H. E. WHITE.

METAL EXPANDING MACHINE.

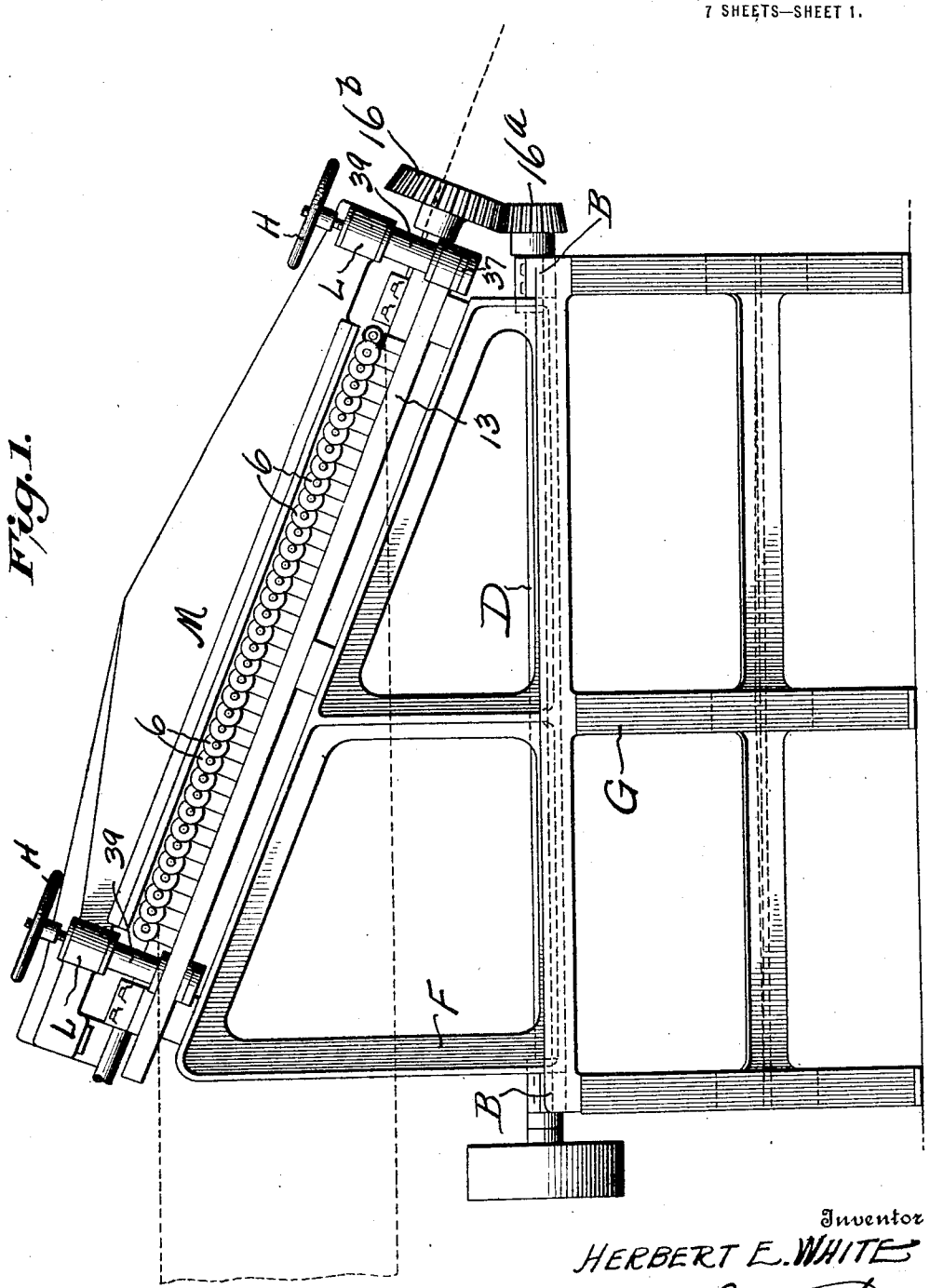
APPLICATION FILED APR. 27, 1920.

1,411,543.

Patented Apr. 4, 1922.

7 SHEETS—SHEET 1.

Fig. 1.



Inventor

HERBERT E. WHITE

Witnesses

Chas. L. Griesbauer

By

Attorney

H. E. WHITE.

METAL EXPANDING MACHINE.

APPLICATION FILED APR. 27, 1920.

1,411,543.

Patented Apr. 4, 1922.

7 SHEETS—SHEET 2.

Fig. 4

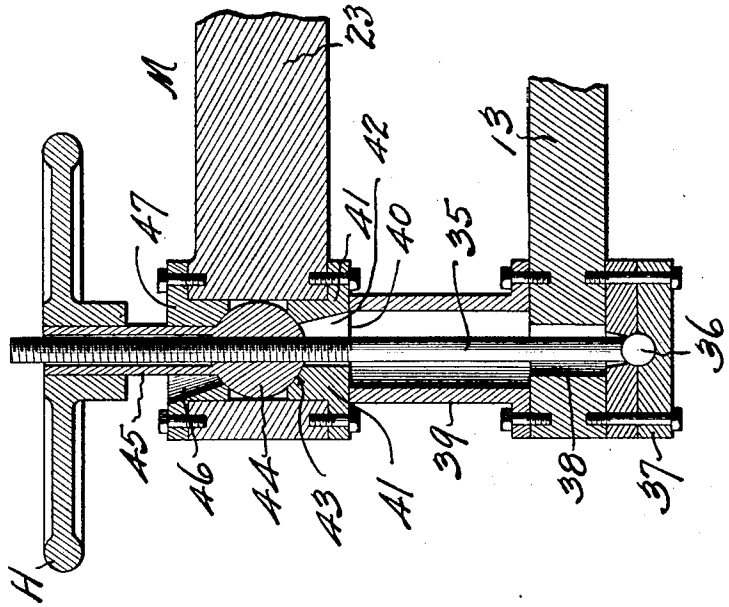
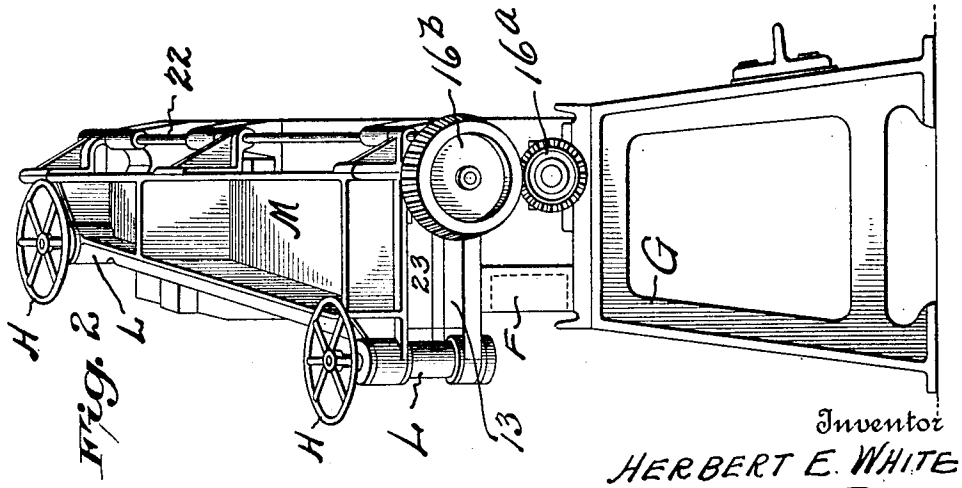


Fig. 2



Inventor

HERBERT E. WHITE

WITNESSES:-

By

Attorney

H. E. WHITE.

METAL EXPANDING MACHINE.

