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2,032,485

VACUUM FRAME ARRANGEMENT

Filed Oct. 30, 1934

3 Sheets-Sheet 1

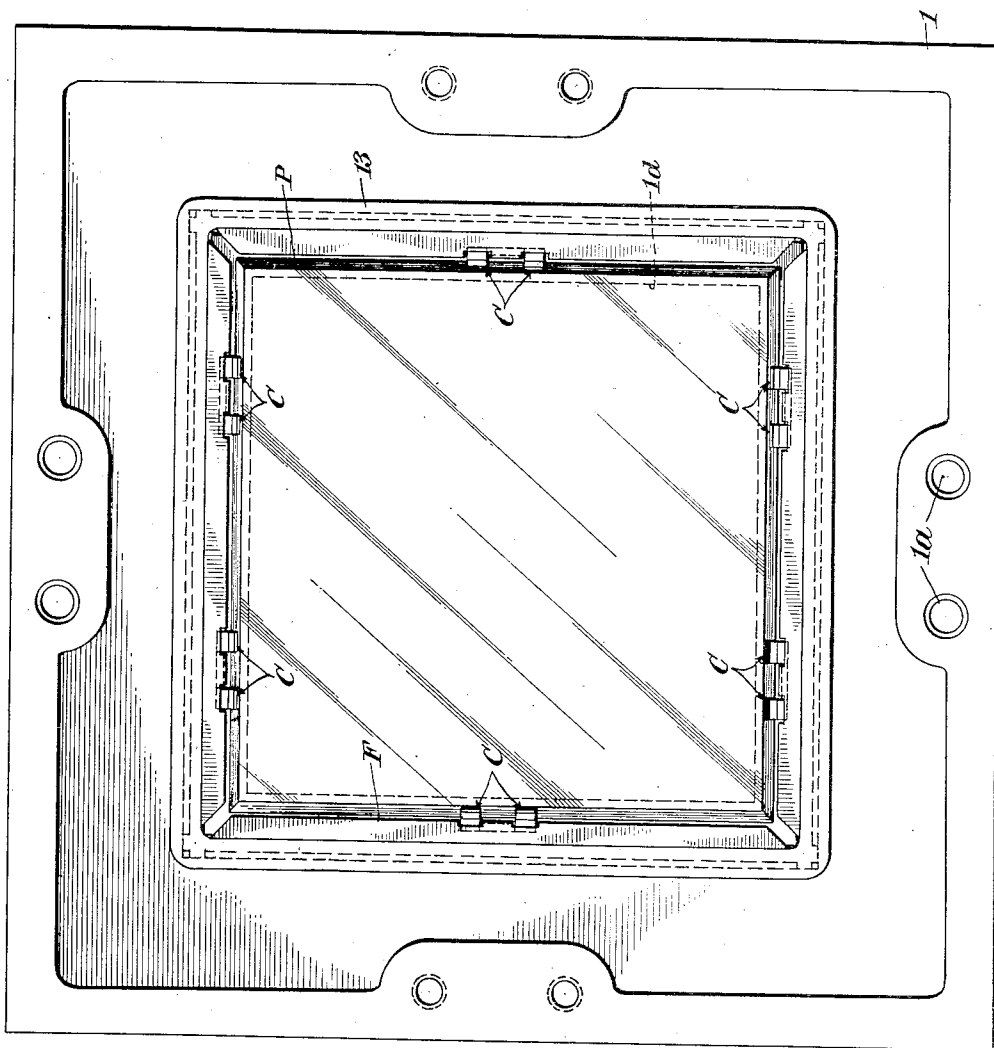
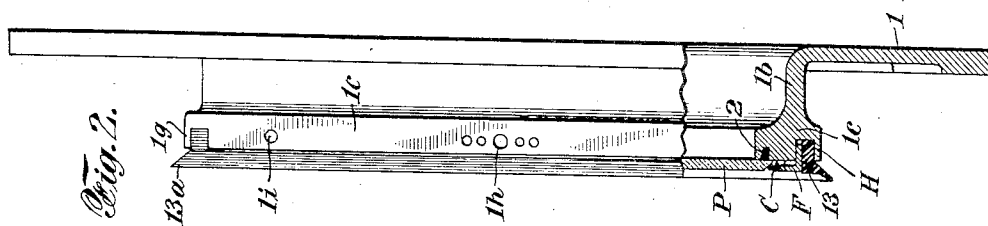


Fig. 1.

