

Feb. 17, 1931.

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1,792,829

AIRPLANE COVERING MATERIAL AND METHOD OF MAKING SAME

Filed Nov. 26, 1929

2 Sheets-Sheet 1

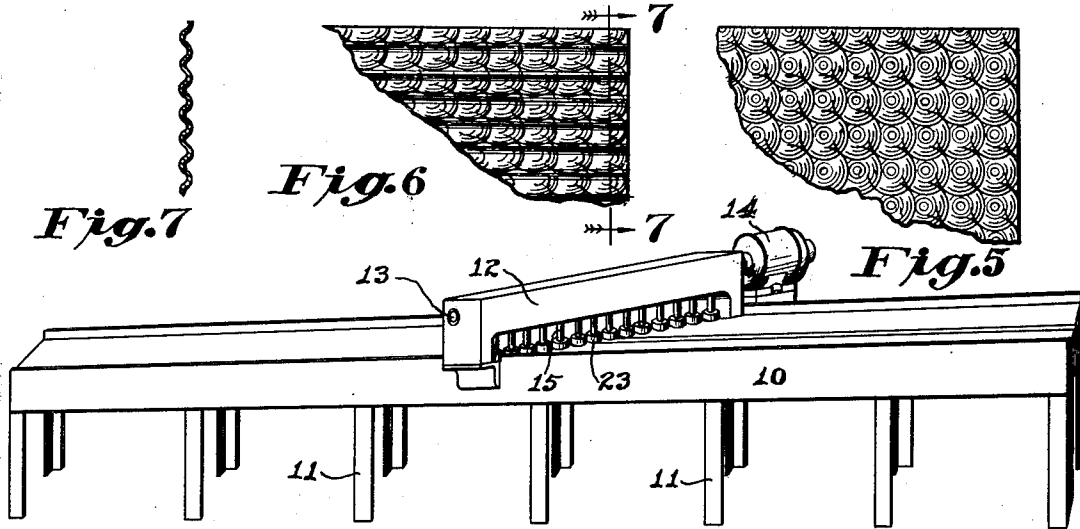


Fig. 1

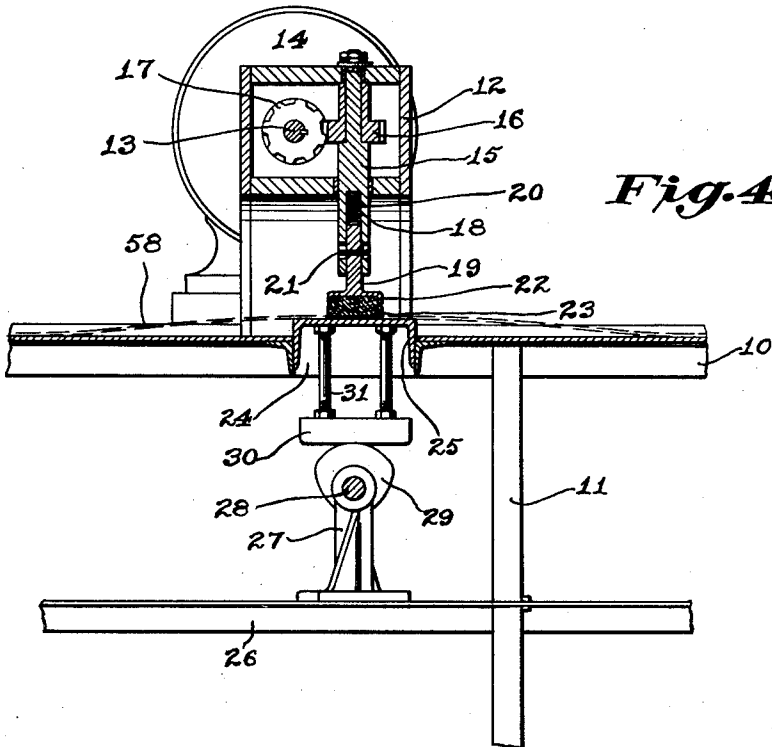


