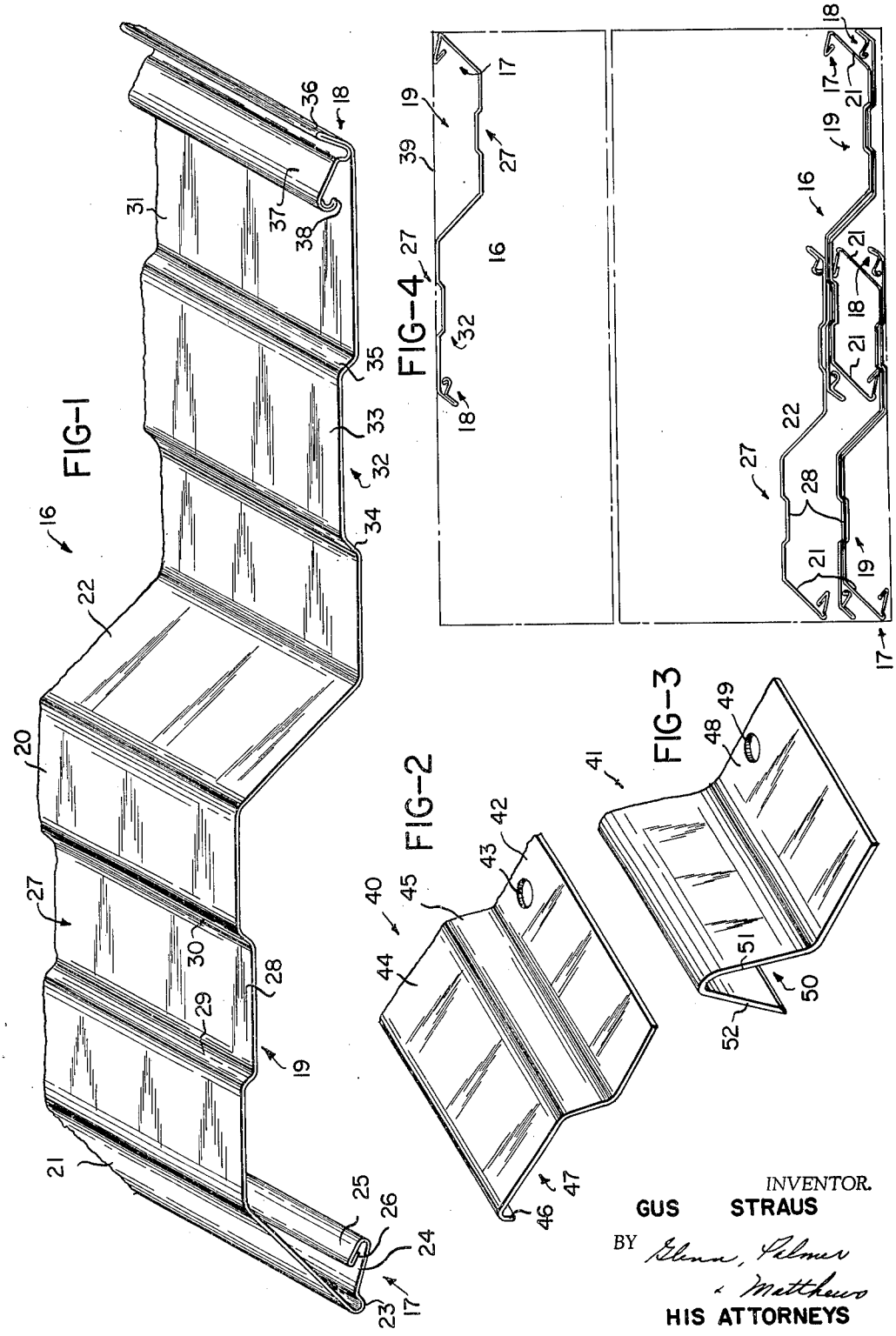
May 31, 1966 G. STRAUS 3,253,376

PANEL CONSTRUCTIONS AND THE LIKE

Filed Nov. 6, 1962 3 Sheets-Sheet 1



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PANEL CONSTRUCTIONS AND THE LIKE

