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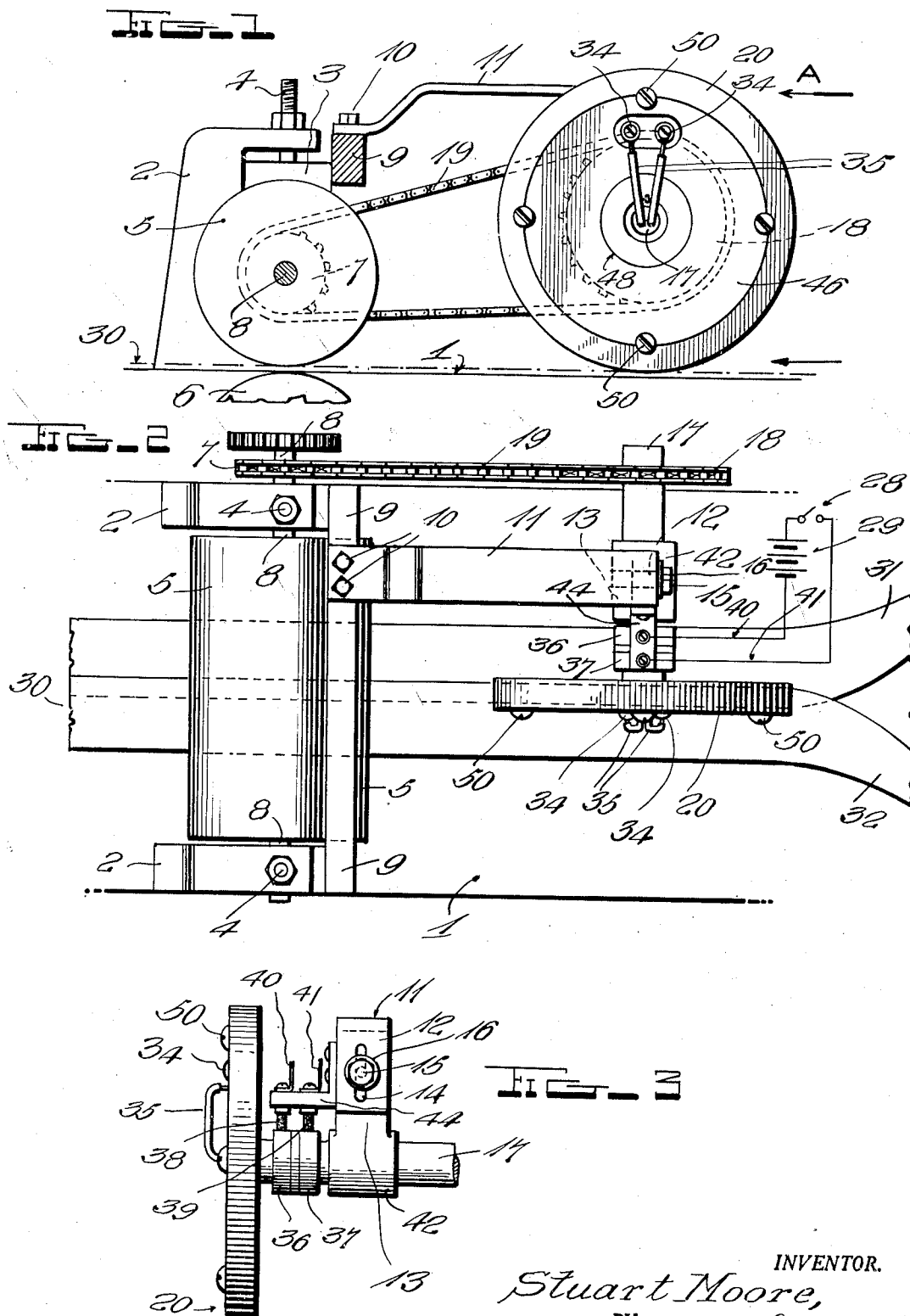
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2,126,908