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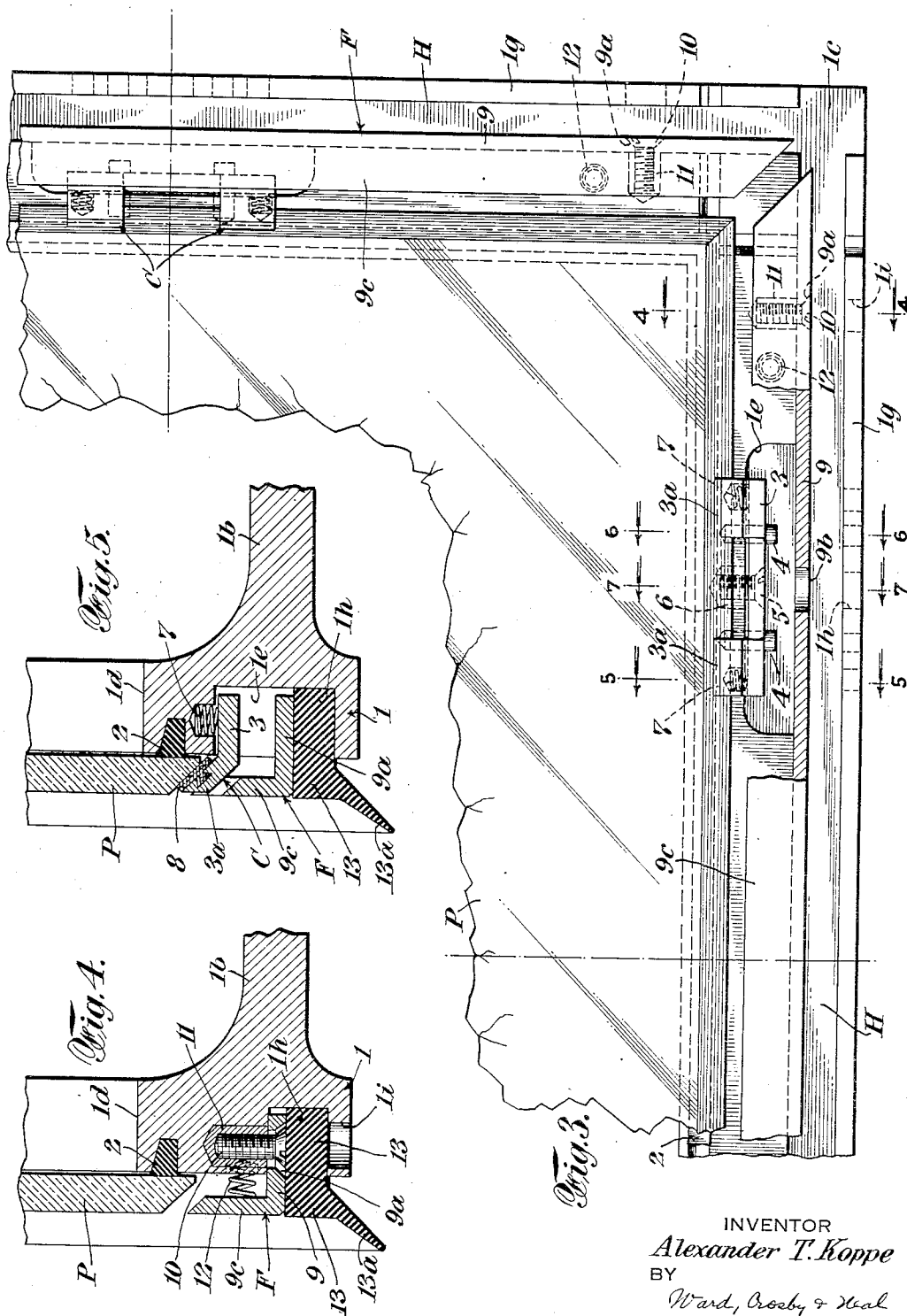
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3 Sheets-Sheet 2