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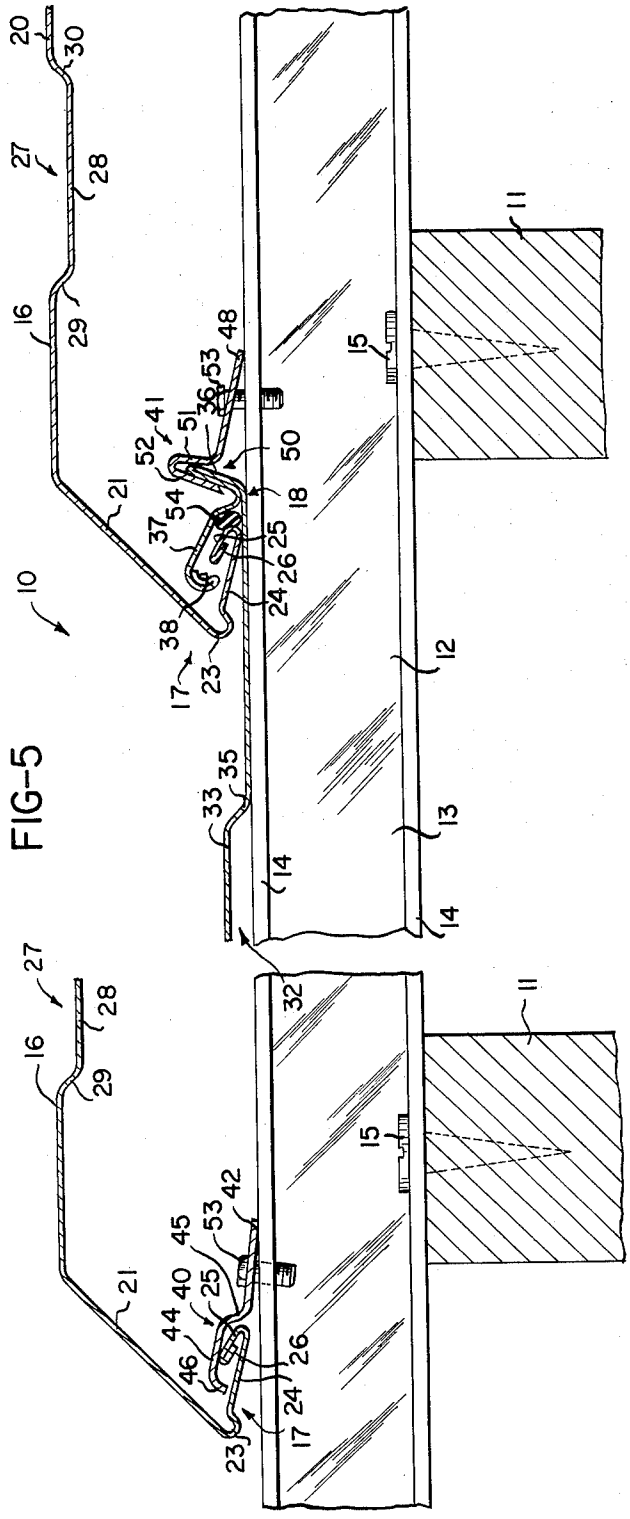


FIG-5

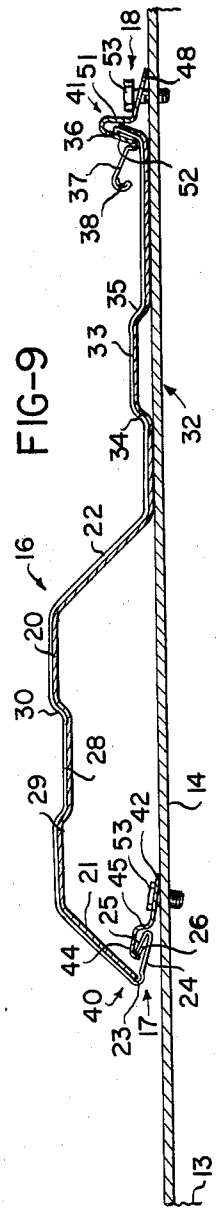


FIG-9

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PANEL CONSTRUCTIONS AND THE LIKE