APPARATUS FOR AND METHOD OF SEALING BAGS

Filed June 12, 1935

2 Sheets-Sheet 1



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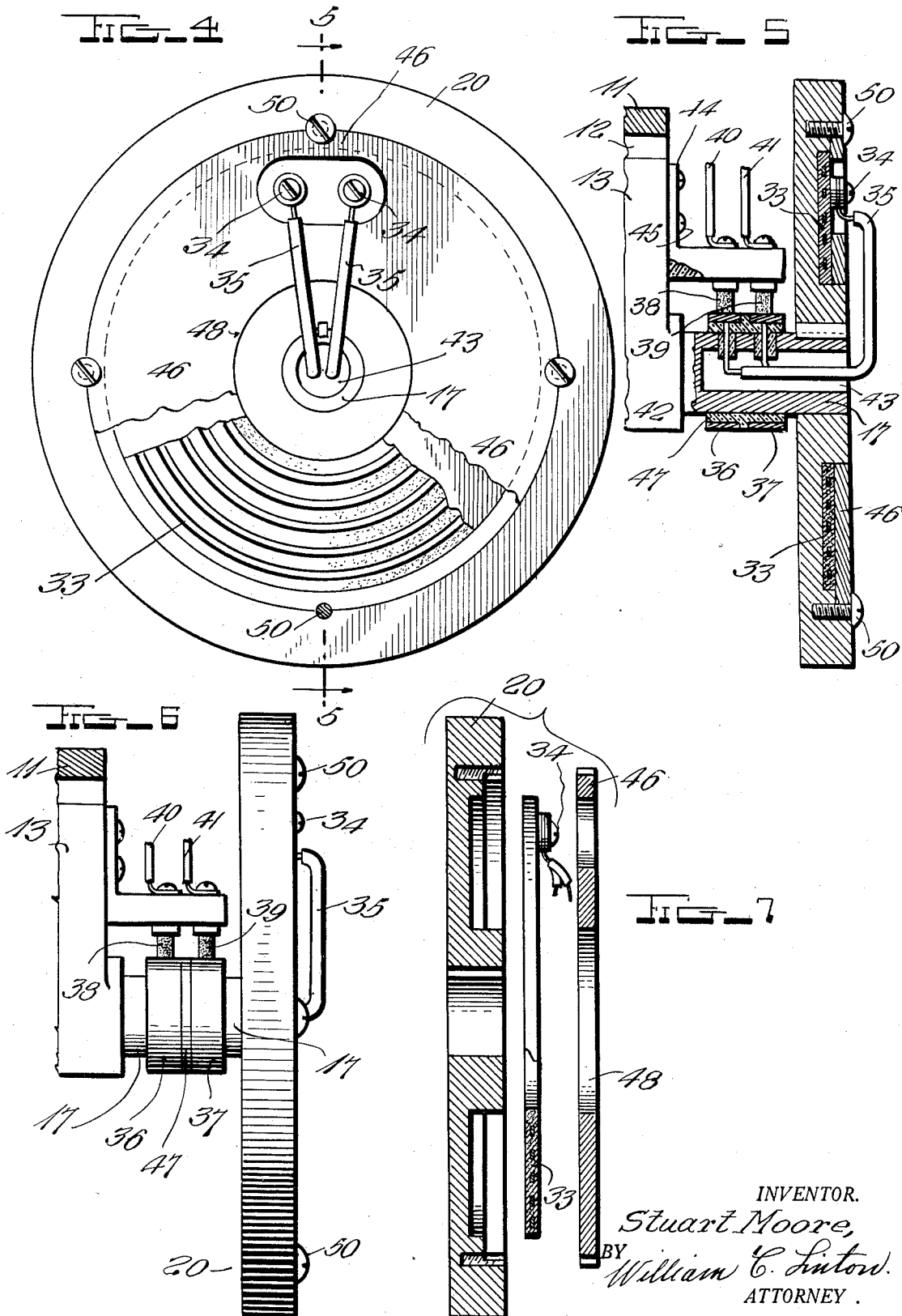
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APPARATUS FOR AND METHOD OF SEALING BAGS

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2 Sheets-Sheet 2



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2,126,908

APPARATUS FOR AND METHOD OF SEALING BAGS

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Application June 12, 1935, Serial No. 26,255

5 Claims. (Cl. 154—42)

My invention relates to machines for making waxed, paraffined or the like coated paper bags, from paper which has been treated with a substance which makes it adhesive repellent.

More particularly, my invention provides improved means for applying heat to the longitudinal seam of the web of coated paper subsequent to its folding to form overlapping edges constituting said seam, in order to effectively seal said seam.