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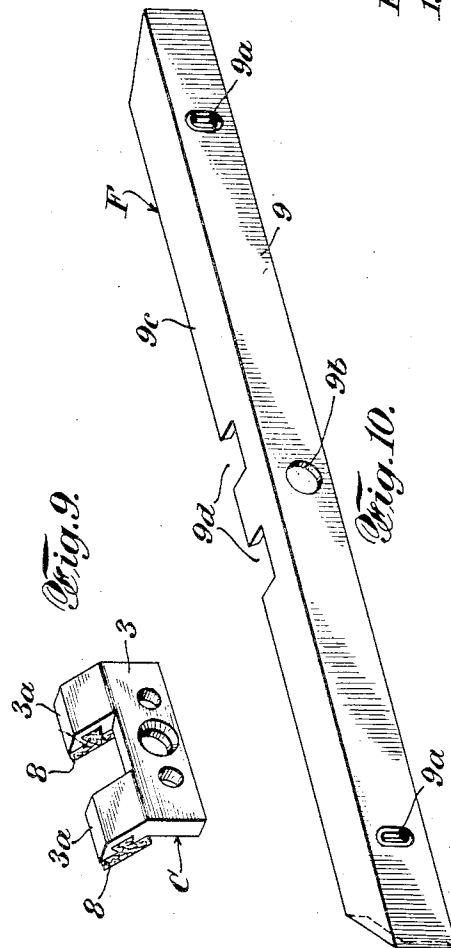
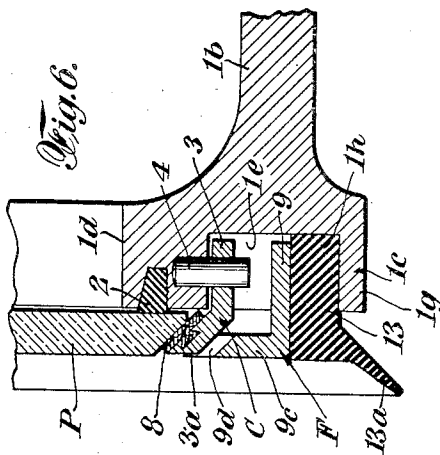
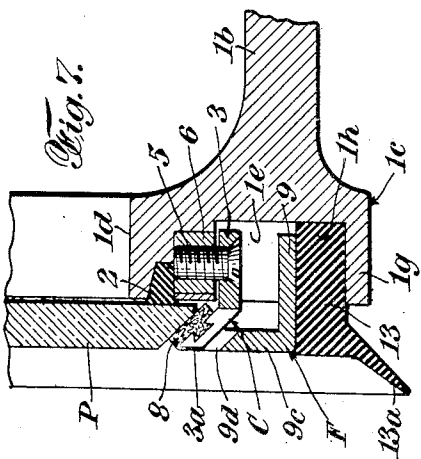
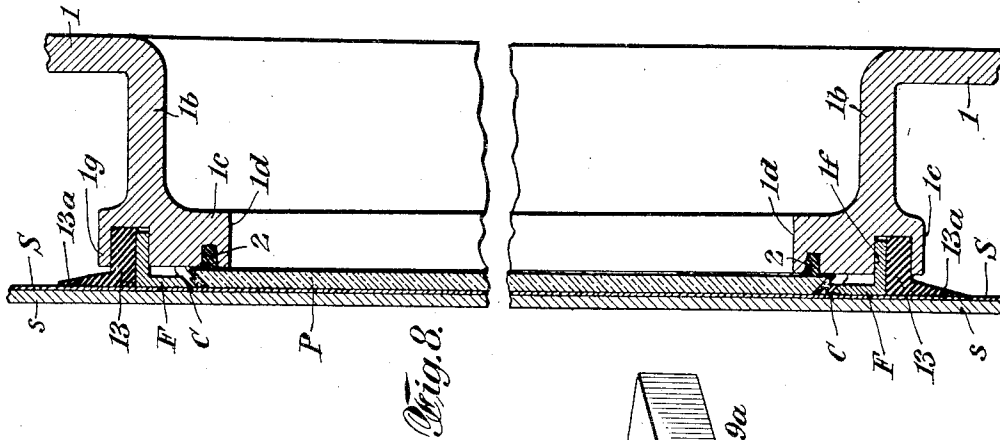
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3 Sheets-Sheet 3



