

Feb. 6, 1951

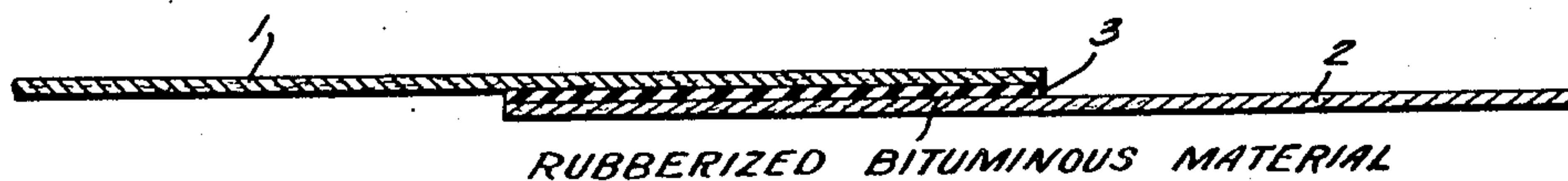
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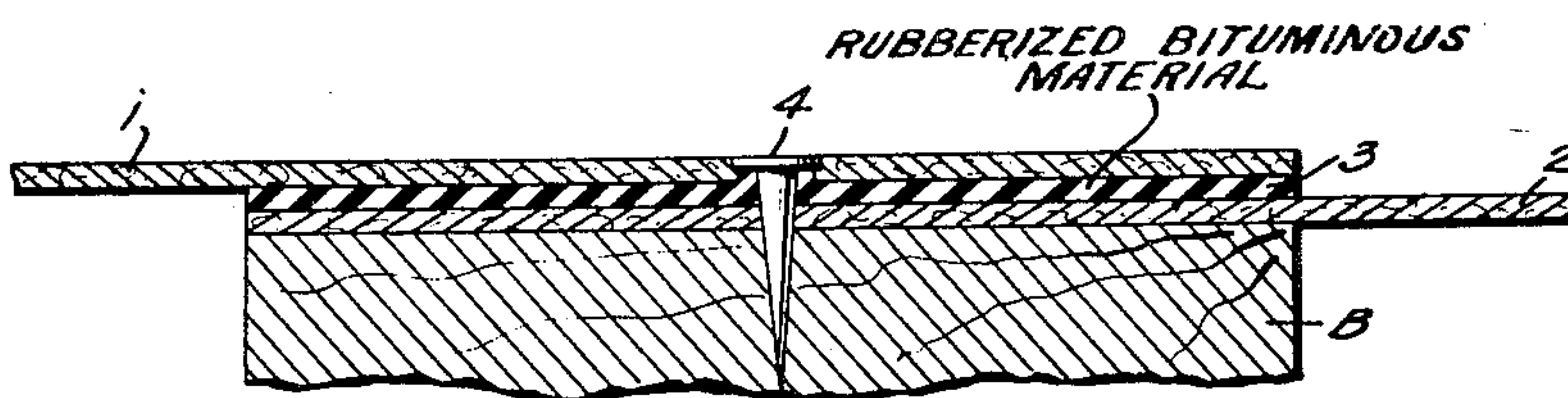
RUBBERIZED BITUMINOUS SEALING JOINT