My invention provides a travelling or movable heating element adapted to move in contact with said overlapping edges, and to apply heat thereto, comprising an electrical heater element which is easily removable.

An object of my invention is to provide means for effectively and tightly sealing the seams of paper bags made from waxed or similarly treated papers in order that such bags may withstand considerable pressure from the contents.

A further object of my invention is to provide a movable heated sealing member to move in contact with the overlapping edges to be sealed at substantially the same rate of speed as said overlapping edges, or at a slightly slower speed.

A still further object of my invention is to provide a device which is capable of being readily and easily installed upon or removed from an ordinary bag making machine according to the type of paper being used, without necessitating material changes therein, so that the installation of the particular construction embodying my present invention will not involve any unwarranted expense and labor.

Another object of my invention is to provide a sealing apparatus wherein the movable heat-applying sealing member makes only a brief contact with the moving paper web, thus offering little or practically no resistance to the movement of the latter, thereby accelerating the rate of production.

A still further object of my invention is to provide a movable heating element so mounted that said heating element with its associated parts will be rigidly or bodily mounted as a unit with the web feed roll, whereby the heating element will follow any displacements of the feed roll in order that both may be displaceable as a unit.

Other objects of my invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by persons skilled in the art, I have in the accompanying illustrative drawings and in the detailed follow-

ing description based thereupon, set out an embodiment of the same.

In the drawings, wherein like characters of reference designate corresponding parts throughout:

Fig. 1 is a side elevation showing diagrammatically my bag sealing apparatus as applied to a bag making machine.

Fig. 2 is a plan view of Fig. 1, showing the course of the formed overlapping edges of the web past the sealing apparatus.

Fig. 3 is an edge view of the sealing disc and supporting and current supplying parts.

Fig. 4 is a face view of the sealing disc with parts removed, showing the spiral electrical heating element, the plate for retaining the heating element, and the current leads.

Fig. 5 is a cross-sectional view of the sealing disc taken on the line 5—5 of Fig. 4.

Fig. 6 is a detail view of the assembled sealing disc and heating element and supporting and current supplying parts.

Fig. 7 is a sectional view of the several parts of the sealing disc with the parts separated in juxtaposition, showing the electrical heater element and its retaining plate.

In Fig. 1, 1 represents the bed of a commonly used bag making machine, over which passes the formed paper web 30 after it has been folded over to form the longitudinal seam of the bags to be manufactured from separate edge folds of the paper 31 and 32. At each side of the bed 1 is provided a pair of oppositely positioned bearing supports 2, each carrying a bearing member 3. The bearing members 3 are mounted in their respective supports 2 for variable adjustment by means of a set bolt 4 which may be completely disengaged from the bearing members to permit the removal of the latter when desired.

A pair of feed rolls are positioned intermediate the bearing supports 2, comprising the upper feed roll 5 and the lower feed roll 6. The upper feed roll 5 is mounted on a shaft 8 which is carried on the bearing members 3. One end of the shaft 8 projects beyond a bearing member 3, and carries on its extended portion a sprocket wheel 7.

Rigidly fixed to the normal forward portion of the bearing 3 and mounted above the bed 1 of the machine in substantial parallel relation to the feed roll 5, is a bar 9 to which is secured by means of bolts 10 or the like, an arm 11 arranged at substantially right angles to bar 9 and positioned in longitudinal direction with respect to the bed 1 of the machine. Preferably, the free extremity of arm 11 is bent downwardly

as shown at 12, to carry a bearing bracket 13. This bearing bracket 13 is provided with a slot 14 through which passes a lock bolt 15 for fixedly connecting the bracket 13 to the bent portion 12 of the arm 11. The slot 14 provides convenient means for adjusting bracket 13 in a vertical direction on its supporting arm 11. A washer 16 may be interposed between the head of the bolt 15 and the adjacent portion of the bracket 13 to effect a more secure frictional engagement of the parts connected thereby. The bracket member 13 comprises a cylindrical bore adapted to constitute a bearing or journal 42 for journalling a stub shaft 17.

The stub shaft 17 projects from both sides of bracket member 13, and is substantially parallel to feed roll shaft 8. To one end of stub shaft 17 is securely attached, preferably by keying, a sprocket wheel 18. Sprocket chain 19 connects sprocket wheel 18 with the sprocket wheel 7 carried on feed roll shaft 8.