APPLICATION FILED APR. 27, 1920.

1,411,543.

Patented Apr. 4, 1922.

7 SHEETS—SHEET 3.

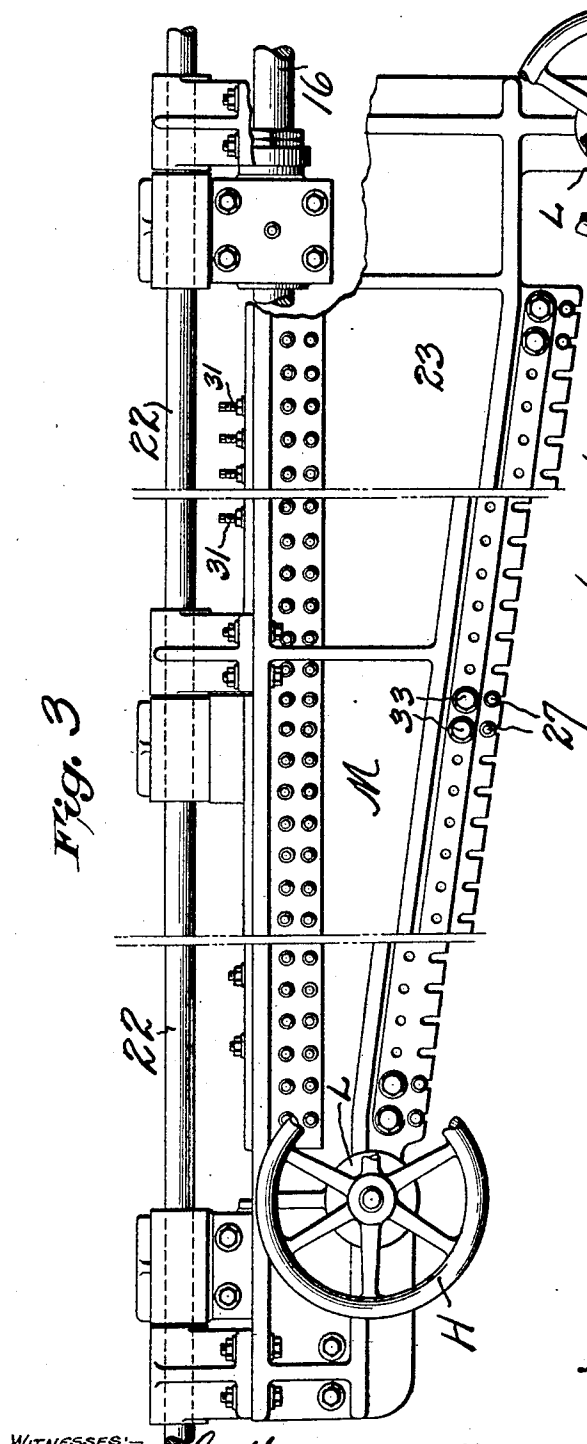


Fig. 3

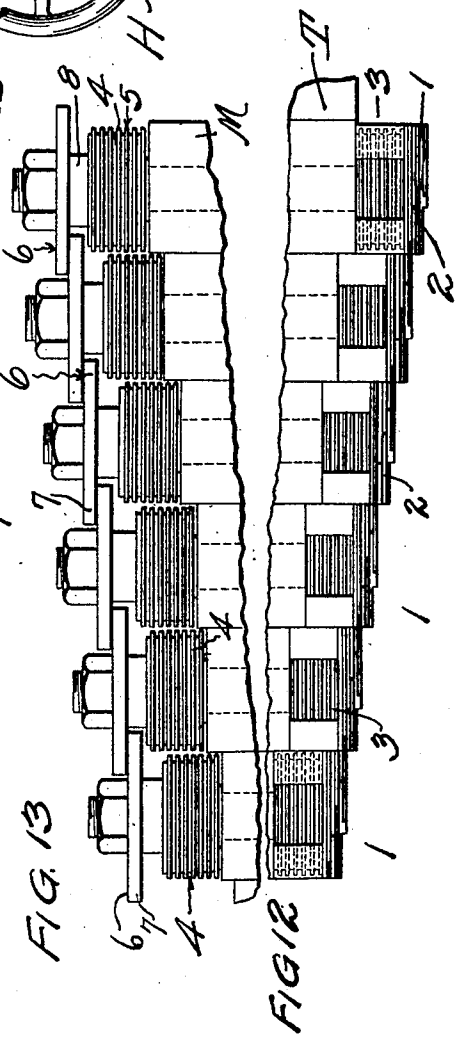


FIG. 13

FIG 12

Inventor

HERBERT E. WHITE

By

Attorney

WITNESSES:-

Chas. L. Griestauer

H. E. WHITE.

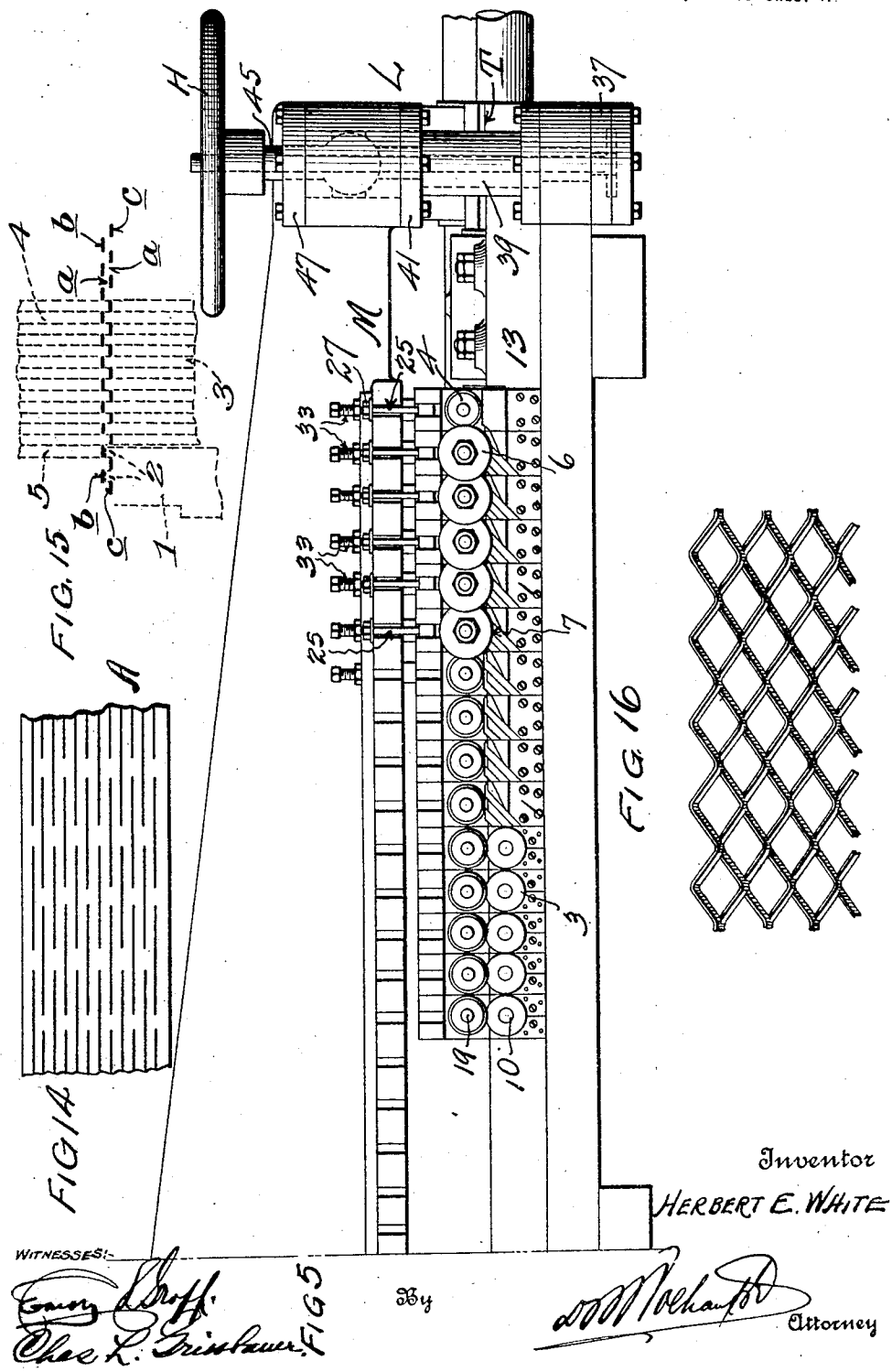
METAL EXPANDING MACHINE.

APPLICATION FILED APR. 27, 1920.

1,411,543.