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FIG-6

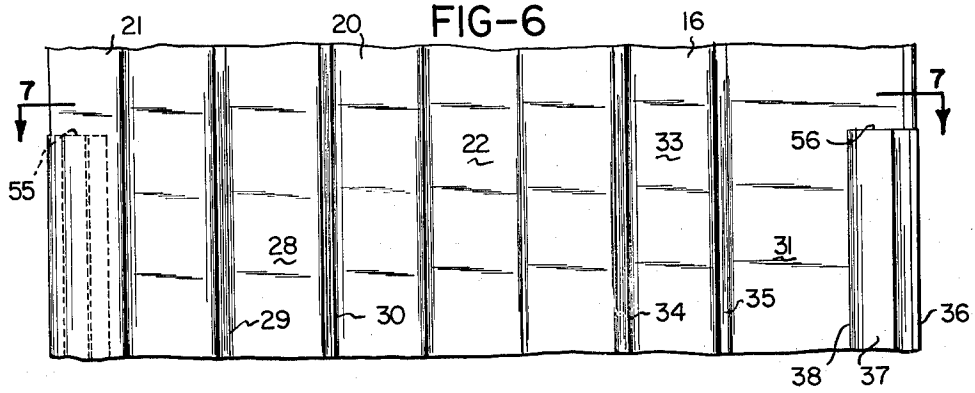


FIG-7

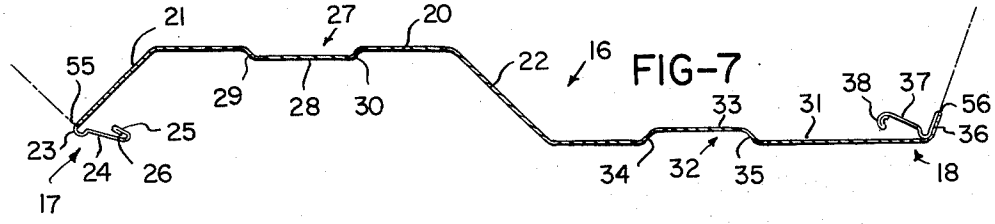
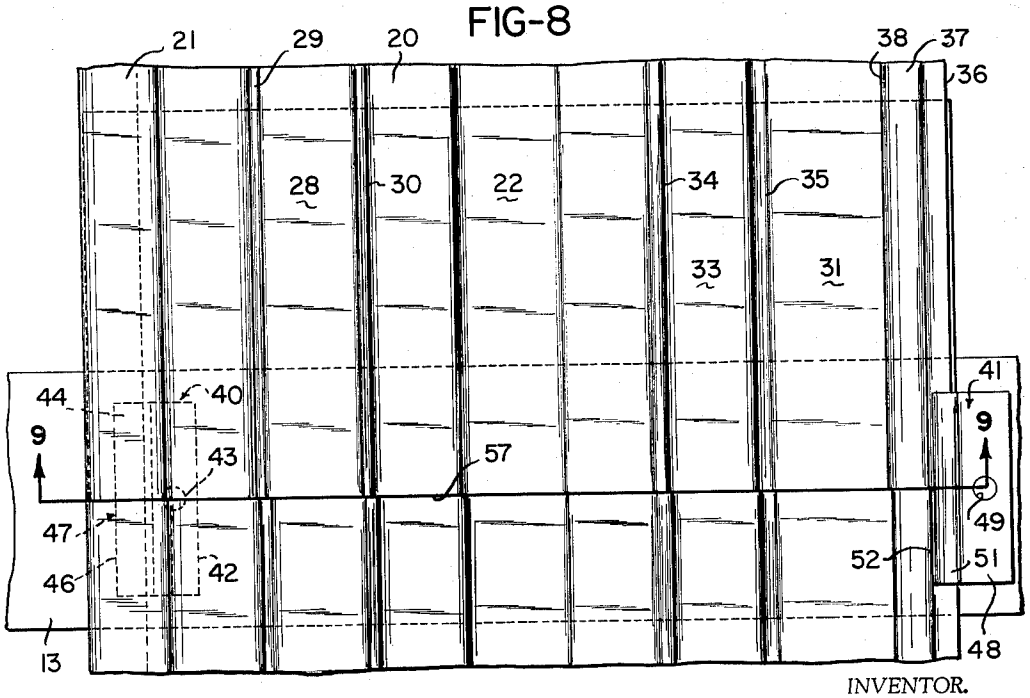


