

[54] **CARRIER FOR NAILS FOR NAIL DRIVING DEVICE**

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[51] Int. Cl..... B65d 21/00, B65d 85/24

[58] Field of Search..... 206/56 DF, 56 AB, 65 F, 206/65 R, 65 A, 17; 220/23.4, 23.6, 97 R; 211/40, 126; 248/68 R

[56] **References Cited**
UNITED STATES PATENTS

2,511,730	6/1950	McClain	211/40
2,598,492	5/1952	Boes	206/65 A
2,823,789	2/1958	Henning	206/56 AB
3,154,192	10/1964	Cowley	206/17
3,363,544	1/1968	Eriksen	211/126

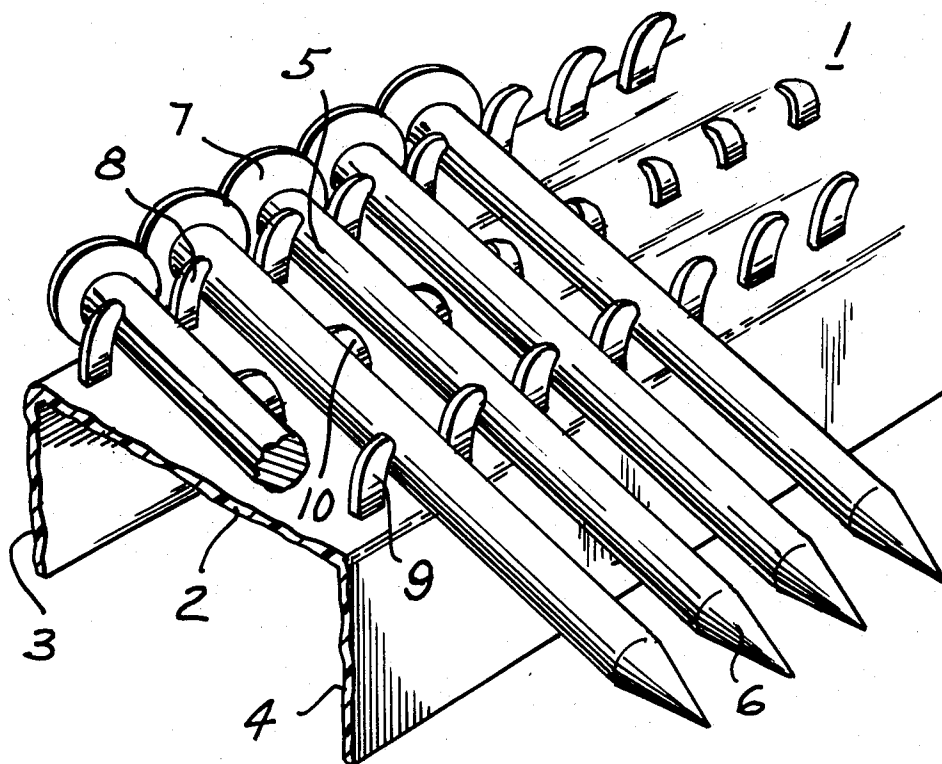
3,363,864	1/1968	Olgreen.....	248/68 R
3,438,487	4/1969	Gallee et al.	206/56 DF
3,737,031	6/1973	Carroll.....	220/23.6

Primary Examiner—William T. Dixon, Jr.
Attorney, Agent, or Firm—Hane, Baxley & Spieccens

[57] **ABSTRACT**

There is disclosed a nail carrier for supporting and locating nails to be fed to a power-operated nail driving device. This carrier comprises a rigid bottom plate mounted in a slanted position. The plate has secured thereto on its top side a first group of rigid studs arranged in two parallel spaced-apart rows and a second group of yielding studs disposed in one row parallel to the two other rows. The studs in the three rows are so correlated that each two studs of the first group in conjunction with one stud of the second group provide a locating position for a nail in which two studs of the first group are on one side of such nail and one stud of the second group is located on the opposite side of the nail. Each of the three studs has a tip bent to overlie the nail placed therebetween. Removal of a nail can be effected by applying a pulling force thereto, such pulling force causing the stud of the second group to yield, thereby freeing the nail.