Patented Apr. 4, 1922.

7 SHEETS—SHEET 4.



Inventor

HERBERT E. WHITE

WITNESSES:

Emma Schaff

Chas L. Grisbauer

By

Attorney

H. E. WHITE.

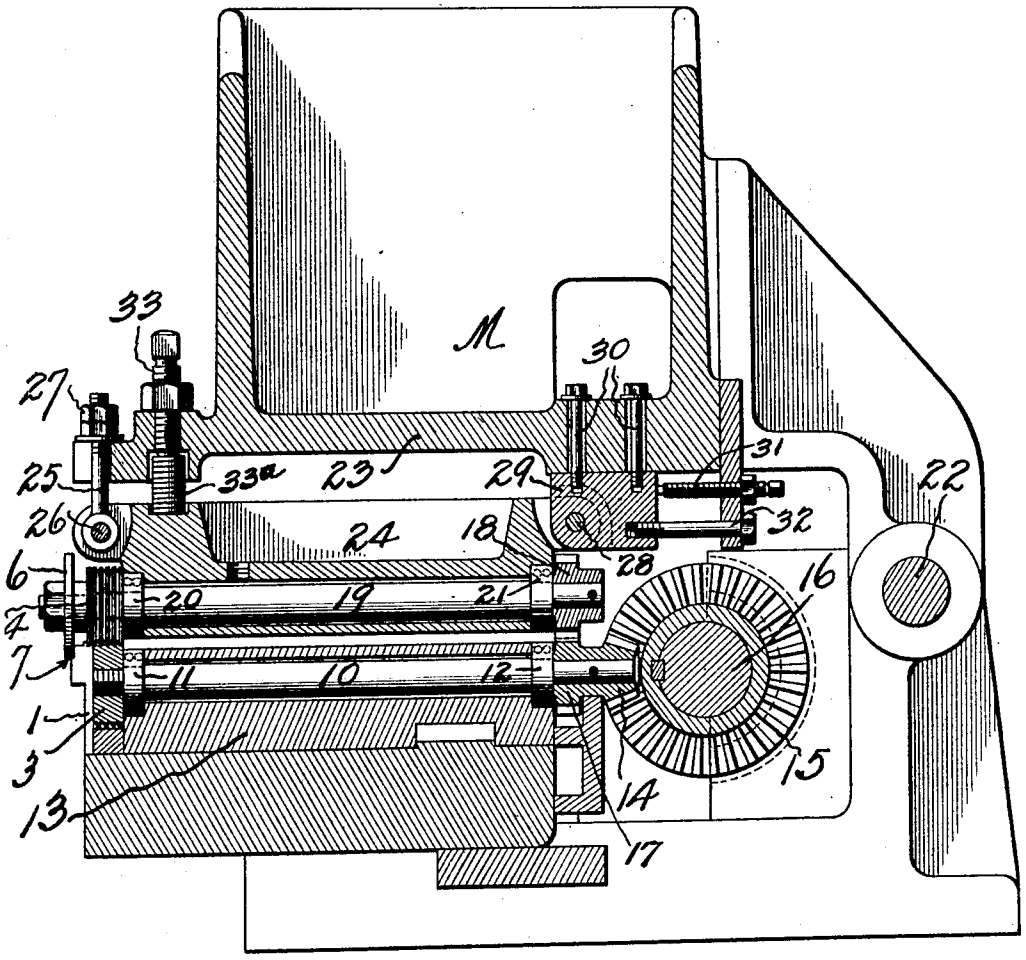
METAL EXPANDING MACHINE.

APPLICATION FILED APR. 27, 1920.

1,411,543. Patented Apr. 4, 1922.

7 SHEETS—SHEET 5.

Fig. 6



Witness
Emory
Chas. K. Griesbauer

Inventor
HERBERT E. WHITE

By

Attorney

H. E. WHITE.

METAL EXPANDING MACHINE.