FIG-8



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3,253,376

PANEL CONSTRUCTIONS AND THE LIKE

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Filed Nov. 6, 1962, Ser. No. 235,722
8 Claims. (Cl. 52—512)

This invention relates to improved panel constructions, such as roofing, siding and the like, and to improved parts for such panel constructions or the like.

It is well known that many forms of sheet metal panel means or the like have been provided for roofing and siding installations.

However, many problems are encountered in forming such panel constructions.

For example, expansion and contraction of the panel construction must be accommodated, rattling should be reduced or minimized, ease of assembly should be provided, adequate sealing against leakage must be assured, and undue spreading of the panel means under load, such as when ornamental three dimensional shapes are employed, must be prevented.

It is, therefore, a feature of this invention to provide a panel construction or the like capable of satisfying the above requirements as well as having other advantages.

Accordingly, it is an object of this invention to provide an improved panel construction having one or more of the novel features set forth above or hereinafter shown or described.

Another object of this invention is to provide an improved part for such a panel construction or the like.

Other objects, uses and advantages of this invention are apparent from a reading of this description, which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a fragmentary, perspective view of one of the improved panel means of this invention.

FIGURE 2 is a fragmentary, perspective view of a fastening means for the initial panel construction of this invention.

FIGURE 3 is a view similar to FIGURE 2, illustrating subsequent fastening means of this invention.

FIGURE 4 is a schematic side view illustrating the nestability of the panel means of FIGURE 1.

FIGURE 5 is a fragmentary, partial cross-sectional view illustrating one embodiment of the panel construction of this invention.

FIGURE 6 is a fragmentary, top view illustrating the panel means of FIGURE 1 to be utilized in aligned relation with another panel means.

FIGURE 7 is a cross-sectional view taken on line 7—7 of FIGURE 6.

FIGURE 8 is a fragmentary, top view illustrating aligned and overlapped panel means of this invention.

FIGURE 9 is a cross-sectional view taken on line 9—9 of FIGURE 8.

While the various features of this invention are hereinafter described as being particularly adaptable for forming sheet metal panel constructions for roofing and siding purposes, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide other constructions as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURE 5, an improved panel construction of this invention is generally indicated by the reference numeral **10** and comprises a roofing installation or the like. However, it is to be understood that the panel construction **10** could comprise a siding or other installation, as desired.

As illustrated in FIGURE 5, the panel construction **10** includes a plurality of rafters or trusses **11** on which are mounted a plurality of spaced and transversely disposed girts or purlins **12**.

For example, each purlin **12** can have a substantially U-shaped cross-sectional configuration defined by a cross member **13** and a pair of legs **14** integrally secured to the opposed ends of the cross member **13**, the lower leg **14** being secured to the rafters **11** by fastening means **15** in any suitable manner.

A plurality of panel means **16** are in turn secured to the purlins **12** and are arranged in aligned overlapping relation and in interlocking and overlapping rows in a manner hereinafter described.

While the panel means **16** can be formed of any suitable material and in any suitable manner, the embodiments thereof illustrated in the drawings are formed by stamping or drawing aluminum-containing metallic sheet material or the like, such as Alclad 3004 aluminum alloy which can be embossed, painted, or both, or remain plain, as desired.