Filed April 4, 1945

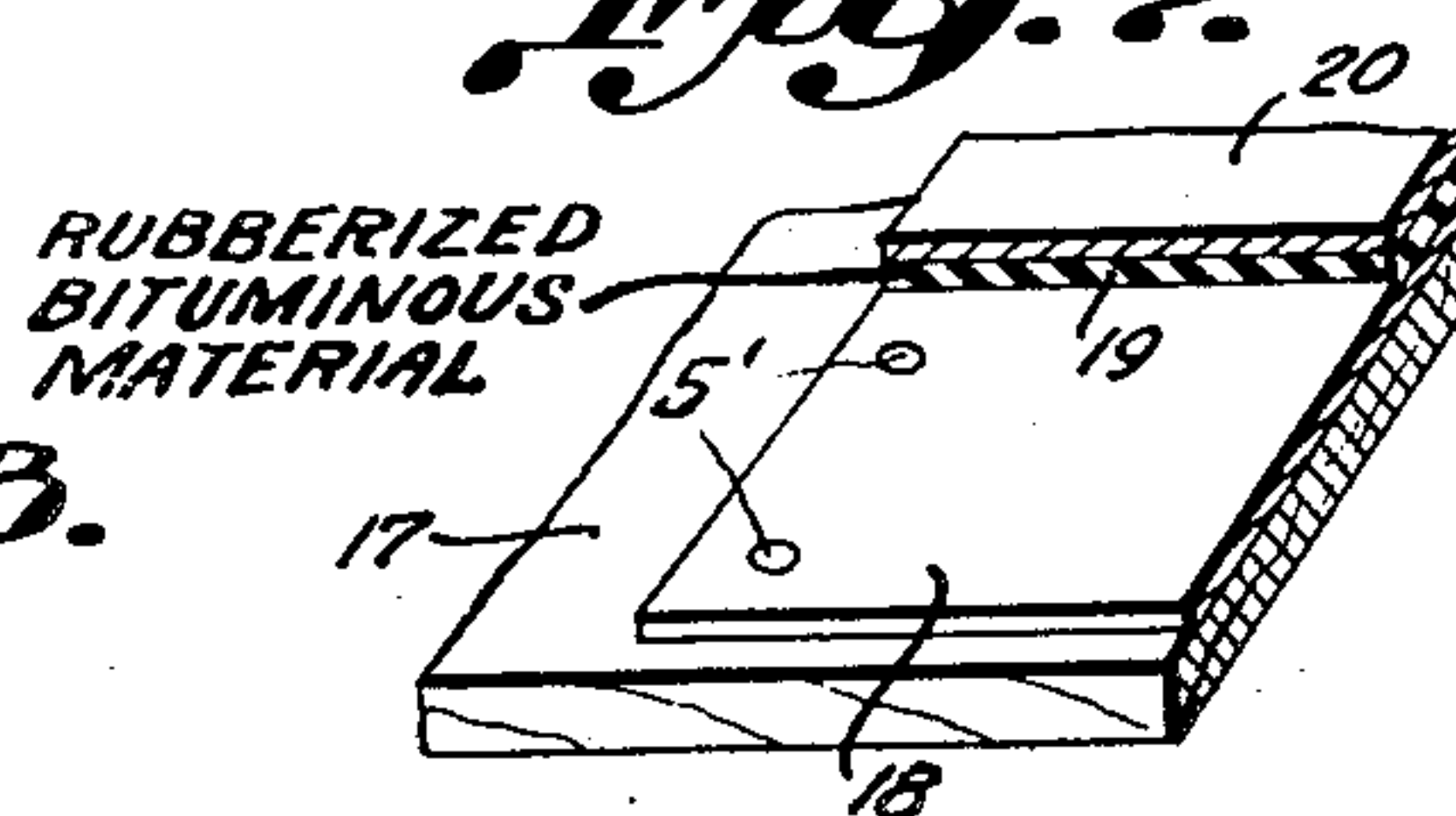
*Fig. 1.*



*Fig. 2.*



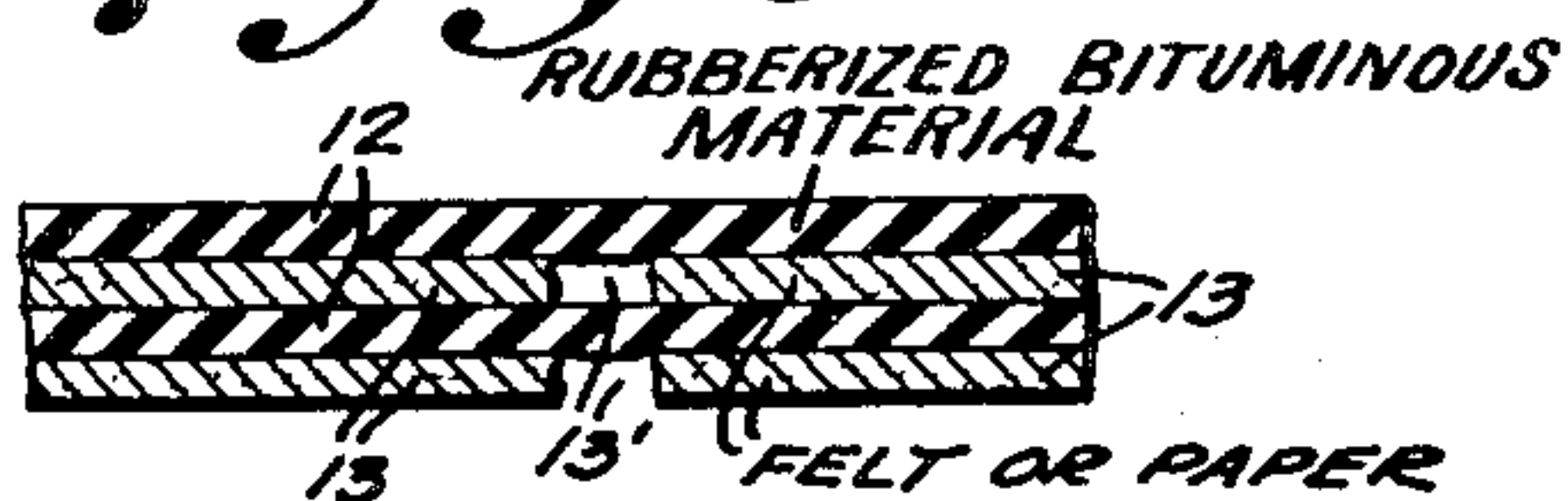
*Fig. 3.*



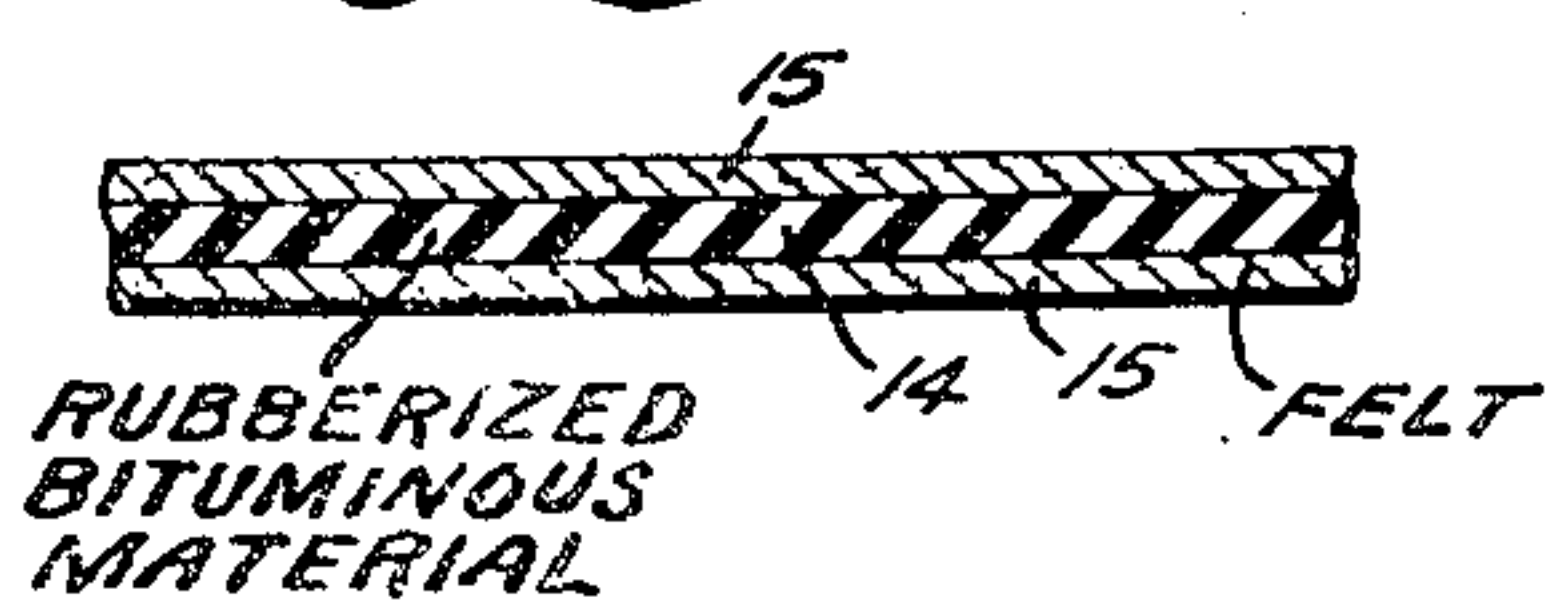
*Fig. 4.*



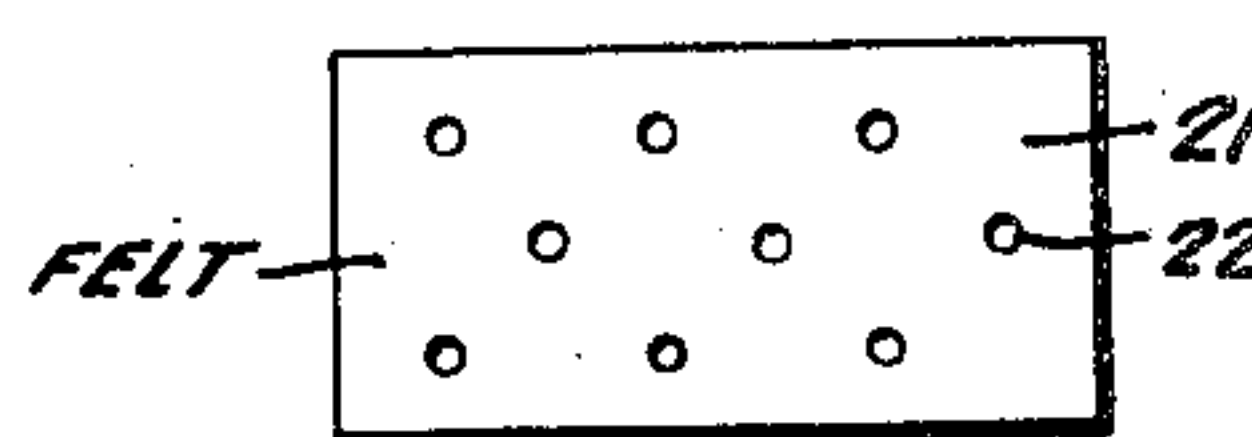
*Fig. 5.*