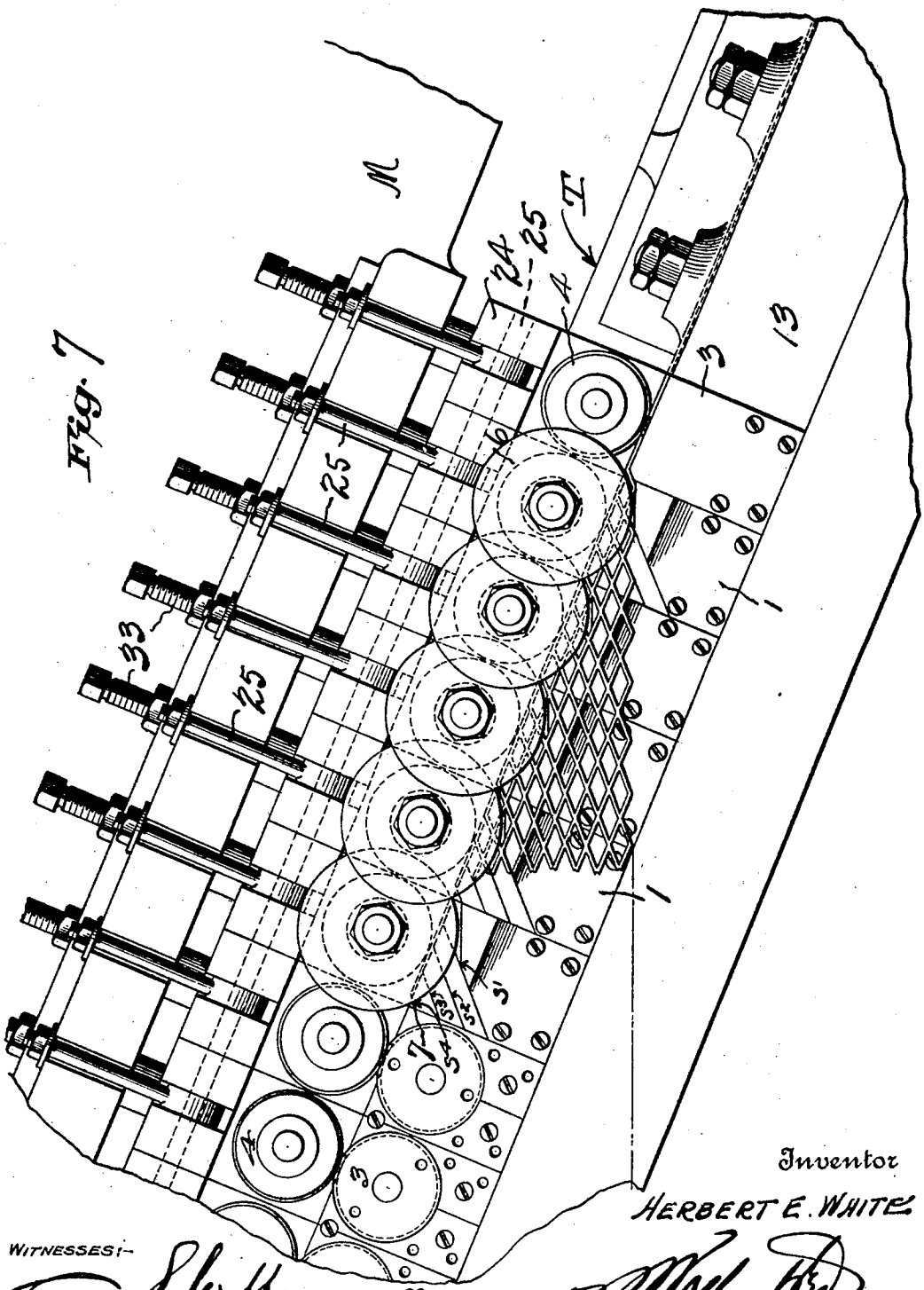
APPLICATION FILED APR. 27, 1920.

1,411,543.

Patented Apr. 4, 1922.

7 SHEETS—SHEET 6.

Fig. 7



Inventor

HERBERT E. WHITE

WITNESSES:-

Chas. L. Griesbauer

By

Attorney

H. E. WHITE.

METAL EXPANDING MACHINE.

APPLICATION FILED APR. 27, 1920.

1,411,543. Patented Apr. 4, 1922.

