

SPECIFICATION

Storage of photographic transparencies

5 This invention relates to storage of photographic transparencies.

Compared with a stack of transparencies to be supplied to a suitable projector, the most commonly used magazines for storing the transparencies take up considerable space. Thus they are normally provided with 5.2mm compartments corresponding with the operational pitch of standard magazine projectors, to allow storage of a transparency with a maximum standard thickness of 3.2mm in each compartment. The compartment in standard magazines are subdivided on both sides by means of side—or partition walls. Thus a magazine designed to receive 36 transparencies normally occupies a volume of 630 cm³, whereas a set of the thickest transparencies stored in the magazine only occupies a volume of 288 cm³. The ratio of magazine occupied volume to effective transparency stack volume is considerably more unfavourable, when glass-free service frames are stored in standard magazines. A stack of 36 such frames each 2mm thick only represents a volume of 180 cm³. This disproportionately large space requirement of the transparency magazines is particularly unfavourable to active amateur photographers who are required to provide a correspondingly large storage volume for magazines.

35 Known transparency magazines made up of individually assembled modules (German OS No. 1 901 091) or spring-connected holders for transparencies (German OS. No. 2 145 927), only tend to complicate storage, changing and transport of transparencies and in certain cases impose the need for special projector feed mechanisms. Moreover, they are unsuited to providing an effective reduction in magazine space requirements for the transparencies.

The space required for storing transparencies can however be effectively reduced by completely dispensing with containers or magazines and suitably interconnecting the transparency frames. German OS No. 2,031,484 discloses such a transparency frame pack, in which frames arranged in sequence each have a corner hole, and are connected to each other so as to pivot about a rivet-like peg passing through the facing corner holes. Projection of transparencies grouped in a pack in this manner basically requires a special projector, which is itself unsuited to project normal transparencies at least in semi-automatic operation.

German Patent No. 1,296 820 also discloses a transparency frame, which can be connected together with further frames to form a pack, each frame being slidable out of the pack for showing in a transparency projec-

tor. Each major surface of each frame in the pack has upper and lower parallel ribs with mutually presented inclined surfaces which are in locking sliding contact with ribs on the opposed surface of an adjacent frame. This frame design also calls for different system to that of standard projectors for the purposes of projection and particularly for picture changing and advancement. Moreover, in view of the ribs projecting from its major surfaces, this type of frame is unsuited to standard partitioned magazines and normal projector frame holders. Finally, the production costs of such transparency frames are unusually high since to produce the required sloping surfaces, a relatively complex injection moulding operation is necessary.

An object of the present invention is therefore to reduce or overcome the above mentioned disadvantages experienced in the prior art.

Accordingly, the invention resides in one aspect in a photographic transparency frame comprising a pair of generally parallel, apertured major surfaces joined around their periphery by edge surfaces, and a shaped portion projecting from, and extending along at least part of, one edge surface of the frame, the shaped portion including at least one elongated projection and at least one elongated recess which have their longitudinal axes parallel with said edge surface and which extend in a direction perpendicular to said major surfaces so that the depth dimension of the groove and the height dimension of the projection extend in said direction, said groove being open at at least one end thereof so that the frame can be inserted into a transparency magazine with the shaped portion engaging a complementarily shaped region of the magazine to prevent removal of the frame in a direction perpendicular to the frame insertion direction.

In a further aspect, the invention resides in a transparency magazine into which a plurality of photographic transparency frames according to said one aspect of the invention can be slidably inserted in a direction parallel with said apertured major surfaces of each frame, the magazine including means engageable by a transport mechanism of a projector to allow the magazine to be successively advanced through the projector, and a plurality of guide members with or between which said frames can be slidably engaged, each guide member including at least one fixed projection and/or recess defining location means for a respective transparency frame, and each projection and/or recess being engageable with the or one shaped portion of an associated frame to positively retain the frame against removal from the magazine in a direction perpendicular to the frame insertion direction.