As illustrated in FIGURE 1, each panel means **16** has a pair of opposed hook-shaped end portions **17** and **18** and an inverted channel portion **19** disposed intermediate the end portions **17** and **18**, the channel portion **19** being defined by an upper wall **20** and oppositely angled side walls **21** and **22**.

The hook-shaped end portion **17** of each panel means **16** is integrally joined to the side wall **21** of its respective channel portion **19** by a substantially semicircular portion **23**, the end portion **17** including a downwardly directed, substantially straight portion **24** and a reversely turned and upwardly directed substantially flat portion **25** having the free end **26** thereof turned upon itself for reinforcing purposes.

In this manner, it can be seen that the hook-shaped end portion **17** of each panel means **16** is disposed beneath its respective channel portion **19** and has the reversely turned portion **25** thereof directed toward the side wall **21** for a purpose hereinafter described.

In order to add strength to the upper wall **20** of the channel portion of each panel means **16**, an upwardly directed channel portion **27** is provided therein and is defined by a lower wall **28** and a pair of oppositely angled side walls **29** and **30**.

The hook-shaped end portion **18** is spaced from the side wall **22** of the channel portion **19** of each panel means **16** by an intermediate, substantially flat portion **31**.

To reinforce the flat intermediate portion **31** of each panel means **16**, an inverted channel portion **32** is provided therein and is defined by an upper wall **33** and oppositely angled side walls **34** and **35**.

While the side walls **21**, **22**; **29**, **30**; and **34**, **35** of the channel portions **19**, **27** and **32** can be disposed at any angle relative to the horizontal, it is found that if the same are disposed at approximately 45 degrees relative to the horizontal, the resulting structure provides a relatively strong panel means **16** for the intended purpose thereof.

For example, it has been found that the angle of 45 degrees relative to the horizontal gives the greatest area of coverage for the panel means **16** per amount of strength thereof.

The end portion **18** of each panel means **16** includes an outwardly and upwardly directed looped portion **36** provided with a reversely turned substantially flat portion **37** extending upwardly toward the side wall **22** and having a looped, hook-shaped reinforcing free end **38** for a purpose hereinafter described.

While the panel means **16** can have any desired dimensions, it has been found that when the panel means **16**

is formed of the above-mentioned aluminum-containing metallic material and has a thickness of 0.032 of an inch, the overall width thereof between the end portion **17** and **18** should be approximately 18.313 inches, with the overall length of each panel means **16** varying as desired.

When the panel means **16** is formed of the above dimensions, it has been found that no horizontal flat section thereof has a width greater than 1.382 of an inch, whereby good structural strength is provided by the panel means **16** of this invention.

One means for determining the effective overall width of the panel means **16** when placed under compression is to multiply 1.7 by the thickness of the panel means **16** by the square root of the modulus of elasticity thereof divided by the allowable stress.

However, it is to be understood that this invention is not to be limited to any particular dimensions and the above figures are merely given as one example of a workable panel means **16**.

While each of the panel means **16** of this invention is provided with the afore-described configuration for ornamental as well as functional purposes, as will be apparent hereinafter, it is to be understood that the particular configurations of the panel means **16** permit the panel means **16** to be compactly arranged together for storing and shipping purposes.

For example, reference is made to FIGURE 4 wherein it can be seen that a plurality of panel means **16** can be readily arranged in the pattern illustrated to form a substantially rectangular assembly **39** which can be readily held together by placing double wall corrugated fibre board or the like against the top, bottom, sides and ends with 2 x 4 battens arranged around the same and held together by steel strapping or the like whereby the panel means **16** can be readily shipped and stored in compact form.

While any suitable means can be utilized for fastening the panel means **16** to the supporting structure **12** previously described, one such means is illustrated in FIGURES 2 and 3 which respectively illustrate a starter clip **40** and an anchor clip **41**.