5 Claims, 18 Drawing Figures



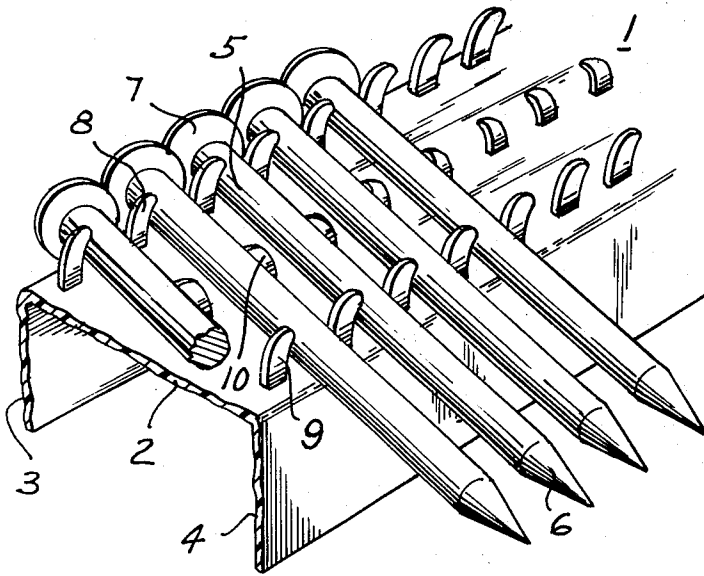


FIG. 1

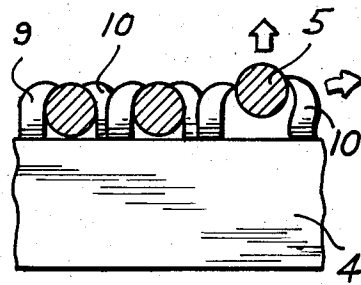


FIG. 2

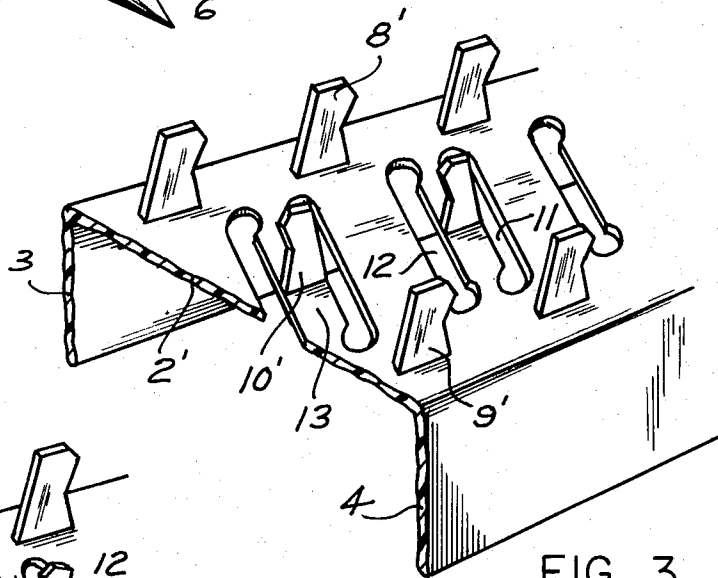


FIG. 3

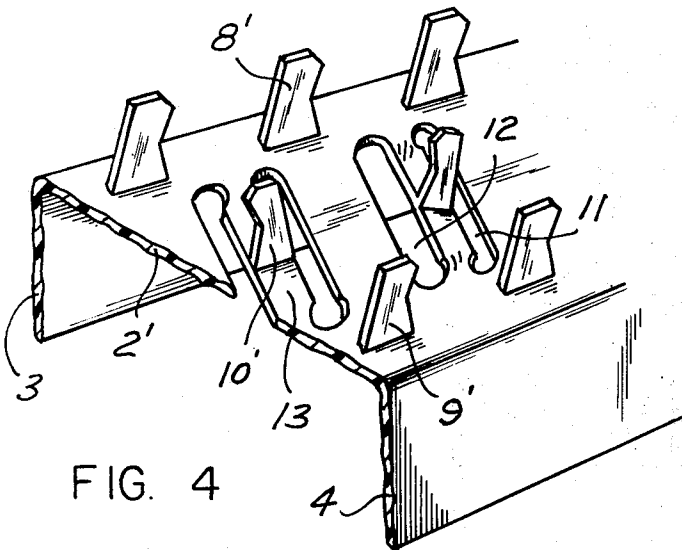


FIG. 4

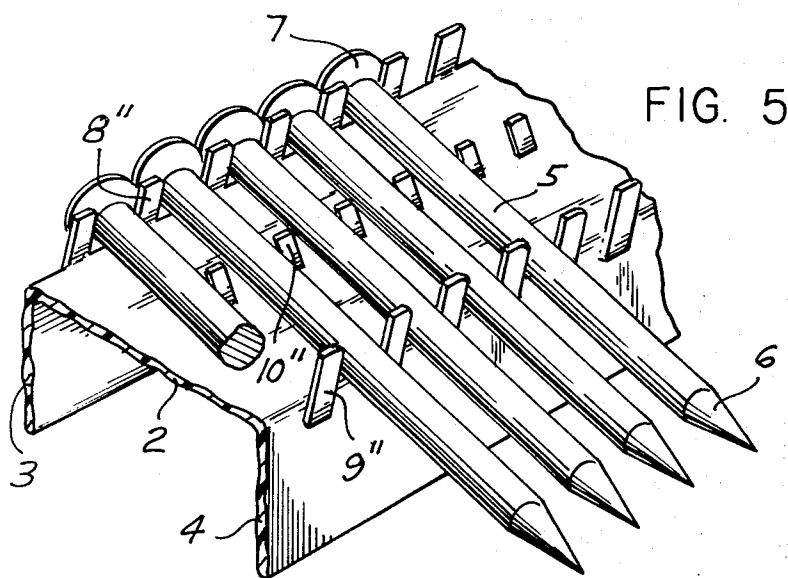


FIG. 5

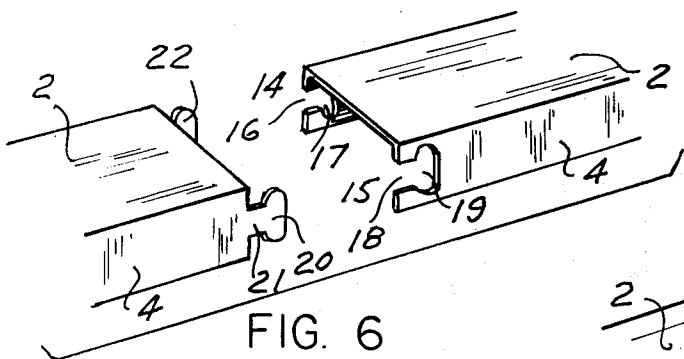


FIG. 6

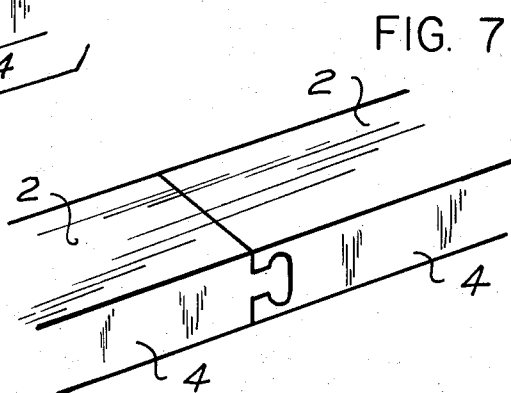


FIG. 7

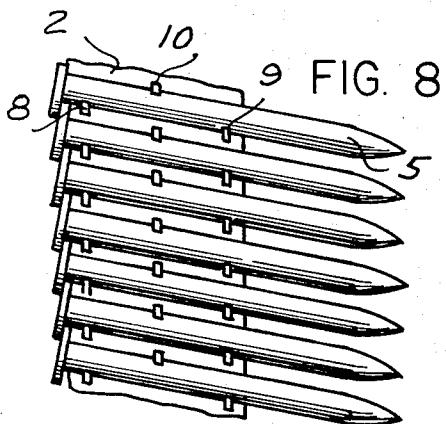


FIG. 8

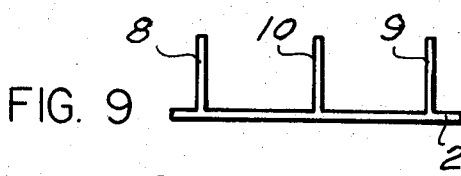


FIG. 9

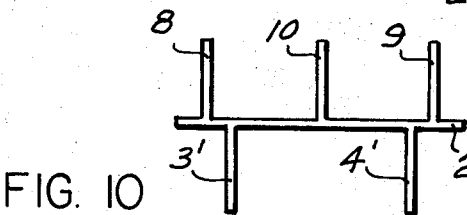


FIG. 10

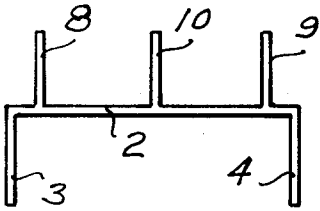


FIG. 11

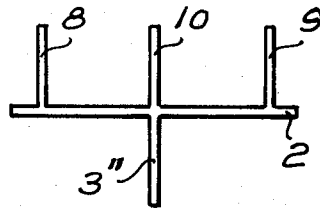


FIG. 12

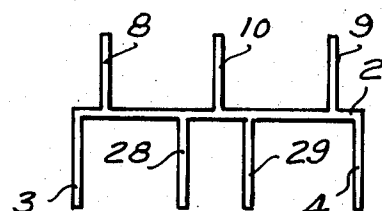


FIG. 13

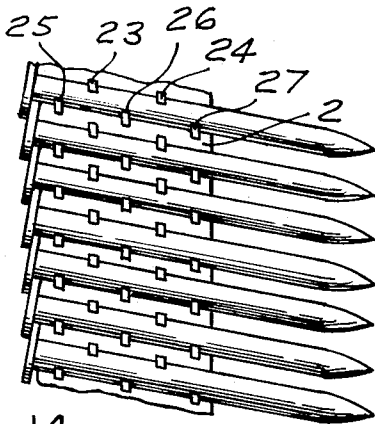


FIG. 14

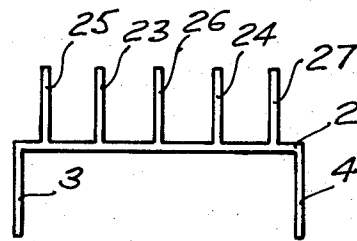


FIG. 15

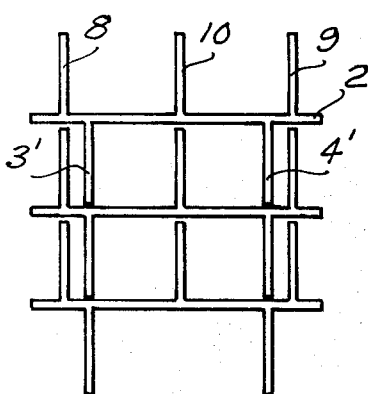


FIG. 16

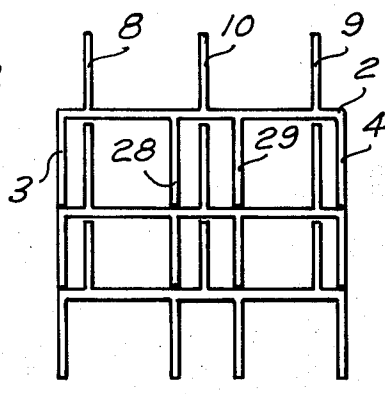


FIG. 17

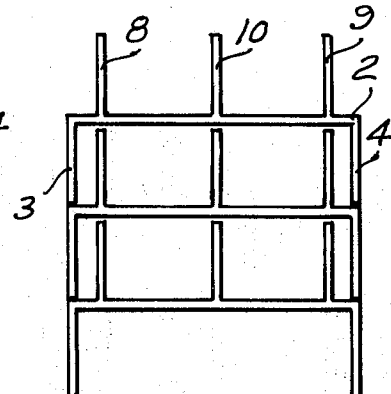


FIG. 18

CARRIER FOR NAILS FOR NAIL DRIVING DEVICE

The present invention relates to a carrier for nails for a nail driving device. Such devices can be powered in various ways, e.g., with compressed air or with explosive gas from small cartridges. In both cases a piston is driven, which hits a nail, which has been placed in a guide sleeve in which the piston moves. In order to achieve rapid