from edge 68 of the second upper roller 56 to greater angles than that of antifriction roller 67, so that as the strip is moved forward, said bent portion of the strip is further bent against the edge 68 of said second upper roller, as shown in Fig. 9. The side edge 73 of the third upper roller 56 also stands in line with the side edge 64 of the first upper roller 56, and a series of antifriction rollers 74, 75, 76 and 77, placed below said bent portion of the strip are successively inclined from edge 73 of the third upper roller 56 to greater angles than that of antifriction roller 72, so that as the strip is moved forward, said bent portion of the strip is further bent against said edge 73 of the third upper roller, until said portion of the strip stands nearly at a right angle to the edge of the strip; as shown in Fig. 10. The guide bar 46 is then provided with an overhanging part 78 against which the edge of said bent portion of the bent-over edged strip bears.

The said edges of the fourth and succeeding upper rollers 56, and the overhanging part 78 of said guide bar 46 stand removed from the bend that has been formed in the strip by means of the said edges of the first, second and third upper rollers 56. Antifriction rollers 79, 80 and 81 are placed at successive inclinations greater than that of roller 77, so that, as shown in Fig. 11, they cause said bent portion of the bent-over edge strip to stand at a right angle to the plane of the strip. The overhanging part 78 of guide bar 46 then serves to hold the bend of said bent portion of the strip toward the supporting bar 45. A series of antifriction rollers 82, 83, 84, 85, 86, 87 and 88, are inclined at angles successively more acute toward the plane of the strip, so that they cause said bent portion of the bent-over edged strip to be correspondingly bent, as shown in Figs. 12 and 13. Antifriction roller 88 is the first of a series which stand at the inclination required to cause the fold *b* to be formed in strip, thereby completing the formation of the metal binding, which is shown in Fig. 14.

In Fig. 15 is shown the manner in which

the finished product shown in Fig. 14 is bent upon a portion 89 of a suit case.

Having described our invention, what we claim is:

1. A machine of the character described, comprising mechanism for automatically bending over the edges of a strip of sheet metal; a series of upper and lower rollers which force said strip forward; the side edges of certain of said upper rollers being located a limited distance from one of said bent-over edges of said strip; a series of antifriction rollers located below the portion of said strip extending from said side edges of the upper rollers to said bent-over edges of said strip; said antifriction rollers having a gradually increasing inclination from the side edges of said upper rollers, whereby said forward movement of said strip over said antifriction rollers causes said portion of the strip to be bent up against the side edges of the upper rollers; in combination with a fixed guide against which the edge of said bent portion of the bent-over edged strip bears; and a series of antifriction rollers which are successively inclined against said portion of the strip from a position at right angles to the plane of the strip to an acutely inclined position relative thereto, so that forward movement of said strip causes said bent portion of the strip to be further bent to an acute angle to the plane of the strip.

2. A machine of the character described, comprising mechanism for automatically bending over the edges of a strip of sheet metal; lateral guides against which the edges of said bent-over edged strip bear; a series of upper and lower rollers which force said strip forward between said lateral guides; the side edge of certain of said upper rollers being located a limited distance from one of said bent-over edges of said strip; a series of antifriction rollers located below the portion of said strip extending from said edges of said upper rollers to said bent-over edge of said strip; said antifriction rollers being successively inclined from a small to a greater angle from said side edges of said upper rollers, so that the last roller of the series stands nearly at right angles to the plane of the strip; whereby forward movement of said strip over said antifriction rollers causes said portion of the strip to be bent up against said side edges of said upper rollers so that it stands nearly at a right angle to the plane of the strip; in combination with a fixed guide against which the edge of said bent portion of the bent-over edged strip bears; and a series of antifriction rollers which are successively inclined against said bent portion of the strip from a position at right angles to the plane of the strip to an acutely inclined position relative thereto, so that forward movement of said strip causes said bent portion of the strip to be further bent to an acute angle to the plane of the strip.

3. A machine of the character described, comprising mechanism for automatically bending over the edges of a strip of sheet metal; a series of upper and lower rollers which impart forward movement to said strip; the side edge of certain of said upper rollers being located a limited distance from one of said bent-over edges of said strip; a series of antifriction rollers located below the portion of said strip extending from said side edge of said upper rollers to said bent-over edge of said strip; said antifriction rollers being successively inclined from a small to a greater angle from said side edges of said upper rollers, so that the last roller of the series stands nearly at right angles to the plane of the strip, whereby movement of said strip over said antifriction rollers causes said portion of the strip to be bent up against said side edges of said upper rollers, so that it stands nearly at right angles to the plane of the strip; in combination with a fixed guide against which the edges of said bent portion of the bent-over edged strip bears; and a series of antifriction rollers which are successively inclined against said bent portion of the strip from a position at right angles to the plane of the strip to an acutely inclined position relative thereto, so that forward movement of said strip causes said bent portion of the strip to be further bent to an acute angle to the plane of the strip.

4. A machine of the character described, comprising mechanism for automatically bending over the edges of a strip of sheet metal; lateral guides against which the edges of said bent-over edged strip bear; a series of upper and lower rollers which force said strip forward between said lateral guides; the said edge of certain of said upper rollers being located a limited distance from one of said bent-over edges of said strip; a series of antifriction rollers located below the portion of said strip extending from said side edge of said upper rollers to said bent over edge of said strip; certain of said antifriction rollers being successively inclined from a small to a greater angle from said side edge of one of said upper rollers; other of said antifriction rollers being inclined successively to a greater angle from said side edge of the second of said upper rollers; and other of said antifriction rollers being inclined successively greater from said side edges of the third of said upper rollers, so that said antifriction rollers stand nearly at right angles to the plane of the strip, whereby forward movement of said strip causes said portion of the strip riding over said inclined antifriction rollers to be bent nearly to a right angle to the plane of the

strip; in combination with a fixed guide against which the edge of said bent portion of the bent-over edged strip bears; and a series of antifriction rollers which are successively inclined against said bent portion of the strip from a position at right angles to the plane of the strip to an acutely inclined position relative thereto, so that forward movement of said strip causes said bent portion of the strip to be further bent to an acute angle to the plane of the strip.

Signed at New York city, in the county of New York and State of New York, this 25th day of July, A. D. 1918.

ABRAHAM KIPNISS.
MAX PAUL NEUMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."