Fig. 4

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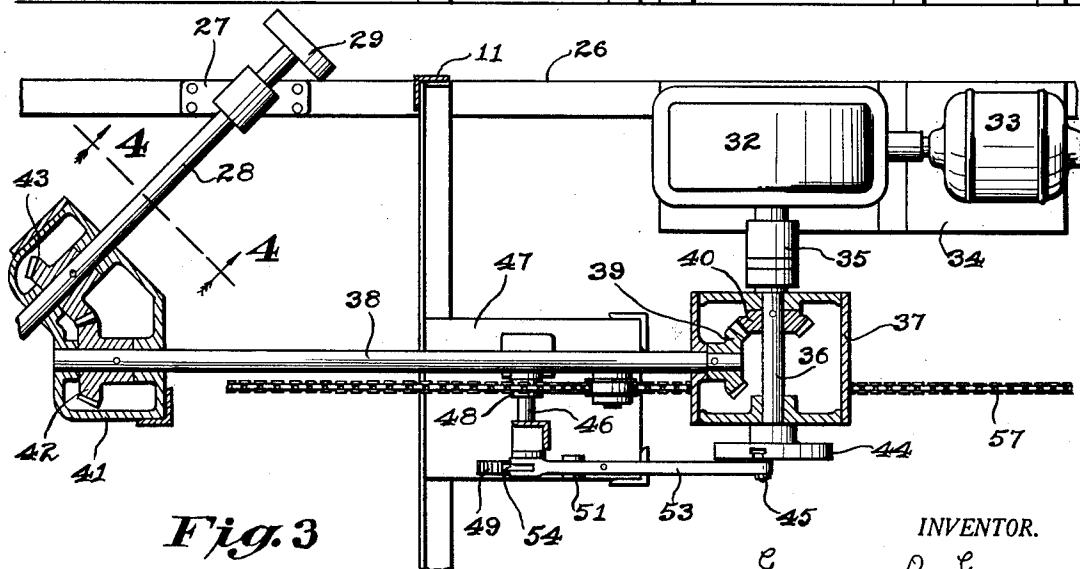
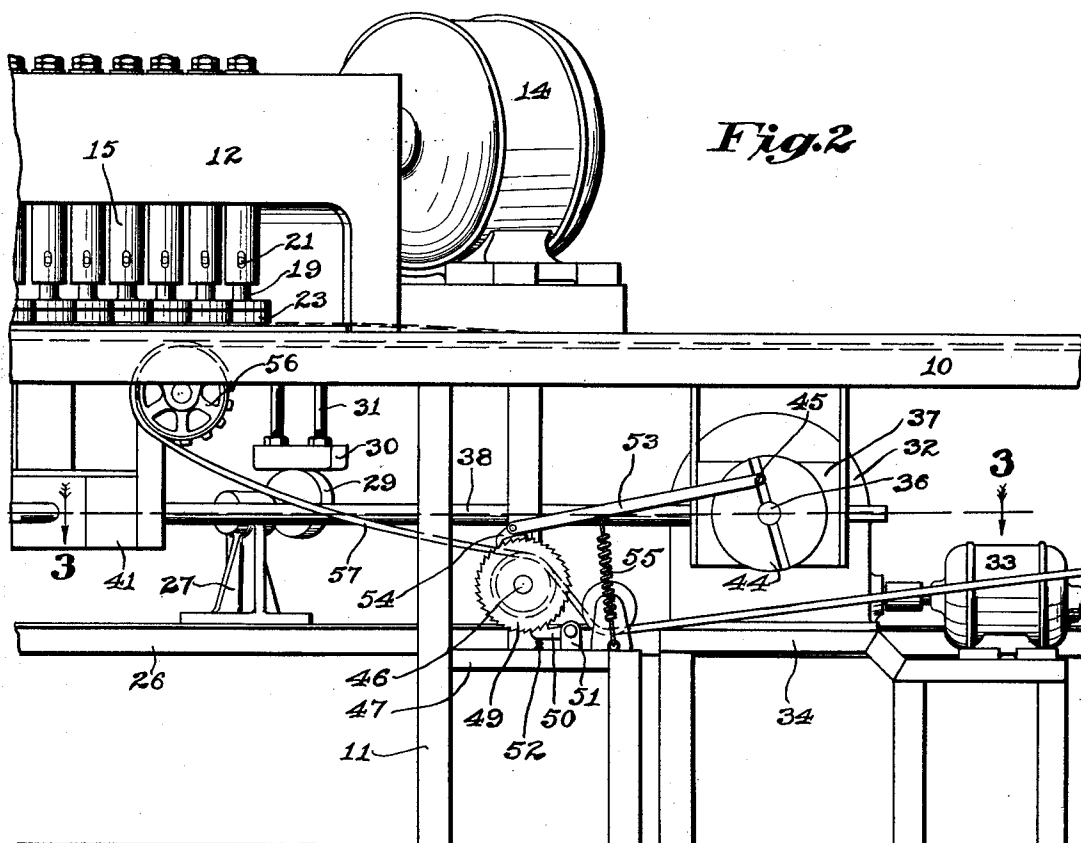
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AIRPLANE COVERING MATERIAL AND METHOD OF MAKING SAME