nailing, various carriers have been created, e.g., one in which the nails are arranged after each other and parallel with each other between two long strips of paper. The nails form an angle with the longitudinal direction of the strips, and are glued to the strips. It has now proved that the procedure involved in preparing a nail carrier of said kind is both expensive and time-consuming, and much waste occurs when such carriers are prepared.

The purpose of the present invention is to create a carrier, where the above-mentioned drawbacks are avoided, and where also gluing and heating procedures are eliminated.

According to the invention, a strip is used, which should preferably be as rigid as possible. On the top of the strip, two groups of studs, directed upwards, are arranged for each nail. These two groups together secure the nail. The studs in the two groups can be moved in relation to each other. The studs in the group which is in front of the nail in the feeding direction have a spring action, while on the other hand, the studs in the group behind are rigid. At both of its ends the strip part is provided with members so that it can be connected together with identical strip parts, in such a way that the distance between the nails at the joints will be the same as on the actual strip part.

According to a favourable embodiment, the strip part is provided with reinforcing sections. The strip part with the reinforcing sections can have a U-profile.

By arranging the studs and the reinforcing sections in a certain way, the carrier units can be made so that they can be stacked upon each other.

According to a favourable embodiment, the group of studs which are to be rigid can be positioned at the edge of the strip part, and there can be two of them, while the other group, which is to be flexible, can consist of one stud and can be positioned in the middle of the strip part.

According to a special embodiment, the last-mentioned one stud can also be made rigid, but the strip part should then be provided with a stamped out section in front of and behind the stud, so that the stud will be fastened to a transversal strip which has torsion spring properties.

Carriers according to the present invention can be made of any suitable material whatsoever which meets the above-mentioned requirements. A suitable material is plastic, and one of the groups of studs should be made of harder material than the other. The studs in both groups can be made of hard material if the studs in one of the groups have recesses in front of and behind them, so that an element of the strip will thus provide spring action.