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2,032,485

VACUUM FRAME ARRANGEMENT

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Application October 30, 1934, Serial No. 750,707

4 Claims. (Cl. 95—76)

My invention relates to a vacuum frame arrangement adapted for use with a photo-composing machine, or equivalent.

My invention has particular reference to a vacuum frame arrangement of such improved character that it may readily be associated in a highly satisfactory manner with the light sensitive surface of a photo-composing machine.

Various other objects, advantages and characteristics of my invention will become apparent from the following description.

My invention resides in the vacuum frame arrangement, features and combinations of the character hereinafter described and claimed.

For an understanding of my invention and for an illustration of one of the forms thereof, reference is to be had to the accompanying drawings in which:

Figure 1 is an elevational view of a vacuum frame as constructed in accordance with my invention;

Fig. 2 is an edge elevational view, partly in section, of the frame shown in Fig. 1;

Fig. 3 is an enlarged, fragmentary elevational view, partly in section, of said frame;

Fig. 4 is a transverse sectional view, partly in elevation, and is taken on the line 4—4 of Fig. 3 looking in the direction of the arrows;

Fig. 5 is a transverse sectional view, partly in elevation, and is taken on the line 5—5 of Fig. 3 looking in the direction of the arrows;

Fig. 6 is a transverse sectional view, partly in elevation, and is taken on the line 6—6 of Fig. 3 looking in the direction of the arrows;

Fig. 7 is a transverse sectional view, partly in elevation, and is taken on the line 7—7 of Fig. 3, looking in the direction of the arrows;

Fig. 8 is a transverse sectional view, partly in elevation, showing the novel vacuum frame in operative relation with a light-sensitive surface;

Fig. 9 is a perspective view of a part of the clamping mechanism for the transparent plate; and

Fig. 10 is a perspective view of a filler rail.

With vacuum frames of a proposed type, it has been ascertained in practice that the light-sensitive plate or surface of the photo-composing machine becomes embossed or indented throughout an area extending around the negative-carrying plate and within the space defined by the frame proper. This is highly undesirable and is overcome in an advantageous manner by the novel vacuum frame arrangement hereinafter described.

Referring to the drawings, there is illustrated

a vacuum frame arrangement which comprises a square base 1, each side of which is formed with a pair of dowel holes 1a, two dowel holes of each set being disposed on opposite sides of the adjacent frame center line and spaced equidistantly therefrom.

As indicated in Fig. 2, the base 1 comprises the laterally arranged web-sections 1b which terminate in the square supporting structure 1c, the inner surfaces of which define a large square opening 1d through which the projecting light beam passes. The supporting structure 1c is provided with a square channel which receives an endless sealing strip 2 of rubber or other suitable resilient material, this sealing strip normally projecting to some slight extent beyond the outer surface of said supporting structure 1c, Figs. 4-7 inclusive.