Filed Nov. 26, 1929

2 Sheets-Sheet 2



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AIRPLANE-COVERING MATERIAL AND METHOD OF MAKING SAME

Application filed November 26, 1929. Serial No. 409,960.

The object of my invention is to provide a spot burnished covering material of simple, durable, and inexpensive construction.

A further object of my invention is to provide a covering especially suitable for use as corrugated metal covering of airplanes.

Still a further object of my invention is to provide a spot burnishing machine which will burnish a pattern in a flat sheet of metal, the design produced being such that after the sheet is corrugated it will have a mottled rather than a corrugated appearance.

In the conventional metal-covered airplane, the sheets of duralumin are corrugated longitudinally to give structural rigidity. This method of increasing the bending resistance of thin metal sheets is well known and is universally used in the case of metal airplane covering. However, the appearance of such corrugated covering is objectionable to a large class of people due perhaps because it resembles the obsoleted corrugated iron used for building purposes. Painting the covering or trimming the relieved portions of the plane with contrasting colors does not have the effect of detracting from corrugated appearance of the covering as the horizontal shadows prevail irrespective of the color of the covering.

It is the object of this invention to provide a metal covering for airplanes which is corrugated to provide structural strength and which is spot burnished to detract from the corrugated appearance of the covering.

The applicant's corrugated airplane covering has spots burnished thereon so related to the corrugations that an entirely different appearance is given to the corrugated metal. The high lights produced by these burnished spots form vertical and diagonal lines which tend to neutralize the effect of the corrugations and give the covering the appearance of a mottled flat sheet. This effect is produced even though the covering is viewed from nearby and the illusion is carried out even more so when the ship is some distance away.

The design of the burnished spots on the flat sheet of covering is so proportioned that after the metal has been folded to the corru-

gated form, similar portions of these spots will coincide with similar portions of the corrugations thereby creating a uniform appearance throughout the entire sheet.

Still a further object of my invention is to provide an automatic spot burnishing machine into which the operator is required only to feed the strips of sheet metal. The timing, feeding and the burnishing operations, are entirely automatic.

Still a further object of my invention is to provide a spot burnishing machine in which the burnishing is done by a cork burnishing head operating against an emery and oil paste which has previously been applied to the sheet of metal.

With these and other objects in view, my invention consists in the arrangement, construction, and combination of the various parts of my improved device, as described in the specification, claimed in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a perspective view of my improved spot burnishing machine.