A movable heater element, here shown preferably as a metallic disc, 20, is keyed or fixedly carried on the other end of the stub shaft 17 and is rotatable with shaft 17. The disc 20 is mounted with its plane in the direction of travel of formed paper web 30 between the feed rolls, and in contact with the seam formed by the overlapping edges of the paper web, or closely adjacent thereto in heat relation therewith, and hence its periphery moves with a tangential component of motion in the plane of the seam of the overlapping edges of the paper web. The relations between the diameters of feed roll 5 and disc 20 and their respective driving sprockets 7 and 18 may be so designed that disc 20 is driven with a peripheral speed substantially the same as the surface speed of movement of paper web 30 past disc 20 in contact therewith. However, I have found that better results are obtained if the ratios of these respective diameters are so designed that disc 20 is driven with a peripheral speed at its area of contact with the paper web a little slower than the speed of movement of the paper web past the sealing disc 20.

As shown more particularly in Fig. 4, the metal disc 20 is provided on one of its flat sides with a wide annular recess adapted to receive a heating element 33 which as shown, is preferably spiral in form. A circular plate member 46 fits over and closes the annular aperture in disc 20 and retains heating element 33 therein. The terminals of heating element 33 lead to binding posts 34 which are connected by leads 35 which pass to the axis of shaft 17 and axially of axis 17 through an axial bore 43 formed therein, to slip rings 36 and 37 carried on shaft 17 electrically insulated therefrom by insulating material 47. The electrical heating element 33 is mounted in heat exchange relation with disc 20, and when suitable electrical energy is applied to terminals 34 through its connections, the disc 20 becomes heated.

Carried upon bearing bracket 13 is a brush bracket 44 affixed thereto by screws 45. Brush bracket 44 carries brush members 38 and 39 which are respectively adapted to engage slip rings 36 and 37. Brushes 38 and 39 are connected to a suitable source of electrical energy by wires 40 and 41. Cover plate 46 is attached to disc 20 by screws 50 which are easily removable, thereby permitting the easy removal of electrical heating element 33 from disc 20, as shown in Fig. 7. Cover plate 46 is provided with a central aperture 48, as shown in Fig. 7.

The size, construction, and heating element of the disc 20, are such that when the web of coated paper passes through the machine, heat will be supplied to the seams or edges of the paper to be connected together, at the proper temperature and for the proper length of time, in order that the wax or other treating substance applied to the paper, will first be melted, and the adhesive which in ordinary operation has been applied to the paper, will be permitted to flow into contact with the paper, and the cells or pores of the paper will be caused to expand and to permit the adhesive to be more freely absorbed by the fibres of the paper. While in ordinary practice, a suitable adhesive will have been applied to the formed edges of the paper web before reaching the sealing disc, there are some types of such treated papers for which it is not necessary to apply an adhesive, since the melted treating compound itself applies after hardening sufficient adhesion to constitute a good seal. When the adhesive is used, the application of heat from the sealing disc causes the adhesive to set more quickly, and when the heat is withdrawn, the wax or other treating substance so melted will be permitted to congeal about the same or edges of the paper so sealed together, whereby a moisture proof seal about the connection of the edges of the paper will be established. By providing the type of structure which has been described, in which the moving disc makes only a brief contact with a given point on the travelling web, practically no resistance is offered to the movement of the travelling web, thereby accelerating the rate of production.

It will be understood that my improved sealing device, which is supported forwardly of the feed rolls, may be easily removed from the bag machine when it is desired to make bags from ordinary papers which have not been treated with adhesive repellent compounds.

In operation, the separate portions 31 and 32 of the waxed or similarly treated paper from which bags are to be made, are formed by folding over mechanisms well known in the art provided in usual bag making machines to form the web or bag tubing 30, from which the blanks to constitute individual bags are cut. There is a seam where the edges 31 and 32 overlap after being formed into web 30. As the formed web is drawn through the bite of feed rolls 5 and 6 by the action thereof, the heated sealing disc 20 applies heat to the overlapping edges and causes adhesion of the edges, as has been explained. The sealing disc 20 is cooperatively driven with feed roll 5 at a speed such that the peripheral speed of disc 20 at its area of contact with web 30 is substantially the same as the surface speed of web 30 past disc 20, or slightly less than said surface speed of the web, as has been explained. It will also be understood that in normal operation, a suitable adhesive will have been applied to the respective overlapping edges while separate and before being formed into the web.