While the starter clip **40** and anchor clip **41** can be formed of any suitable material, the embodiments thereof illustrated in the drawings are formed by stamping suitable sheets of aluminum-containing metallic material or the like or are formed by extrusion, as desired.

As illustrated in FIGURE 2, each starting clip **40** comprises a substantially flat anchor portion **42** having one or more apertures **43** passing therethrough and integrally interconnected to a substantially flat portion **44** by an angularly disposed wall **45**, the flat portion **44** having a downwardly turned end **46** to provide a hook-shaped portion **47**.

As illustrated in FIGURE 3, each anchor clip **41** comprises a substantially flat portion **48** provided with one or more apertures **49** passing therethrough and integrally interconnected to a hook-shaped portion **50** defined by a pair of legs **51** and **52** integrally joined together and angularly disposed relative to each other.

One method for assembling the panel construction **10** of this invention will now be described.

Starting at the lower left-hand corner of the roof construction or the like, a starting clip **40** is secured to the purlin **12** by a threaded fastening member **53** passing through the aperture **43** thereof and being threadedly disposed in a threaded bore passing through the upper leg **14** of the purlin **12**, the fastening member **53** preferably being disposed at an angle relative to the leg **14**, as illustrated.

After the starting clip **40** has been secured to the purlin **12** in the above manner, the left-hand panel means **16** is placed on the purlin **12** with the channel portion **19** thereof covering the starter clip **40** but with the hook-shaped end portion **17** thereof being disposed to the left of the starter clip **40**.

Thereafter, the left-hand panel means **16** is moved to the right to cause the portion **25** of the hook-shaped end portion **17** thereof to cam under the turned end **46** of the starter clip **40** until the free end **26** thereof snaps under the turned portion **46** of the starter clip **40**.

Preferably, the left-hand panel means **16** is moved to the right relative to the starter clip **40** until the same is centered between the turned portion **46** and wall **45** thereof as illustrated in FIGURE 5.

Because of the natural resiliency of the end portion **17** of the panel means **16**, the end portion **17** thereof is placed into compressed relation with the undersurface of the wall **44** of the starter clip **40** when the substantially flat portion **41** of the left-hand panel means **16** is placed against the upper surface **14** of the purlin **12** as illustrated in FIGURE 5 whereby rattling is reduced to a minimum.

After the left-hand panel means **16** has the end portion **17** thereof secured to the purlin **12** by the starter clip **40**, the other end portion **18** thereof is also secured to the purlin **12** by an anchor clip **41**.

In particular, the anchor clip **41** has the looped portion **36** of the left-hand panel means **16** received between the legs **51** and **52** thereof as illustrated in FIGURE 5 whereby the anchor clip **41** can be secured to the purlin **12** by a threaded fastening member **53** passing through the aperture **49** in the anchor clip **41** and into a thread bore passing through the upper leg **14** of the purlin **12**.

In this manner, the left-hand panel means **16** is firmly secured to the purlin **12** while still permitting longitudinal expansion and contraction thereof relative to the clips **40** and **41**.

Further, the clips **40** and **41** permit the panel means **16** to be secured in place without puncturing the panel means **16** which would cause a source of leakage.

Further, lateral expansion and contraction of the left-hand panel means **16** can take place as the left-hand end portion **17** thereof can move relative to the starter clip **40** within the limits of the parts **45** and **46** thereof.

In addition, should a transverse force be provided downwardly on the upper walls **20** and **33** of the channel portions **19** and **32**, such as by a person walking on the panel means **16** or placing a ladder thereagainst or the like, the panel means **16** is adapted to expand laterally under such forces to absorb the same because the end portion **17** of the panel means **16** is adapted to move to the left relative to the starter clip **40** until the free end **26** of the end portion **17** of the panel means **16** abuts the turn portion **46** of the starter clip **40** whereby further lateral expansion of the panel means **16** is terminated.