Figure 2 shows a side elevation of the feeding mechanism and burnishing tool head.

Figure 3 shows a sectional view taken on the line 3—3 of Figure 2.

Figure 4 shows a sectional view taken on the line 4—4 of Figure 3.

Figure 5 shows a flat sheet of metal after being burnished in my improved burnishing machine.

Figure 6 shows a sheet of metal having a design burnished thereon in relation to the corrugations therein, and

Figure 7 shows a sectional view taken on the line 7—7 of Figure 6.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate generally a table having legs 11. This table 10 has a width slightly wider than a sheet of metal 58, shown by dotted lines in Figure 4, and a length slightly over twice the length of the sheet. The sides of the table project upwardly to form a channel which guides the flat sheet of metal as it is being fed through the machine.

A head member 12 is secured diagonally

across the center of the top face of the table 10 and so straddles the table that the sheet may travel beneath this head. The head is placed at 45 degrees in relation to the sides of the table so that the desired pattern may be produced on the sheet of metal.

The head member 12 consists of a box like structure having a longitudinal shaft 13 rotatably mounted therein. The shaft 13 is directly connected to a motor 14 which is suitably mounted adjacent to the head member 12. A plurality of vertical spindles 15 are rotatably mounted in the head 12 and are provided with gears 16 which mesh with similar gears 17 secured to the shaft 13 so that when the motor 14 is operated it rotates the spindles 15. The lower end of each spindle 15 projects from the head member 12 and is provided with a bore 18 into which a burnishing tool holder 19 is reciprocally mounted. A spring 20, disposed between the bottom of the bore 18 and the top of the tool holder 19, urges this tool holder out of the spindle. A pin 21 extends through the shank of the tool holder 19 and reciprocates in a suitable slot in the spindle 15 to secure a positive drive for the tool holder and to limit the movement of the holder.

The lower end of the tool holder 19 is provided with a dished in portion 22 into which a burnishing cork 23 is secured. Numerous experiments have proven the advantage of using cork burnishing members, however, if desired, other burnishing material may be substituted in place of the cork. The corks 23 are of a size that they come very close to touching each other.

Referring to Figure 4, the table 10 is provided with a diagonal opening 24 beneath the head 12 into which an inverted channel member 25 is reciprocally mounted. The channel 25 may be raised so that it comes in contact with burnishing corks 23. Longitudinally extending braces 26 connect the table legs 11 and a pair of bearing blocks 27 are secured to these braces. A diagonally extending shaft 28 is rotatably mounted in the bearings 27 and is provided with a cam 29 near each end thereof in position to co-act with shoes 30 extending from the lower face of the channel 25 by means of studs 31. It may thus be seen that when the shaft 28 is rotated the cams 29 will reciprocate the channel 25 in the opening 24.

A conventional speed reducer 32 driven by a motor 33 is mounted beneath the table 10 on a suitable support 34. The slow speed shaft 35 from this speed reducer is coupled to a shaft 36 which is rotatably mounted in a gear box 37 attached to the under side of the table 10. A longitudinally extending shaft 38 extends between these two gear boxes and is rotatably mounted in suitable bearings in each box. A pair of bevel gears 39 and 40, secured to the shafts 38 and 36, re-

spectively, in the gear box 37 transmit the drive from the speed reducer 32 to the shaft 38. A second gear box 41 is secured to the under side of the table 10 beneath the channel 25 in position so that the shaft 28 may extend therethrough and be rotatably mounted in this gear box. A second pair of bevel gears 42 and 43 secured to the shafts 38 and 28, respectively, in the gear box 41 transmit the drive from the shaft 38 to the shaft 28. It may thus be seen that when the motor 33 is operated, the shafts 36 and 28 are driven at a reduced speed through the aforementioned gears and shaft 38.