7 SHEETS—SHEET 7.

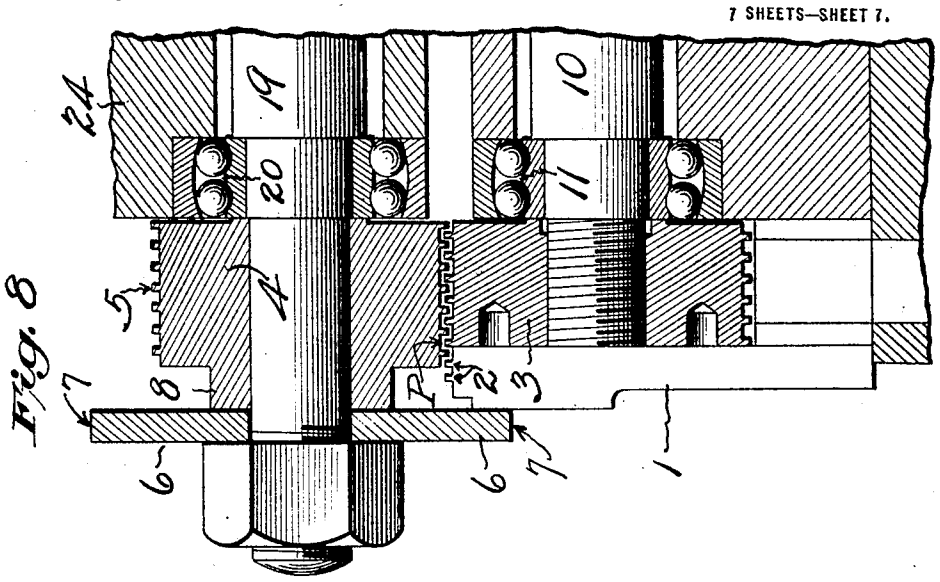


Fig. 8

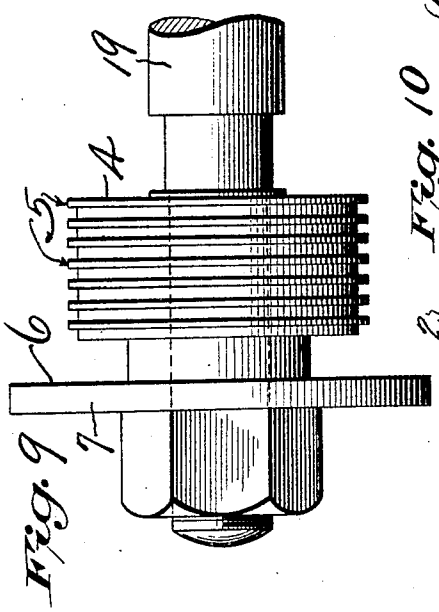


Fig. 9

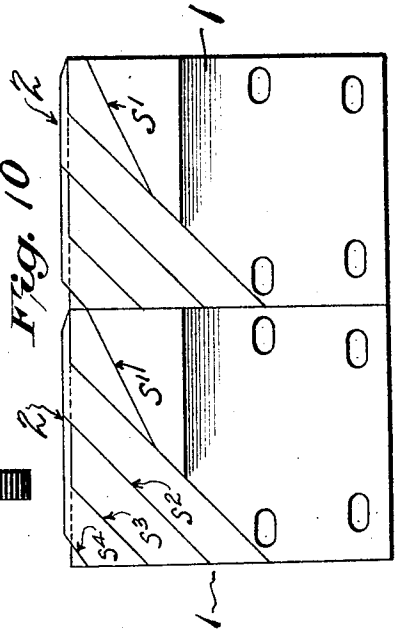


Fig. 10

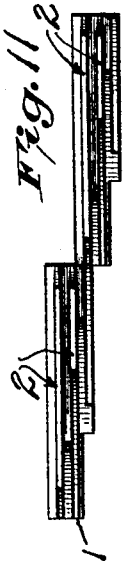


Fig. 11

Inventor

HERBERT E. WHITE

By

Attorney

Witnesses:-

Chas. K. Griesbauer

UNITED STATES PATENT OFFICE.

HERBERT E. WHITE, OF YOUNGSTOWN, OHIO, ASSIGNOR TO THE TRUSCON STEEL COMPANY, OF YOUNGSTOWN, OHIO, A CORPORATION OF MICHIGAN.

METAL-EXPANDING MACHINE.

1,411,543. Specification of Letters Patent. **Patented Apr. 4, 1922.**

Application filed April 27, 1920. Serial No. 377,016.

To all whom it may concern:

Be it known that I, HERBERT E. WHITE, citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Metal-Expanding Machines, of which the following is a specification.

This invention relates to an improvement in machines for making expanded sheet metal fabric.

Primarily, the invention has in view a novel and practical organization of parts constituting an improved feeding and expanding means, serving to expeditiously and accurately handle a previously slitted metal sheet, and to uniformly expand the same into the final open-mesh form, these results being accomplished with such facility as to satisfactorily meet the desirable manufacturing requirements of speed and excellence of product.

A further object of the invention is to so construct and arrange the improved feed and expanding means that the slitted metal sheet may be fed forward in a flat plane upon a table, and in such a manner that it will be definitely and positively interlocked with the feeding members, thereby being held to a fixed path of movement and prevented from lateral slipping or displacement, thus permitting speed and accuracy in the expanding operation. Also the invention provides a novel structural unit, consolidating the feeding and expanding means into what may be termed an expander unit which is susceptible of duplication to any desired extent according to the width of the sheet to be expanded, and at the same time greatly facilitates assembly and replacements.

Another object of the invention is to simplify the expanding instrumentalities, while also obtaining accuracy and speed in functioning, and further, to so arrange the same with reference to the feeding elements that the active expanding elements may be advantageously located along the front edge of the feed table, entirely accessible and so disposed as to deliver the expanded material in a downward direction onto the truck or floor.

A still further object of the invention is to provide a machine in which all the various operating parts are readily accessible for adjustment and repairs and which may be operated with a minimum expenditure of power.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a side elevation of the present machine.

Figure 2 is an end elevation of the machine.

Figure 3 is a top plan view of the machine.

Figure 4 is an enlarged detail sectional view of the means for raising and lowering the upper jaw member.

Figure 5 is an enlarged detail side elevation of the machine.

Figure 6 is a detail vertical sectional view through the machine illustrating more in detail the relation of one of the expander units to its supporting and driving instrumentalities.

Figure 7 is an enlarged detail elevation of a group of the expander units clearly showing the pusher disks and the dies.

Figure 8 is a detail vertical sectional view through the feed roll end of one of the expander units.

Figure 9 is a detail elevation of the upper feed roll of the expander unit and the pusher disk.

Figure 10 is an enlarged detail elevation of a pair of dies clearly showing the abutment shoulders thereon.

Figure 11 is a top plan view of the dies shown in Figure 10.

Figure 12 is a top plan view of a portion of the edge of the feed table showing a series of the die members or die plates and the adjacent lower feed rolls in operative position.

Figure 13 shows the upper complemental parts which are adapted to immediately overly the parts shown in Figure 12; that is

Figure 13 is a bottom plan view of a portion of that edge of the upper jaw member which carries the upper feed rolls and the pusher disks.

Figure 14 is a plan view of the form of slitted blank upon which the machine operates.

Figure 15 is a diagrammatic cross sectional view of the said blank showing the raised and depressed strands, producing the grooves and illustrating in dotted lines the engagement of the ribs of the feed rolls with said sheet.

Figure 16 is a plan view of a section of the finished product.

Similar reference numerals designate corresponding parts throughout the several figures of the drawings.

The present machine is designed to operate upon a previously slitted metal sheet, designated A, causing the same to be expanded to any predetermined extent by spreading apart the strands into diamond-mesh or other conventional forms. It is preferred, however, to use a slitted blank in which the strands upon opposite sides of each slit are alternately raised and depressed, resulting in making a grooved formation of slitted sheet. Such a slitted blank may be made by any suitable machine, as for example, by the machine of the patent of Curtis No. 671,915 dated April 9, 1901, and from the illustration in Figure 15 of the drawings of the present case it will be seen that the said slitted blank is characterized by the longitudinal grooves, *a*, lying between the rows of raised strands *b*, at one side of the sheet, and between the rows of depressed strands, *c*, at the opposite side of the sheet. Thus, the slitted blank has the grooves at both sides thereof, and this construction of blank is adapted to mechanically cooperate with the feeding means of the machine in the manner herein set forth, for the purpose indicated.

Referring first to the principal primary features of the machine it is to be observed that the slitted metal sheet, having the grooved characteristic referred to is fed while lying in a flat position over an upwardly inclined table T, in such a manner that the expander units arranged at one edge of the table in a line oblique to the line of feed, progressively engage the slitted sheet to open the same into meshes and produce the desired metal fabric. These expander units are similar in construction and involve the same features and relation to cooperating parts. Briefly, each expander unit essentially comprises a stationary die and a pusher member cooperating therewith, in combination with feeding rolls so constructed as to have a registering and interlocking engagement with the grooved slitted metal sheet, thereby insuring a positive feed of the sheet through the machine and at the same time compelling a straight movement without the possibility of lateral deflection.