After the left-hand panel means **16** has been secured to the purlin **12** in the above manner, the next adjacent panel means **16**, as represented by the right-hand panel means **16** in FIGURE 5, is adapted to be secured in place.

In particular, the right-hand panel means **16** is placed over the left-hand panel means **16** with the end portion **17** thereof disposed to the left of the end portion **18** of the left-hand panel means **16**.

Thereafter, the right-hand panel means **16** is moved to the right to permit the portion **25** of the end portion **17** thereof to cam under the hook-shaped end **38** of the end portion **18** of the left-hand panel means **16** until the right-hand panel means **16** is in the position illustrated in FIGURE 5.

Subsequently, the end portion **18** of the right-hand panel means **16** is secured to the purlin **12** by an anchor clip **41** in the manner previously described.

Therefore, it can be seen that the right-hand panel means **16** is also adapted to laterally expand if transverse forces are opposed thereon in the manner previously described because the end portion **17** thereof is adapted to move to the left until the free end **26** thereof engages the abutment **38** of the end portion **18** of the left-hand panel means **16**.

If desired, before the right-hand panel means **16** is secured to the left-hand panel means **16** in the above

manner, a sealing gasket or caulking **54** can be placed under the flat portion **37** of the end portion **18** of the left-hand panel means **16** as illustrated in FIGURE 5 to provide a sealing means between the end portions **17** and **18** of the respective right-hand and left-hand panel means **16** when the same are disposed in the normal positions thereof.

Therefore, it can be seen that each succeeding row of panel means **16** can be joined to its adjacent row in the above manner whereby the panel means **16** can be completely disposed across the roof structure to form a covering therefor.

Should it be found that the panel means **16** are not long enough to extend from the top of the roof to the bottom thereof, it will be necessary to overlap at least one or more panel means **16** in each vertical row thereof.

The panel means **16** of this invention readily permits such overlapping thereof without providing leakage or rattling situations.

In particular, reference is made to FIGURES 6 and 7 wherein a panel means **16**, which is to have the upper end portion thereof subsequently overlapped by another panel means **16** disposed in aligned relation therewith, has parts of the end portions **17** and **18** thereof removed for a distance of approximately six inches inwardly from the upper free end thereof.

In particular, the end portions **17** and **18** of the overlapped panel means **16** are respectively cut away at points **55** and **56** as illustrated in FIGURES 6 and 7.

Thereafter, the panel means **16** to be overlapped is placed on and secured to the purlin **12** in the above manner as illustrated in FIGURE 8.

Subsequently, the overlapping panel means **16** is disposed over the cut away portion of the overlapped panel means **16** in the manner illustrated in FIGURE 8 whereby the anchor clip **41** as illustrated in FIGURE 9 is adapted to hold the aligned panel means **16** in place as illustrated, it being preferred that the overlap seam **57** illustrated in FIGURE 8 be disposed over a purlin **12** or the like.

Therefore, it can be seen that this invention provides improved panel constructions for roofing or siding purposes as well as improved parts for such panel construction or the like, the panel means of this invention being adapted to have adjacent rows thereof overlapped and interlocked together and being adapted to be disposed in aligned overlapping relation in each row thereof.

Further, the improved panel constructions of this invention are substantially leak proof because the fastening means do not puncture the panels thereof.

In addition, should water leak past the sealing means **54** into the area between overlapped panels **16**, the same will be trapped in the trough defined between the looped portion **36** and flat portion **37** of the overlapped panel **16** and drain out of the eave because of the slope of the roof construction **10**.

For example, water could be stacked up on the roof construction **10** to the height of the upper wall **20** of the overlapping panel **16** and the troughs between the looped portion **36** and flat portion **37** of each overlapped panel **16** will sufficiently drain away such water that leaks past the sealing means **54** before the same can leak into the house or building.