In yet a further aspect, the invention resides in a transparency magazine into which a plu-

reality of photographic transparency frames according to said one aspect of the invention can be slidably inserted in a direction parallel with said apertured major surfaces of each

- 5 frame, the magazine including means engageable by a transport mechanism of a projector to allow the magazine to be successively advanced through the projector, a base wall, a plurality of parallel upstanding partition walls
10 connected to the base wall at least at one side of the magazine, adjacent partition walls defining guide channels for receiving respective transparency frames, and at least one fixed projection provided on each partition
15 wall and spaced from the base wall, each projection being engageable with the or one shaped portion of a transparency frame inserted, in use, in the associated guide channel to positively retain the frame against removal
20 from the magazine in a direction perpendicular to the frame insertion direction, and the mean distance between adjacent partition walls being only slightly in excess of the maximum thickness of said transparency
25 frames.

The invention will now be more particularly described with reference to the accompanying drawings, wherein:

- 30 *Figure 1* is a sectional view of one example of a transparency storage magazine according to the invention, showing part of a photographic transparency located in the magazine,

Figure 2 is a plan view of part of the magazine shown in *Fig. 1*;

- 35 *Figure 3* is a sectional view along the line III-III of *Fig. 1*;

Figure 4 is an end view in the direction of the arrow in *Fig. 2*;

- 40 *Figure 5* is a plan view of one example of a transparency according to the invention;

Figure 6 is a sectional view along the line VI-VI of *Fig. 5*;

- 45 *Figure 7* is a plan view of part of a transparency according to a further example of the invention;

Figure 8 is a sectional view along the line VIII-VIII in *Fig. 7*;

Figure 9 is a sectional view to an enlarged scale of part of *Fig. 6*;

- 50 *Figures 10A, B and C* are sectional views of parts of transparencies according to yet further examples of the invention, and

- 55 *Figure 11* is a sectional view illustrating the interconnection between a magazine and a transparency according to a still further example of the invention.

- Referring to *Figs. 1 to 4*, the magazine shown is intended to provide space-saving storage of photographic transparencies 4 and includes a base plate 6 provided with a plurality of equi-spaced short partition walls 10. Defined between adjacent pairs of partition walls 10 are respective guide channels 8 which are closed at one end by a rear wall 12
65 which projects from the base plate 6 beyond

the upper edges of the walls 10. Running along the upper edges of each partition wall 10 are oppositely directed projecting ribs 14 which extend into the respective channels 8 defined on opposite sides of the wall 10. Each rib 14 is engageable in a respective groove 15 defined by a complementarily shaped edge section 16 of the frame of a transparency 4 slidably received in the associated channel 8.
70 Each groove 15 is bounded at the edge of the frame of the transparency by a rib 18 which extends parallel with said edge and, when the transparency is mounted in said channel 8, engages behind the associated projection 14 to define a mechanical interlock retaining the transparency against removal from the magazine in a direction perpendicular to the guide channel 8 and hence the direction of insertion of the transparency into the magazine.

- 85 Parallel ribs 19 are formed on the front surface of the rear wall 12 such that each rib 19 extends in the same plane as a respective sidewall 10 and at right-angles to the plane of the base plate 6. Defined between each pair of adjacent ribs 19 is a gap for receiving a respective transparency 4. The ribs 19 thus give additional support to the transparencies 4 engaged in the guide channels 8, and prevent tilting and excessive transverse loading of the side walls 10 co-operating with the shaped edge sections 16. Since the ribs 19 and the partition walls 10 formed with the projections 14 engage only relatively thin edge sections of the transparencies 4, the magazine allows
100 relatively tight packing of the transparencies 4 at right angles to the base wall 6 and in alignment with the relevant guide channels 8. As will be seen from *Fig. 3*, the mean distance between adjacent partition walls 10, as well as between adjacent ribs 19, is only slightly greater than the maximum thickness of the transparencies 4 to be engaged in guide channels.

- The guide channels 8 defined between the partition walls 10 are open at the underside 20 of the magazine 2, so that the magazine may be produced without difficulty as a one-piece plastics injection moulding. Each partition wall 10 is joined at one end to the rear wall 12 and at its opposite, insertion end to the bottom wall 6.

- Adjacent the insertion end of each partition wall, the ribs 14 are rounded at 21 to facilitate insertion of the transparencies 4.