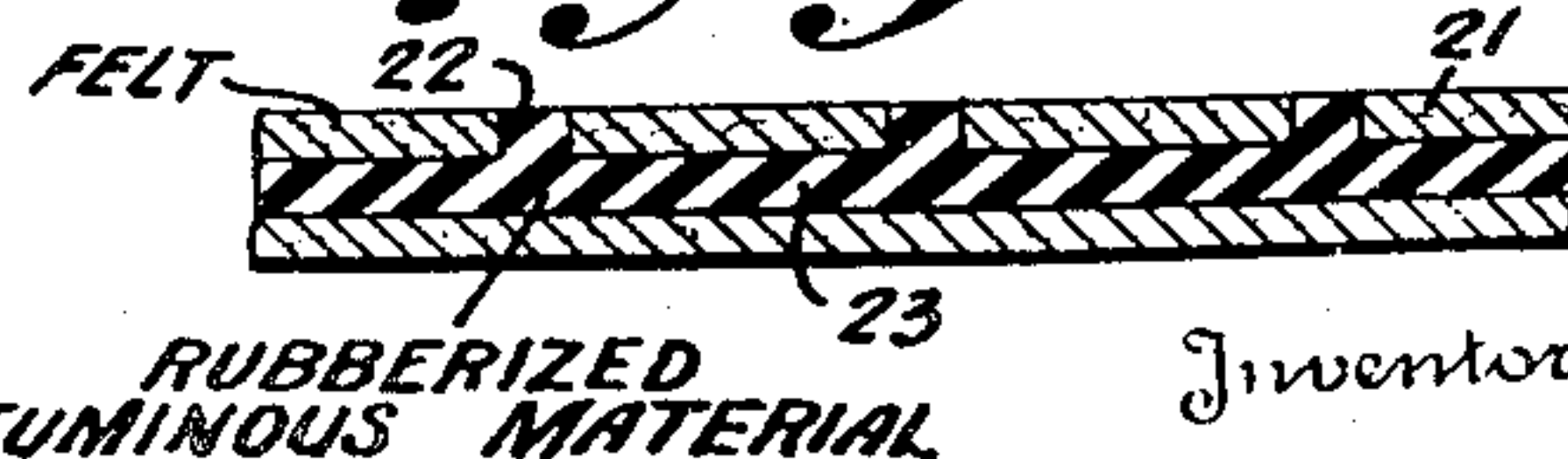
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



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## UNITED STATES PATENT OFFICE

2,540,252

## RUBBERIZED BITUMINOUS SEALING JOINT

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Application April 4, 1945, Serial No. 586,479

3 Claims. (Cl. 108-7)

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This invention relates to rubberized bituminous sealing joints and particularly to such joints for roofing sheets and analogous structural sheets.