Further characteristics of the present invention will be noted from the following claims.

A couple of examples of embodiments according to the present invention will be described with reference to the attached five drawings, in which

FIG. 1 shows a carrier unit with nails in perspective,

FIG. 2 shows a side view of said carrier, at the same time showing how a nail is being removed,

FIGS. 3 and 4 show another embodiment of a carrier in two different situations,

FIG. 5 shows a third embodiment of a carrier,

FIGS. 6 and 7 show a connection of carriers,

FIG. 8 shows the carrier according to FIG. 1 viewed from above,

FIG. 9 shows a cross-section of the last-mentioned carrier without reinforcing sections,

FIG. 10 shows the same carrier with reinforcing sections,

FIG. 11 shows the same carrier with a second variant of reinforcing sections,

FIG. 12 shows the same carrier with a third variant of reinforcing sections,

FIG. 13 shows the same carrier with a fourth variant of reinforcing sections,

FIG. 14 shows the same carrier as in FIG. 1, but provided with a greater number of studs,

FIG. 15 shows a cross-section of the last-mentioned carrier without nails,

FIG. 16 shows how carriers according to FIG. 10 can be stacked,

FIG. 17 shows how carriers according to FIG. 13 can be stacked, and

FIG. 18 shows how carriers according to FIG. 11 can be stacked.