It will, therefore be apparent that a distinctive feature of the present invention is the provision of sheet interlocking means for the purpose of engaging with the grooved slitted sheet to prevent lateral shifting or movement during the feeding operation. This means may consist of the ribbed and grooved feeding rolls and the ribbed or ridged formation of the die tops as shown in the present case, or may be also effectively carried out by any suitable and convenient rearrangement or combination of these features suitable for the purpose.

Referring particularly to the details of construction of the parts comprising each expander unit it will be observed from Figures 7 to 11 inclusive that the same essentially includes a die member or plate 1 whose outer active face is slanting or oblique and has formed thereon a plurality of inclined abutment shoulders S^1 to S^4 arranged in progressively stepped relation transversely of the die plate, and in addition to the said shoulders the die member or die plate is provided at its upper edge with a plurality of upstanding guiding ribs 2 adapted to engage the grooves at the underside of the slitted sheet A as will hereinafter more fully appear. Furthermore, it will be observed that the series of inclined shoulders on the slanting or oblique faces of each die member or die plate extend forwardly and downwardly at an appropriate angle which is determined by the amount of expansion desired.

For the purpose of advancing or feeding the grooved slitted sheet A over the die and to the pusher member the cooperating feed rolls 3 and 4 are employed, the same being of ribbed construction. That is, each feed roll is provided upon its periphery with a series of parallel annular ribs 5 of a width fractionally less than the width of the grooves, *a*, in the slitted blank. These ribs 5 interlock with said grooves of the blank to thereby compel a straight movement thereof by preventing lateral displacement, and at the same time frictionally gripping the blank with sufficient firmness to positively propel the same to the pusher members of the expander units.

The upper feed roll has mounted coaxially therewith the pusher member which in the present case preferably consists of a disk, wheel, or roll having a plain flat periphery 7 against which the slitted blanks are pushed by the feeding means. The said disk or wheel 6 abuts against the spacing collar portion 8 of the upper feed roll 4 to enable its periphery to clear the outer face of the die with the exception of the abutment shoulder S^1 with which it cooperates. By reason of

this arrangement it will be apparent that when the grooved slitted sheet is passed over the die by the cooperation of the feed rolls 3 and 4, the outer strand of the slitted fabric, assuming that the unit referred to is the first unit of the series, will be fed to the periphery 7 of the disk 6 and held in guiding engagement between the same and the shoulder S^1. As the disk 6 rotates with the feed roll 4 it pushes the particular strand which meets it downward over the abutment shoulder S^1, the upstanding ribs 2 of the die meanwhile cooperating with a groove in the slitted blank to prevent the blank from being pulled out from between the feed rolls and the continued operation of the feed rolls in feeding the slitted fabric over the top of the die and to the pusher disk will cause the opening up of the strands contiguous to the first strand as the same are progressively released for deflection over the upper corners of the successive shoulders of the die member 1.

To carry this expanding operation into effect across the entire width of the blank the dies of the individual expander units are arranged successively one in advance of the other, but having a progressively inwardly offset relation as clearly indicated in Figure 10 of the drawings, whereby the entire series of the die members or plates will be arranged at the edge of the table along a line oblique to the line of blank feed. At the same time the die members or plates are disposed in matching relation, that is, with the immediate adjacent abutment shoulders at their adjoining edges in registration and forming a continuation of each other, thereby providing in effect a continuous regularity of the inclined abutment shoulders along the stepped edge of the feed table to which the die members or plates are fitted. Thus, it will be apparent that the entire series of units are intended to be arranged in a line generally oblique to the line of blank feed to enable the machine to progressively expand the entire slitted sheet or blank as it is moved through the machine by the feed rolls of the expander units.

It will now be seen that the novel expander units may be utilized in any number desired according to the width of the slitted blank which is to be expanded into open-mesh form. And, since these units function in synchronism to obtain uniform operating conditions not only is the construction of each the same, but the operating means therefor is also alike throughout the machine.

Referring particularly to the operating means for the several expander units, each of which includes the feed rolls, such operating means for each unit may include the main driving spindle 10 which carries the lower feed roll 3 at one end and is suitably journalled as indicated at 11 and 12 in the stationary bed 13 of the machine. The end of the spindle 10 opposite the lower feed roll 3 is fitted with a pinion unit which may include the bevel pinion 14 for meshing with bevel gear 15 on the main driving shaft 16 and also the driving pinion 17 that engages with pinion 18 on spindle 19 which carries the upper feed roll 4 and the deflector disk 6. The bearings 20 and 21 for the upper feed roll are, like the bearings 11 and 12, preferably of the ball-bearing type so that a minimum amount of friction only is encountered in the operation of the numerous units.

From Figure 6 of the drawings it will be observed that another novel and distinctive feature of the machine resides in the provision of the upper jaw member M which carries the upper half of the expander units, namely the driven spindles 19 and the feed rolls 4 and pusher disk 6. This upper jaw member is preferably hinged at one side of the machine as indicated at 22 and has suspended from the body 23 thereof a plurality of relatively adjustable carried bars 24 which support and carry the upper spindles 19 of the expander units in such a manner that the same may be accurately adjusted with reference to the instrumentalities carried by the stationary bed of the machine. Thus, the mounting of the carrier bar 24 enables the upper feed rolls to be accurately adjusted to engage with the grooves of the slitted blank in cooperation with the lower feed rolls 3 to insure proper feeding of the blank through the machine.

Referring more particularly to the means for adjusting the spindle carrying bar 24 for each unit it will be observed that the same is supported at the exposed end by a suspension bolt 25 which engages as at 26 with the said bar 24 and has a bearing engagement with the body 23 of the jaw through the medium of the nut and washer elements 27 carried by the stem of the bolt. Thus this bolt 25 prevents the contacting of the feed rolls when there is no blank in the machine. The opposite side of the carrier frame is supported as at 28 in the adjustment block 29 which is suspended from the body of the jaw by the vertically disposed bolts 30, while for the purpose of adjusting the carrier 24 transversely in either direction the oppositely working set screw elements 31 and 32 may be employed. Also, for the purpose of maintaining the carrier bar 24 of each individual unit in proper adjusted relation at its outer or exposed side a relatively large set screw element 33 is employed to work in opposition to the supporting bolt 25, a spring 33^a being interposed between 24 and the set screw 33 to provide an elastic engagement. After the carrier bar has been lifted to proper elevation to provide the proper pass

between the feed rolls 3 and 4 the set screws 33 may be turned until sufficient tension is exerted through spring 33ª to grip the blank passing between the feed rolls, and thereby enable the latter to positively engage and grip the same under all conditions of use.