It is the object of the present invention to provide a lasting joint between adjoining sheets of roofing material which remains effective under all temperature conditions in both extremely hot and cold weather.

It is a further object of the invention to provide a sealing joint for roofing sheets which may be supplemented by the integration of roofing nails which are self-sealing, so that no penetration of moisture into the joint ever takes place.

It is a further object of the invention to provide self-sealing roofing sheets which seal any ruptures or breaks in the roofing sheets occasioned by undue expansion, impacts or other disturbances.

It is a further object of the invention to provide a laminated structural unit exemplified by roofing sheets or built-up roofing, waterproofing sheets, concrete curing sheets and the like, in which at least one of the laminations consists of tacky and adhesive rubberized bituminous material which serves to heal and seal any breaks in the felt or paper layers of the sheet material.

Other objects and purposes will appear from the following detailed description of the invention, taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a vertical sectional view of a roofing joint embodying rubberized bituminous lap cement coating;

Fig. 2 is a vertical sectional view showing the roofing joint embodying a lap cement coating of rubberized bituminous material which is supplemented by fastening nails;

Fig. 3 is a vertical sectional view of a roofing nail coated with tacky adhesive rubberized bituminous material which seals more completely the opening in the joint whereat the nail is applied;

Fig. 4 is a vertical sectional view of a sheet of structural material embodying a coating of rubberized bituminous material which is self-healing;

Fig. 5 is a vertical sectional view of a multiply structural sheet material having a plurality of laminations of paper or fabric covered with layers of rubberized bituminous material to effectuate a sealing of the composite sheet upon the occurrence of a break in any one of the lamina;

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Fig. 6 is a vertical sectional view of a laminated structural sheet which may be a roofing sheet embodying an intermediate rubberized layer between sheets of roofing paper or fabric, and

Figs. 7 to 9 illustrate variations of roofing arrangements of that shown in Figs. 1 to 3.

Fig. 1 shows a roofing joint embodying sheets 1 and 2 of roofing paper or cloth of conventional construction, in which the lap joint between them is made by the application of a coating of rubberized bituminous material 3, at the junction between the ends of the sheet. The use of this specific material in lieu of conventional lap cement results in a lasting joint which remains effective under all adverse conditions including sub-freezing temperatures as low as  $-10^{\circ}$  F. The application of this material is also a simple procedure, since the same is applied as a coating or paint and not as a cut-back material for the purpose of dissolving any of the asphaltic material on the roofing sheets 1 and 2. The joint becomes adherent immediately and remains so even when sheets 1 and 2 move relatively to one another as a result of variations in temperature.

The sealing joint with the rubberized bituminous material may be supplemented by the penetration of roofing nails or tacks 4 into the roofing stud B as shown in Fig. 2. The rubberized bituminous material surrounds the nail closely and in effect acts as a self-sealing puncture in a tire, in which case the sealing composition becomes localized at the opening to effect a closing thereof. This self-sealing function may be further supplemented by the use of nails 5 having at least the shanks 6 thereof coated with rubberized bituminous material of rubberized bituminous nature. This assures a copious supply of sealing medium at the point where penetration of moisture into the joint is most likely to occur.

The rubberized bituminous mixture used in the making of the joint under consideration is of a tacky adhesive character having a great degree of distendability and recuperative power.

The composition may consist of about  $3\frac{1}{2}\%$  to 5% of rubber, 35% of a hard brittle asphalt having a melting point of about  $170^{\circ}$  F. to  $180^{\circ}$  F.,  $\frac{1}{2}\%$  to 1% of a plasticizing agent, about 40% of a soft asphalt having a flow point of about  $90^{\circ}$  F., 5% to 7% of a mineral filler and 1% to 3% of a flow retarder.

The composition may have a polymerized linseed oil in lieu of the rubber constituent.