FIG. 1 shows a carrier 1. The carrier has a strip part, or bottom part 2, which is made of as rigid material as possible. At its edges, the strip part, or bottom part, has two reinforcing sections, or flanges, 3 and 4, which are directed downwards. The bottom part and the reinforcing sections together have the same profile as a channeled bar. On the top there are two rows of studs 8 and 9, directed upwards, for each nail 6 to be secured by the studs. Each nail has a pointed top 6 and a head 7. The nails are placed parallel with each other, and then in such a way that the longitudinal direction of the nails from an angle with the longitudinal direction of the carrier. This angle particularly deviates from 90°. By having such an oblique positioning, the heads of the nails can partly overlap each other, as will be noted from the figure. A greater number of nails can thereby be placed on the carrier. For each nail, there are provided of studs 8 and 9, and there is further provided a row of studs one stud 10 being provided for each nail. The nails are not positioned exactly opposite each other, whereby the studs can be made more sturdy than if they were placed opposite each other, when the nails are to lie close to each other. Each stud has the distance between two nails allotted to it, and need not share this space with a second stud. Any suitable material whatsoever can be used for the manufacture of the carrier with bottom part, reinforcing sections and studs. The bottom part should be as rigid as possible, as this part, when it coacts with a nail driving device, is subjected to a pressure against its left side. It is then, of course, appropriate that the bottom part is not bent. Further, also each stud in the row of studs which acts upon the left side of each nail should be as rigid as possible, so that no movement of the nail to the left in relation to the bottom part 2 is imparted to the nail. On the other hand, the studs 10 on the right side of the nail should be made of softer material, so that the nail can leave

the carrier when it reaches a guide sleeve of a nail driving device. In this situation the nail is given a movement which is at right angles to the surface of the bottom part. The way in which the movement takes place will be noted from FIG. 2.

It should be obvious that a carrier of the above-mentioned kind is extremely easy to load with a suitable machine. The loading procedure is rapid. No glue is required, and it is very cheap to make the carrier of cast plastic.

The flexible studs 10 can be of the same hard kind as the studs 9 and 8, but can be given a spring action through certain cut-out sections and recesses or in some other appropriate way. A softer plastic material can, of course, be used.

The carrier according to FIGS. 3 and 4 conforms, in general, to the carrier according to FIGS. 1 and 2. The only difference is that a hard stud 10' is used, which corresponds to the stud 10 in FIGS. 1 and 2. Said stud is given a spring action by the bottom part 2' having been made with two transversal cut-out sections 11 and 12 behind the stud 10' and in front of the stud 10'. In this way, the stud 10' will be mounted on a narrow strip-like part 13. This strip-like part 13 functions as a torsion spring. The spring action of the actual stud 10' is thus transferred to the strip-like part 13. In FIG. 4 it is clearly shown how the strip-like part 13 functions as a torsion spring. The non-flexible studs in the carrier are 8' and 9'.

FIG. 5 shows a carrier of the same kind as the one according to FIG. 1, except that the studs 8 and 9 according to FIG. 1 have been moved out to the outer edges of the bottom part 2. In FIG. 5 the studs have been given the reference designations 8'' and 9''. This positioning of the studs has the advantage that it is easier to manufacture the carrier.

As the carrier according to the invention has a limited length, and as it is a desire, when using carriers of the present kind, to have the same advantage as when an infinitely long band is used, it must be possible to connect the carriers together, in such a way that the nails in the joint section will have the same distance between them as on a carrier. FIGS. 6 and 7 show a way in which two carriers can be connected together. It should be obvious that there are many different ways. In the present case it has been chosen to utilize the reinforcing flanges 3 and 4, in such a way that in one end of the carrier a male member is formed and in its other end a female member. In FIG. 6, two axial slots 14 and 15 have been made, each of which first have a narrow part 16 and 18, and thereafter a wider part 17 and 19. The following carrier, arranged to the left, first has a part 20 corresponding to the recess 19 and thereafter a part 21 corresponding to the recess 18. It also has a part 22 which fits into the recess 10 and a not shown part which fits into the recess 16. FIG. 7 shows how two carriers have been connected together. Another way of connecting two carriers together is to arrange a straight linear male part at one end of the bottom part of the carrier which coacts with a straight linear female part at an adjacent carrier.