Therefore, the roof constructions of this invention can be installed on roofs having slopes as low as ½ inch in every 12 inches, whereas the minimum slope for most roof construction is 3 inches in every 12 inches.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. In combination, a supporting means, and a pair of interlocked and overlapped panel means attached to each other and to the supporting means, each panel means having opposed ends and a body portion, one end of each panel means having a hook-shaped portion disposed beneath said body portion thereof, the other end of each panel means having an outwardly and upwardly directed looped portion defined by said other end being doubled back upon itself and having a hooked-shaped free end portion disposed over said body portion thereof and spaced from said looped portion by a substantially straight portion extending from said doubled back looped portion, said hook-shaped portion at said one end of one of said panel means overlapping with said hook-shaped portion at the other end of the other of said panel means.

2. In combination, a supporting means, and a pair of interlocked and overlapped panel means attached to each other and to the supporting means, each panel means having opposed ends and a body portion, one end of each panel means having a hook-shaped portion disposed beneath said body portion thereof, the other end of each panel means having an outwardly and upwardly directed looped portion defined by said other end being doubled back upon itself and having a hook-shaped free end portion disposed over said body portion thereof and spaced from said looped portion by a substantially straight portion extending from said doubled back looped portion, said hook-shaped portion at said one end of one of said panel means overlapping with said hooked-shaped portion at the other end of the other of said panel means, and fastening means hooked over said looped portions of said panel means and secured to said supporting means to attach said panel means to said supporting means.

3. In combination, a supporting means, and a pair of interlocked and overlapped panel means attached to each other and to the supporting means, each panel means having opposed ends and a body portion, one end of each panel means having a hook-shaped portion disposed beneath said body portion thereof, the other end of each panel means having an outwardly and upwardly directed looped portion defined by said other end being doubled back upon itself and having a hook-shaped free end portion disposed over said body portion thereof and spaced from said looped portion by a substantially straight portion extending from said doubled back looped portion, said hook-shaped portion at said one end of one of said panel means overlapping with said hook-shaped portion at the other end of the other of said panel means, and a fastening means hooked over said hook-shaped portion at said one end of said other panel means and secured to said supporting means to attach said one end of said other panel means to said supporting means.

4. In combination, a supporting means, and a pair of interlocked and overlapped panel means attached to each other and to the supporting means, each panel means having opposed ends and a body portion, one end of each panel means having a hook-shaped portion disposed beneath said body portion thereof, the other end of each panel means having an outwardly and upwardly directed looped portion defined by said other end being doubled back upon itself and having a hook-shaped free end portion disposed over said body portion thereof and spaced from said looped portion by a substantially straight portion extending from said doubled back looped portion, said hooked-shaped portion at said one end of one of said panel means overlapping with said hook-shaped portion at the other end of the other of said panel means, each panel means having an inverted channel portion in said body portion intermediate said ends thereof.

5. A combination as set forth in claim **4** wherein said channel portion of each panel means is defined by an upper wall and a pair of oppositely angled side walls.

6. A combination as set forth in claim **5** wherein said upper wall has a longitudinal channel therein.

7. A combination as set forth in claim **5** wherein said one end of each panel means is interconnected to one of

said side walls of its respective channel portion and extends under the same.

8. A combination as set forth in claim 5 wherein said other end of each panel means is spaced from one of said side walls of its respective channel portion by an intermediate portion disposed against said support means.

References Cited by the Examiner

UNITED STATES PATENTS

237,133	2/1881	Sagendorf	52—520
358,405	2/1887	Niehaus	52—470
403,899	5/1889	Abrahams	52—528
1,706,924	3/1929	Kane	52—529
2,632,538	3/1953	Schmidt	52—520
2,918,151	12/1959	Kennedy	52—588

3,041,784	7/1962	Facer et al.	52—521
3,047,111	7/1962	Clements et al.	52—520
3,119,473	1/1964	Mitchell	52—529 X
3,135,070	6/1964	Waring et al.	52—94
3,157,965	11/1964	Watson	52—394

FOREIGN PATENTS

1,189,617	3/1959	France.
1,235,993	6/1960	France.

OTHER REFERENCES

German printed application No. 1,055,219, 4–1959.

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