A crank plate 44 having an adjustable crank pin 45 secured therein is fastened to the outer end of the shaft 36. A shaft 46 is rotatably mounted parallel to the shaft 36 on a suitable bracket 47 secured to the table 10. This shaft is provided with a chain sprocket 48 and ratchet wheel 49 secured thereon. A pawl 50 is pivotally mounted on ears 51 and is urged into contact with the ratchet wheel 49 by a spring 52. Referring to Figure 2, the ratchet wheel 49 is therefore free to move only in a counter-clockwise direction.

A connecting rod 53 extends from the crank pin 45 to position adjacent to the ratchet wheel 49 and is provided with a ratchet dog 54 which co-acts with this ratchet wheel. A tension spring 55 urges the connecting rod and ratchet dog into contact with the ratchet wheel. As the crank plate 44 rotates, the ratchet wheel 49 is intermittently rotated that portion of a revolution corresponding to the adjustment of the crank pin 45. The sprocket 48 being driven by the ratchet wheel 49 of course moves a corresponding portion of a revolution for each revolution of the crank plate 44.

An idler sprocket 56 is rotatably secured to the under side of the table 10 adjacent to the head 12 and a similar sprocket, not shown in the drawing, is rotatably mounted beneath the far end of the table. An endless roller chain 57 extends between these two sprockets and over the sprocket 48 so that as this sprocket 48 is intermittently rotated the chain 57 will also be intermittently moved. The upper section of the chain which is tangent to the two idler sprockets slides in a groove formed in the top face of the table 10.

Suitable hooks are provided for hooking into the links of the chain 57, these hooks connecting with the end of the sheet 58 to be burnished so that when the machine is in operation the sheet will be intermittently pulled beneath the head 12.

The operation of the machine is as follows: The flat sheet of metal is placed on the left hand side of the table 10, referring to Figure 1, and its forward end fastened to the chain 57. The sheet is first coated with an emery powder and oil mixture and the machine is then put in operation. During the first part

of a revolution of the shaft 36 the ratchet wheel 49 is rotated by means of the connecting rod 53. This movement draws the chain 57 a predetermined distance along the table so that the sheet 58 is drawn beneath the burnishing corks 23. As the shaft 36 rotates further around the cams 29 raise the channel member 25 so that the sheet 58 is brought into contact with the revolving corks. A diagonal series of circular spots is thereby burnished in the face of the sheet. A further revolution of the shaft 28 lowers the channel 25 so that the sheet 58 is free to be moved a predetermined distance forward again by the action of the ratchet wheel 49 and the sprocket 48. This cycle is repeated until the sheet is drawn entirely through the machine.

Many advantages arise through the use of my improved device among which may be mentioned that the machine is entirely automatic, requiring only the stopping, starting and feeding of the sheets by the operator. Still a further advantage results in that the airplane covering produced by this machine when subsequently corrugated has the appearance of a flat mottled sheet with the structural advantages of the corrugated construction.

Some changes may be made in the arrangement, construction, and combination of the various parts of my improved device without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may reasonably be included within the scope thereof.

I claim as my invention:

1. A corrugated metal airplane covering having a plurality of spots burnished thereon, the centers of said spots being on similar portions of each corrugation.

2. A corrugated metal airplane covering having spots burnished thereon, the center distance of said spots equalling the developed length of one of said corrugations.

3. A corrugated metal airplane covering having spots burnished thereon, the center distance of said spots being a multiple of the developed length of one of said corrugations.

4. A corrugated metal airplane covering having spots burnished thereon, the developed length of said corrugations being a multiple of the center distance of said spots.

5. The method of forming an airplane covering consisting of burnishing a uniform spotted pattern on a flat sheet of metal, and then corrugating said sheet so that the spots will be on similar portions of each corrugation.

6. The method of forming an airplane covering consisting of burnishing an overlapping spotted pattern on a flat sheet of metal, and then corrugating said sheet so that the spots will be on similar portions of each corrugation.

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