FIG. 8 shows the same carrier as the one according to FIG. 1, viewed from above. FIG. 9 shows a cross-section of the last-mentioned carrier without reinforcing sections. The bottom part must then be made as rigid as possible. FIG. 10 shows a cross-section of the carrier according to FIG. 8, provided with two reinforcing

sections 3' and 4', arranged between the outer edges of the bottom part 2. FIG. 11 shows a cross-section of the carrier according to FIG. 8, provided with reinforcing sections 3 and 4 at the bottom part 2, the reinforcing sections then being located at the outer edges of the bottom part. FIG. 12 also shows a cross-section of a carrier according to FIG. 8, provided with only one reinforcing section 3'. FIG. 13 shows a cross-section of the carrier according to FIG. 8, provided with the reinforcing sections 3 and 4, as well as two additional reinforcing sections 28 and 29.

FIG. 14 shows a carrier of the kind shown in FIG. 1, viewed from above, in which each nail 5 is secured by two groups of studs, each group of studs containing a greater number of studs than in FIG. 1. Thus, in FIG. 14, one of the groups contains the studs 23 and 24, and the other group the studs 25, 26 and 27. FIG. 15 shows a cross-section of the carrier according to FIG. 14. The magazine has two reinforcing sections 3 and 4. FIG. 16 shows how carriers according to FIG. 10 can be stacked. FIG. 17 shows how carriers according to FIG. 13 can be stacked, and FIG. 18, finally, shows how carriers according to FIG. 11 can be stacked.

From the foregoing, it will be noted that the present invention relates to a rigid strip, where nails are arranged parallel with each other in the transverse direction and each nail is secured by two groups of studs, the studs in the feeding direction then being flexible, while the studs on the other side are as rigid as possible. The invention can, of course, be varied within the scope of this.

I claim:

1. A nail carrier for supporting and locating nails to be fed to a power-operated nail driving device, said carrier comprising:

a substantially rectangular bottom plate made of rigid material; mounting means supporting said bottom plate at a slant relative to a horizontal plane; a first group of rigid studs fixedly secured to the top side of the bottom plate in two spaced apart rows parallel to each other and to one pair of opposite edges of the bottom plate; a second group of yielding studs secured to the top side of the plate in one row disposed intermediate to the two rows of the studs of the first group and parallel thereto; the locations of the studs in both groups being correlated so that one stud in each row of the first group in conjunction with one stud in the second group define therebetween a guide and restraint position for a nail in which the respective two studs of the first group on one side of the nail and the one stud of the second group is on the other side of the nail, each of the studs in both groups having a bent tip overlying a nail placed in said guide and restraint position whereby said nail is restrained in its position but removable therefrom by yielding of the respective stud of the second group in response to a pulling force applied to said nail.

2. The carrier according to claim 1 wherein said bottom plate comprises pairs of slots, each of said pairs defining a flexible tongue and each of the studs of the second group being secured to one of said tongues thereby supporting said studs yieldably relative to the respective two studs of the first group.

3. The carrier according to claim 1 wherein said two studs of the first group are secured to the bottom plate along said pair of opposite edges thereof.

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4. The carrier according to claim 1 wherein the bottom plate has engaging coupling means at one of the edges of the second pair of opposite edges of the plate and receiving coupling means on the other edge of said second pair of opposite edges for releasably coupling bottom plates as defined in claim 6, said coupling means being correlated to join plates so as to maintain

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the stud spacings in the rows of studs.

5. The carrier according to claim 1 wherein said mounting means constitutes reinforcing means reinforcing the bottom plate and including leg portions disposed for nesting with leg portions on a second bottom plate as defined in claim 6.

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