By reason of the means for vertically and laterally adjusting the carrier bars 24 the upper feed rolls 4 which are carried by the spindles 19 may be accurately adjusted with reference to the lower feed rolls to produce a feed pass P of the proper dimensions to accommodate the slitted blank. Furthermore, the individual carrier bars 24 which constitute a part of each expander unit are carried upon the body 23 of the upper jaw member which is hinged as at 22, whereby the entire series of carrier bars may be lifted as a unit by elevating the body of the jaw on the hinge 22. This not only renders the lower feed rolls and dies of the several units readily accessible, but also permits of ready access to the main driving shaft 16 and the bevel driving gears 15 which mesh with the pinions 14 on the lower spindles 10.

To facilitate the raising and lowering of the upper jaw member on the hinge 22 the machine is provided at each end with a raising and lowering device L shown in detail in Figure 4 of the drawings. These devices may be operated conveniently by manipulating the hand wheels H and referring to the details of construction thereof it will be observed from the figure referred to that each device essentially comprises a T-bolt 35 whose head 36 is arranged in a suitable supporting block 37 secured to the bed frame 13 as shown. The shank of the said T-bolt 35 extends upwardly through the opening 38 in the bed frame which is large enough to permit of the swinging of the shank of the bolt through a relatively limited arc of a circle, and also projects through the housing or casing 39 whose upper edge 40 constitutes a stop or abutment for the bushing element 41 carried by the body 23 of the upper jaw member M. Said bushing 41 is provided with the flared opening 42 for receiving the threaded end of the bolt shank 35, and is also formed with a socket 43 for accommodating a ball joint member 44 having the upwardly extending sleeve extension 45 which carries the hand wheel H previously referred to and is in threaded engagement with the upper end of the bolt shank 35. The said sleeve 45 of the ball joint member 44 also projects through the flared opening 46 of the bushing 47 carried by the upper side of the body 23 of the jaw member and cooperates with the lower bushing 41 to hold the ball joint 44 securely in position.

With the arrangement described it will be apparent that when the hand wheel H is rotated in the proper direction the ball end 44 of the sleeve 45 will also rotate but being held in a fixed position by the bushings 40 and 47 will cause the movement of the jaw 23 upwardly due to the threaded engagement between the sleeve and the upper end of the bolt shank. Obviously, the reverse rotation of the hand wheel will lower the upper jaw member. The raising and lowering devices L therefore provide convenient means for manipulating the upper jaw member M on the hinge 22.

The bed 13 of the machine which is preferably disposed in an upwardly inclined position as clearly shown in Figure 1 of the drawings includes a suitable frame F mounted upon a table or other support G which may conveniently carry the journal bearings B of the main driving shaft D connected with any suitable and convenient source of power and carrying at one end thereof a suitable gear 16ª for meshing with the gear 16ᵇ carried by the main driving shaft 16.

Having described the essential features of the invention and the preferable manner of combining the same in an organized machine to carry out the particular expanding operation, it will now be understood that various changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

I claim:—

1. A machine for expanding a previously slitted sheet including an expander having sheet feeding means and a die, said die being provided with means registering and interlocking with the slitted blank to prevent lateral movement thereof.

2. A machine for expanding a previously slitted sheet including an expander having sheet feeding means and a stationary die, said feeding means and die having a registering interlocking engagement with the slitted blank.

3. A metal expanding machine including an expander unit having a stationary die provided with means for interlocking with the slitted blank and also with a series of inclined steps, and a pusher member for coacting therewith.

4. A metal expanding machine including an expander unit comprising a die having blank guiding means and stepped shoulders, a pusher disk, and means for forcing the metal to be expanded between the periphery of said disk and one of the shoulders on the die.

5. A metal expanding machine including a stationary die, a pusher roll arranged in fixed relation to the die, and means adapted to interlock with the slitted sheet and move the same between the roll and the die.

6. A metal expanding machine including a stationary die having sheet guiding ribs

and inclined shoulders, a pusher disk arranged in fixed relation to the die, and means adapted to have an interlocking engagement with the slitted sheet and move the same between the periphery of the disk and one of the die shoulders.

7. A metal expanding machine including a stationary die having upstanding guide ribs at its top edges and an oblique face with inclined guiding shoulders thereon, a single pusher member arranged in fixed relation to the die, and means for moving a slitted sheet between said single pusher member and the die shoulders.

8. A metal expanding machine including a stationary die having upstanding guide ribs at its top edges and an oblique face formed with stepped shoulders, a single pusher member arranged in fixed relation to the die, and means for moving a slitted sheet between said single pusher and the die shoulders, said means being adapted to interlock with the blank to prevent lateral movement thereof.

9. A machine for expanding slitted metal sheets having a series of expander units, each unit including feeding rolls for the sheet, a die having guiding ribs at its top edge for engaging with the grooved slitted metal blank and also having a plurality of stepped abutment shoulders, and a pusher disk carried by one of the feed rolls and overlying the said die.

10. A machine for expanding slitted metal sheets having a series of expander units, each unit including a feed roll adapted to have an interlocking guiding engagement with the slitted metal blank, a die having guiding ribs at its top edge for also engaging with the slitted metal blank, and a disk overlying the expander die.

11. A machine for expanding a previously slitted sheet including a series of progressively arranged expanding units, each of the said units including expanding means, and a feed roll adapted to have a registering interlocking guiding and feeding engagement with the slitted metal blank.

12. A machine for expanding a previously slitted sheet including a series of progressively arranged expander units, each of the said units having expanding means, and a pair of feed rolls which are adapted to have a registering interlocking guiding and feeding engagement with the slitted metal blank.

13. A metal expanding machine including a series of stationary units arranged in a line oblique to the line of feed for the material and having upstanding sheet engaging and guiding ribs parallel to the line of feed and adapted to have a registering interlocking engagement with the slitted sheet, a pusher member for each die unit, and feeding means for the sheet.

14. A metal expanding machine including a die unit having shoulders on its face and at one edge provided with guide elements adapted to have a registering interlocking engagement with a slitted sheet, means to push the slitted sheet over the shoulders of the die unit, and feeding means.

15. A metal expanding machine including a die member provided upon one face with inclined abutment shoulders and upon one edge with guiding grooves, a pusher disk cooperating with the shouldered face of the die member and feeding means for feeding a grooved slitted sheet over said guide ribs and against said pusher disk.

16. A metal expanding machine including a die member provided upon one face with inclined abutment shoulders and upon one edge with guiding grooves, a disk cooperating with the shouldered face of the die member, and feeding means having an interlocking engagement with a grooved slitted sheet and arranged to move said sheet over said guide ribs and against said disk.

17. An expanding machine including an upwardly inclined sheet supporting and feeding table and expanding means arranged at the edge of the table and extending oblique to the line of feed of the sheet.