A suitable composition is as follows:

Reclaimed rubber-----	17.5%	(12% to 20.0%)
Flux oil (residual oil) --	3.8%	(1% to 10.0%)
Polymerized coumarone--	1.5%	(1% to 5.0%)
Synthetic rubber -----	4.7%	(2% to 10.0%)
Hydrocarbon oil (S. V. superior base) -----	20.0%	(13% to 23.0%)
Resin -----	7.5%	(2% to 12.0%)
Asphalt -----	45.0%	(40% to 50.0%)

The rubberized bituminous coating composition is also useful in roofing sheets and analogous sheet materials used in different locales other than sealing joints, by virtue of the flowing characteristic of the material which is effective in sealing ruptures and breaks in the sheet material of which the same forms a part. The use of rubberized bituminous material in such sheets is illustrated in Figs. 4 to 6.

Fig. 4 shows a layer of rubberized bituminous material superposed upon a layer of paper or fabric which normally can be used as a structural sheet for roofing purposes, waterproofing material, concrete curing sheets or other miscellaneous construction purposes. Upon the occurrence of a rupture or break 11' in the sheet of fabric or paper 11, as a result of stretching of the latter sheet, or external impacts, the sheet 10 retains its integrity and flows into the rupture 11' to mend the break in the sheet so the function thereof can be carried on.

Fig. 5 shows a laminated sheet construction formed of multiple layers 13 of paper or fabric alternating with layers 12 of rubberized bituminous material which are self-sustaining and which accommodate themselves to the irregularities or breaks 13' to render them self-healing.

In the constructional form of the invention shown in Fig. 6, the layer of rubberized bituminous material 14 forms an intermediate ply between the layers 15 of fabric or paper to mend any breaks which may occur in either one or both of these sheets.

Fig. 7 illustrates an arrangement wherein the sheet of roofing felt 18 is applied to the roofing planks 17 by means of nails 5' and the adjacent sheet 20 of roofing felt is lapped over the edge of the sheet 18 and is adhesively applied thereto by a layer of rubberized bituminous material 19. In view of the fact that the overlapped edge of the sheet 20 is in engagement with the underlying sheet 18 by means of the adhesive layer of rubberized bituminous material 19 only, the sheet 20 is free to move relatively to sheet 18 without hindrance of any attaching nails.

If desired, the perforated sheets 21 of felt, having openings 22, may be used in the laying of the roofing in order to permit the escape of air bubbles, as shown in Fig. 8. The engagement of the rubberized bituminous composition with these perforations from the layer 23 is shown in Fig. 9. This interengagement of the rubberized bituminous material with the apertures 22 results in a keying between the adhesive layer and the superposed sheet of felt and consequently in a more effective joint.

The use of the rubberized bituminous material which is more distendable than rubber, particularly in its vulcanized state, and is adhesive under all temperature conditions, makes possible the effective sealing of joints and unintentional ruptures in sheet material so that effective seals are had for unlimited periods of time.

The rubberized bituminous material may be applied to one or both overlapping portions of the sealing joint for roofing sheets. The layers of the rubberized bituminous composition in the laminated sheet constructions may be applied by any suitable coating procedures known in the art of laminating fabrics and other sheets.

This application is a continuation-in-part of my application Serial No. 576,461, filed February 6, 1945, now abandoned.

I claim:

1. A lap joint for roofing sheets embodying a layer of rubberized bituminous oil composition between overlapping portions of said sheets, said composition comprising rubber, flux oil and asphalt, and being tacky, adhesive and highly distensible at varying degrees of temperature, above and below freezing, to maintain the portions of the lapped sheets in sealed relation, said composition material being composed of 14 to 30% rubber, 40 to 50% asphalt, 14 to 33% flux oil and 2 to 12% resin.

2. A laminated structural sheet comprising a base layer having adhered to one surface thereof a composition layer of rubber, flux oil and asphalt composition which is tacky, adhesive and highly distensible at varying degrees of temperature, above and below freezing, to adhesively bond said base to a foundation and maintain said bond therewith, said composition material being composed of 14 to 30% rubber, 40 to 50% asphalt, 14 to 33% flux oil and 2 to 12% resin.

3. A roofing construction comprising decking having layers of roofing felt laid thereon in overlapping relation and a composition layer of rubber, asphalt and flux oil bonding the overlapping portions of the layers of roofing felt, said composition layer being tacky, adhesive and highly distensible at varying degrees of temperature to maintain the overlapped portions of the roofing layers in bonded relation, said composition material being composed of 14 to 30% rubber, 40 to 50% asphalt, 14 to 33% flux oil and 2 to 12% resin.

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