The sealing strip 2 forms a support for a plate P of glass or equivalent transparent material, said plate being adapted to carry the usual photographic positive or negative utilizable for photo-composing purposes. For securing the plate P in the position chosen, any suitable clamping arrangement may be provided. As herein shown, this clamping arrangement comprises a plurality of similar clamping devices C each of which comprises a member 3 slidably mounted on a pair of spaced pins 4 seated in the supporting structure 1c and projecting into a chamber 1e formed in said supporting structure. The member 3, between the pins 4, is provided with a passage through which a screw 5 loosely extends, said screw being threaded into a bushing 6 seated in the supporting structure 1c, Fig. 7. Preferably, a pair of helical springs 7, Figs. 3 and 5, are seated in the supporting structure 1c, these springs engaging the member 3 and biasing the same in an outward direction. As clearly shown in Fig. 9, the upper surface of the member 3 terminates in a pair of spaced inclined sections 3a each of which carries a face member 8 of leather or the like adapted to engage the adjacent inclined face of the plate P.

As shown in Fig. 1, the upper and lower horizontal sides of the supporting structure 1c carry a pair of the clamping devices C which are disposed in suitable spaced relation. Further each vertical side of said supporting structure 1c is shown as carrying a single clamping device C which is disposed midway between the top and bottom thereof. It will be understood that the arrangement described immediately above may be varied in any desired manner.

With the base 1 horizontally disposed and with

the sealing strip 2 facing upwardly, the plate P may be disposed thereon after the screws 5 have been sufficiently retracted to permit the necessary outward movement of the clamping members 3. Thereupon, by manipulation of the screws 5, the plate P may be adjusted to a desired position on the supporting structure 1c and then, by completely tightening said screws 5, the plate P may permanently be retained in such position.

The aforesaid supporting structure 1c, outwardly of the above described chambers 1e, is provided with a square channel H defined in part by the rim members 1g of said supporting structure 1c. In accordance with the invention, each side of this channel receives the depending vertical section 9 of a filler rail F of angular configuration in section as shown in Figs. 4-8 inclusive. Vertical elongated slots 9a are formed adjacent each end of the vertical section 9 of each filler rail F and each of these slots has a screw 10 extending loosely therethrough, each screw 10 being threaded into a bushing 11 seated in the supporting structure 1c, Fig. 4.

Preferably, the filler rails F are biased in a direction from right to left, Fig. 4, and, to this end, an arrangement of any suitable character may be utilized. As shown, a pair of helical springs 12 are associated with each filler rail F, these springs being seated in recesses provided respectively therefor in the supporting structure 1c and said springs 12 being positioned adjacent the respective ends of each filler rail as indicated in Fig. 3.

Disposed in the aforesaid channel 1f is an endless sealing strip 13 of rubber or other suitable resilient material, this sealing strip comprising a lateral and angular extending section 13a.

The sealing strip 13 is detached from the vacuum frame arrangement at the time that the plate P is disposed upon the sealing strip 2 and brought to a desired registered position as described above. As shown in Fig. 3, each filler rail section 9 is provided with a passage 9b and the adjacent rim member 1g is provided with a corresponding passage 1h, the passages 9b and 1h being aligned with respect to the screw 5 so that a screw driver may be passed through the aligned passages when the said screw 5 is to be manipulated. Further, as shown in Fig. 3, each rim member 1g is provided with the passages 1i which are aligned with respect to the respective screws 10. With an arrangement of this character, a screw driver may readily be passed through the adjacent passage 1i when one of the screws 10 is to be tightened or loosened.

After the plate P has been clamped in registered position as described above, the entire vacuum frame arrangement may be inverted and then placed upon a suitable flat surface. With the screws 10 retracted, the springs 12 bias the filler rails F downwardly and cause the filler rail sections 9c to come into engagement with said flat surface upon which the vacuum frame arrangement is supported, each filler rail section 9c being recessed as at 9d so that said filler rail sections may clear the sections 3a of the members 3. The screws 10 may now be tightened to positively clamp the filler rails F in the position to which adjusted as last described. It results, therefore, that the outer surfaces of the filler rail sections 9c are thus brought into and clamped in such position that they are flush or substantially so with the outer surface of the plate P. For the reasons hereinafter stated, it

is highly desirable for this result to be accomplished. However, in accordance with the invention, it shall be understood that the alignment of these surfaces may be accomplished in such other suitable manner as may be desirable.