18. An expanding machine including an upwardly inclined support and feed table having an edge portion running oblique to the line of feed of the machine, expanding means arranged along said oblique edge of the table, and feeding means for feeding the sheet flat upon the table and causing it to be delivered from the expanding means with the edges parallel to the floor.

19. A machine for expanding previously slitted metal sheets including an inclined sheet supporting and feeding table, and a series of expander units arranged diagonally to the line of feed and each of said units including expanding means, and feed elements adapted to have a registering interlocking engagement with the slitted metal sheet.

20. A machine for expanding previously slitted metal sheets including a series of expander units arranged to progressively operate upon a slitted metal sheet in a line diagonal to the line of feed and each of said units including expanding means, and sheet feeding elements adapted to have a registering guiding and interlocking feeding engagement with the slitted metal sheet.

21. A machine for expanding previously slitted metal sheets including a series of expander units arranged in inwardly offset relation, the offsetting being in a line diagonal to the line of feed, and each of said units including expanding means, and feed-

ing elements adapted to have a registering guiding engagement with the slitted metal sheet.

22. A machine for expanding slitted metal sheets including a series of expander units, each unit including a pair of feed rolls adapted to have an interlocking guiding engagement with the slitted metal blank, an expander die, and a disk cooperating with the die.

23. A machine for expanding slitted metal sheets including a series of expander units, each unit including a pair of feed rolls adapted to have an interlocking guiding feeding engagement with the slitted metal blank, a die having guiding ribs for engaging with the slitted metal blank and also having a plurality of stepped abutment shoulders and a disk arranged to cooperate with one of the abutment shoulders of the expander die.

24. A machine for expanding slitted metal sheets including a series of expander units, each unit including a pair of feed rolls adapted to have an interlocking guiding feeding engagement with the slitted metal blank, a die having guiding ribs for engaging with the slitted metal blank and also having a plurality of stepped abutment shoulders and a disk carried with the upper feed roll and overlying the expander die.

25. A machine for expanding slitted metal sheets including a pair of feeding rolls having ribbed peripheries for interlocking with the slitted metal sheet, a die arranged adjacent the lower feed roll and having guide ribs on its upper edge for engaging with the slitted metal blank and also having a series of inclined stepped abutment shoulders on the exposed face thereof, a disk arranged concentric with the upper feed roll and clearing all of the stepped shoulders on the die.

26. A machine for expanding slitted metal sheets including a series of expander units, each unit including a pair of feed rolls adapted to have an interlocking feeding and guiding engagement with the slitted metal blank, a die having the face thereof provided with a plurality of inclined stepped shoulders, a disk mounted coaxially with the upper feed roll and having its periphery arranged to cooperate with the initial abutment shoulder on the die of the unit, and the disk of the next succeeding unit being arranged in overlapping relation to the disk of the preceding unit and behind the same, and the disk of the said next succeeding unit also cooperating with the initial abutment shoulder of the die of that unit.

27. A metal expanding machine including expanding means for a grooved slitted sheet, feeding means including upper and lower ribbed feed rolls providing therebetween a channelled feed pass, and means for adjusting said pass both vertically and laterally.

28. A machine for expanding slitted metal sheets comprising a plurality of expander units including feed rolls having an interlocking feeding engagement with the slitted metal sheet, die abutments arranged in progressively stepped relation throughout the series of units, and rotating elements cooperating with certain of the abutment shoulders on the dies to engage the slitted metal blank at spaced intervals.

29. A machine for expanding slitted metal sheets comprising a feeding table for supporting the slitted metal blank, a plurality of expander units arranged diagonally of the table, the said units including a lower feed roll journalled in the table, an upper feed roll cooperating with the lower feed roll, a hinged jaw member carrying the upper feed roll, and means for raising and lowering the said jaw member.

30. A machine for expanding slitted sheet metal comprising a feed table for supporting the slitted metal blank, a plurality of stationary dies arranged diagonally at one edge of the table, a plurality of lower feed rolls journalled in the table, a plurality of upper feed rolls cooperating with the lower feed rolls and carrying discs which coact with said dies, a hinged jaw member carrying the said upper feed rolls and deflectors, and means for raising and lowering the said jaw member.

31. A machine for expanding slitted metal sheets comprising a relatively stationary bed and an upper adjustable hinged jaw member, and a plurality of expander units each including a lower feed roll, a shaft for operating the same journalled in the said bed member, an upper feed roll cooperating with the lower feed roll, a carrier bar, a shaft journalled in the carrier bar and having the upper feed roll mounted thereon, a pusher disk carried by the shaft on which the upper feed roll is mounted, and means for adjusting the carrier bar which supports the upper feed roll to bring the latter in proper registering relation with the lower feed roll and die, said means including a suspension bolt and said screw working in opposition to said bolt, and a suspension block capable of being adjusted both vertically and horizontally.

32. A machine for expanding slitted metal sheets comprising a relatively stationary bed, an upper adjustable hinge jaw member, feeding and expanding instrumentalities carried by the bed and jaw member, and a raising and lowering device for said jaw member comprising a post element having a relatively adjustable bearing in the bed of the machine, and hand operated means carried by the jaw and having an operative engagement with said post.

33. A machine for expanding slitted metal sheets comprising a relatively stationary bed, an upper adjustable hinge jaw member, feeding and expanding instrumentalities carried by the bed and jaw member, and a raising and lowering device for said jaw member comprising a post having a self-adjusting bearing in the bed and provided at its upper end with threads, a sleeve element having a self-adjusting bearing in the jaw member and engaging with the threads of the said post, and means carried by the sleeve for manipulating the same.

34. A machine for expanding slitted metal sheets comprising a relatively stationary bed, an upper adjustable hinge jaw member, feeding and expanding instrumentalities carried by the bed and jaw member, and a raising and lowering device for said jaw member comprising a T-bolt having the head thereof seated in a bearing socket in the bed of the machine and having its upper portion provided with threads, a manipulating device carried by the jaw member and comprising a pair of socket forming bushings, a sleeve having interior threads for engaging with the threads on the bolt, and a ball end bearing formed on the sleeve for engaging in the socket provided by said bushings, and a manipulating wheel carried by the sleeve.

35. A machine for expanding slitted metal blanks having a series of expanding units, each unit including a feed roll, a die having guiding ribs at its top edge for engaging with the slitted metal blank, and a pusher disk overlying the unit.

36. A machine for expanding slitted metal blanks comprising feed rolls for advancing the slitted blank, disks for displacing the strands from their original plane, and a support with a ribbed surface for engaging the blank to prevent lateral slipping.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HERBERT E. WHITE.

Witnesses:
E. HEBER,
W. F. WIDMER.