Upon leaving the heated sealing disc 20, the travelling web 30 will enter between the feed rolls 5 and 6 and be pressed thereby, causing the overlapping edges of the web to become firmly adherent, thus resulting in a strong seam. The electrical heater element 33 will maintain sealing disc 20 at the proper temperature for effectively applying heat to the seam, and because of the adjustable feature of the device, the position of the sealing disc 20 may be varied and adjusted to the point where it will be most effective.

Because of the fact that the sealing disc 20 is cooperatively driven with the feeding mechanism of the feed rolls, there is no interference between the operation of one with that of the other, and it is therefore not necessary to reduce or adjust the speed of the machine when the sealing disc 20 is employed, and since disc 20 is bodily displaceable with feed roll 5, the possibility of distorting or injuring the paper web when traversing that section of the machine, is obviated.

It is to be noted that when varying the length of the stub shaft 17 carrying the disc 20, said disc may be set at the proper position over the bed 1 of the machine to adequately contact with the overlapping edges of the travelling web.

I claim:

1. In a machine for making bags from a web having overlapping edges and traversing said machine, a web-feeding mechanism, a heat-conducting disc member rotatably mounted in said machine and disposed to contact peripherally with the overlapping edges of said web, electrical heating means comprised in said disc member for applying heat to said disc member for sealing said web, and means cooperatively actuated with said web-feeding mechanism for rotating said disc member in the same direction as the movement of said web at the area of contact therewith at a peripheral speed of its web-engaging surface slightly less than the speed of movement of said web at said area of contact.

2. In a machine for making bags from a web having overlapping edges and movable in said machine, a web-feeding mechanism, a support, a shaft rotatable in said support, a heat-conducting disc member carried by and rotatable with said shaft and disposed to contact peripherally with the overlapping edges of said web, an electrical heater element comprised in said disc member for applying heat to said disc member for sealing said web, electrical terminals for said heater element carried on said disc member, a pair of slip-rings rotatable with said shaft and respectively connected to said terminals, a pair of brushes carried by said support and adapted to engage said slip-rings respectively, means for supplying electrical energy to said brushes, and means for driving said shaft cooperatively with said web-feeding mechanism at a speed such that the web-engaging surface of said disc member moves at a peripheral

speed slightly less than the speed of movement of said web at the area of contact therewith.

3. In a machine for making bags from a web having overlapping edges and traversing said machine, a web-feeding mechanism, a support, a shaft rotatable in said support, a heat-conducting disc member carried by said shaft and disposed to contact peripherally with the overlapping edges of said web, an electrical heater element comprised in said disc member for applying heat to said disc member for sealing said web, electrical terminals for said heater element carried on said disc member, a pair of slip-rings rotatable with said shaft and respectively connected to said terminals, a pair of brushes carried by said support and adapted to engage said slip-rings respectively, means for supplying electrical energy to said brushes, and means for driving said shaft cooperatively with said web-feeding mechanism at a speed such that the web-engaging surface of said disc member moves at a peripheral speed slightly less than the speed of movement of said web at the area of contact therewith.

4. In a machine for making bags from a web having overlapping edges and traversing said machine, a web-feeding mechanism, a heat-conducting disc member rotatably mounted in said machine and disposed to contact peripherally with the overlapping edges of said web, heating means for applying heat to said disc member for sealing said web, and means cooperatively actuated with said web-feeding mechanism for rotating said disc member in the same direction as the movement of said web at the area of contact therewith at a peripheral speed of its web-engaging surface slightly less than the speed of movement of said web at said area of contact.

5. In the manufacture of paper bags from wax coated material, the method of sealing the seam in a moving formed bag webbing having overlapping edges, which comprises positioning and rotating a heated member in contact with said webbing while maintaining the web-engaging surface of said heated member at a temperature sufficient to seal said overlapping edges, and moving said web-engaging surface of said heated member in the direction of movement of said webbing at a speed slightly less than the speed of movement of said bag webbing.

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