After the above noted surfaces of the filler rails F and plate P have been aligned, the sealing strip 13 may be disposed in the channel 1f so as to occupy a position such as shown on the drawings. The vacuum frame arrangement may now be disposed in a photo-composing machine and when thus disposed, as understood in the art a suitable light-sensitive member S carried by a support s, Fig. 8, is positioned flush against the outer surface of the plate P. In so doing, the angular section 13a of the sealing strip 13 is deflected sidewise to thereby form a sealed chamber with respect to the light-sensitive member S. Thereupon, by a suitable pump, not shown, air is withdrawn from the sealed chamber thus formed between the plate P and said light-sensitive member S, whereby a close degree of contact is obtained between said plate and member.

In accordance with the invention, the space between each side of the plate P and the adjacent surface of the sealing strip 13 is largely closed by the section 9c of the adjacent filler rail F. Moreover, this surface is flush with the outer surface of said plate P.

In the absence of an arrangement of this or equivalent character, embossing or deformation of the light-sensitive member S occurs to a substantial extent in the space immediately outside of the plate P when the aforesaid vacuum condition is produced. This is highly undesirable because adversely affecting the appearance of the printed sheets eventually obtained from the developed light-sensitive surface.

The above described filler rails F do not entirely fill the space between the plate P and the sealing strip 13. However, the dimensions of the filler rail sections 9c are such that the aforesaid space is filled to the extent deemed necessary to prevent extensive embossing of the light-sensitive surface. The gaps which remain between the filler rails and the plate P are relatively narrow and, therefore, are of little consequence insofar as any substantial embossing action is concerned.

The disclosed arrangement is highly satisfactory from a practical viewpoint. The filler rails do not adversely interfere with the described registration and clamping of the plate P. Moreover, the filler rails may readily be adjusted in the disclosed or an equivalent manner to readily bring the outer surfaces of the rail sections flush with respect to the outer surface of the plate P.

While the invention has been described with respect to a certain particular preferred example which gives satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. In combination, a frame defining a central opening for the passage of a projecting light beam, a representation-carrying plate, means co-operating with said plate to secure it in fixed position to said frame, a channel formed in said frame along each side of said plate and spaced therefrom, a sealing strip of flexible material

disposed in said channel, a filler rail having a flat outer surface disposed in the space between said plate and sealing strip, and means whereby said filler rail may be adjusted to position said flat outer surface substantially flush with respect to the outer surface of said fixed plate.

2. In combination, a frame defining a central opening for the passage of a projecting light beam, a representation-carrying plate, means cooperating with said plate to secure it in fixed position to said frame, a channel formed in said frame along each side of said plate and spaced therefrom, a sealing strip of flexible material disposed in said channel, a filler rail having a flat outer surface disposed in the space between said plate and sealing strip, means whereby said filler rail may be adjusted to position said flat outer surface substantially flush with respect to the outer surface of said fixed plate, and screw-threaded means for retaining said filler rail in an adjusted position.

3. In combination, a frame defining a central opening for the passage of a projecting light beam,

a representation-carrying plate secured to said frame, said frame defining a channel extending along each side of said plate and spaced therefrom, a continuous sealing strip of flexible material disposed in said channel, and separate filler rails extending along each side of said plate and having flat outer surfaces disposed substantially flush with respect thereto, each filler rail having an angular section depending into said channel.

4. In combination, a frame defining a central opening for the passage of a projecting light beam, a representation-carrying plate secured to said frame, said frame defining a channel extending along each side of said plate and spaced therefrom, a continuous sealing strip of flexible material disposed in said channel, separate filler rails extending along each side of said plate and having flat outer surfaces disposed substantially flush with respect thereto, each filler rail having an angular section depending into said channel, and means coacting with said frame and with each filler rail for retaining the latter in adjusted positions.

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