- 120 Provided on the base wall 6 in spaced relationship with partition walls 10 are a plurality of resilient locking tongues 22 which are preferably moulded integrally with the base wall and which are aligned with the guide channels 8 respectively. The arrangement is such that, when a transparency 4 is located in the magazine, one of the tongues 22 engages behind a corner 23 of the transparency thus securing it in the stored position. Each transparency 4 can be inserted into and removed
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from the magazine by sliding the transparency in the direction of the double-arrow P (Fig. 1). In the latter case, imparting sliding movement to the transparency to release the edge section 16 from the associated guide channel 8 pushes the tongue 22 securing the transparency in the stored position back into a recess 26 formed in the base plate 6. A rack with notch teeth 27 is defined on the lower surface of the base plate 6 in the area of the recess 26.

The magazine 2 described above allows a hitherto unachieved space-saving storage of the transparencies 4, with the transparencies being held in parallel relationship with practically no separation between adjacent transparencies and with only very limited play being possible. The transparency magazine 2 can be used in basically the same manner as a conventional transparency magazine or container and also as a magazine for a projector having a transparency changer for grasping a transparency in the magazine at its free upper section and then moving the transparency in the direction of the the double-arrow P into the projector focal plane. However, since adjacent transparencies are much closer together in the magazine 2, than in conventional magazines, it is necessary to shorten the pitch of movement of the transparency changer as compared with that required for conventional magazines, in order to benefit from the advantages described. This necessitates the provision of suitable means for converting the projector to different pitch lengths.

Figs. 5 and 10 show various examples of transparencies which can be held in a magazine of the type described in Figs. 1 to 4, for storage, transport and/or projection as a result of their space-saving edge sections 16.

The transparency 4 shown in plan view in Fig. 5 and in section in Fig. 6 has matching T-shaped edge sections 16 along its four edges. The transparency can therefore be slidably engaged in a guide channel 8 of the magazine 2 shown in Figs. 1 to 4, from both ends of each edge of the transparency. As previously stated, both flanks of each edge section 16 define grooves 15 which receive the projecting ribs 14 of a guide channel 8 when the transparency is engaged in the magazine. The external walls of the grooves 15 are defined by the rib-like projections 18 while the internal wall of each groove is defined by a shoulder 27. The corners 23 of the transparency in the area of the grooves 15 are equal in thickness to the thinnest portions of the transparency edge sections 16 and hence the grooves 15 extend up to the corners 23 so that the transparency may be readily inserted into a guide channel 8 by way of its flattened corner areas.

Figs. 7 and 8 show a transparency 4' with an edge section 16' of differing design on each major surface of the transparency. The

two grooves 15a and 15b run parallel with each other, but at different distances from the outer edge of the transparency. Complementary projecting ribs 14 of the transparency magazine 2 then ensures that the transparency can only be inserted into the magazine when its major surfaces are in the correct orientation relative to the guide channels 8.

Fig. 9 shows the portion of the transparency 4 ringed and marked with an X in Fig. 6. From Fig. 9 it will be seen that the thickness a of the widest point of the edge section 16 (in the area of the rib-like projections 18) is slightly greater than the thickness b in the area of the grooves 15, though clearly smaller than the maximum thickness c . It will be understood that, provided the difference between the thicknesses c and b corresponds approximately to the width of the side walls 10 of the magazine 2 in the area of the projecting ribs 14, the transparencies can be stored close together in the magazine 2 in the manner of a pack.

Figs. 10A, B and C show differing edge section designs. Fig. 10A shows a transparency with a one-sided edge section, Fig. 10B shows a transparency with a dove-tail edge section and figure 10C shows a transparency with a symmetrical edge section having curved grooves 15.

In the example shown in Fig. 11, each partition wall 10 of the magazine is defined by a beaded rail and each transparency includes a bifurcated edge section 16 adapted to engage and grip a respective rail of the magazine. Thus two adjacent partition walls 10 serve to guide one half of each of two transparencies.

As an alternative to the above examples wherein the partition walls 10 are parallel it is to be appreciated that the partition walls could radiate from the centre of a generally circular magazine.

It is to be understood that the transparency frames described above can be stored in conventional transparency magazines as well as the magazine shown in Figs. 1 to 4.

CLAIMS

1. A photographic transparency frame comprising a pair of generally parallel, apertured major surfaces joined around their periphery by edge surfaces, and a shaped portion projecting from, and extending along at least part of, one edge surface of the frame, the shaped portion including at least one elongated projection and at least one elongated recess which have their longitudinal axes parallel with said edge surface and which extend in a direction perpendicular to said major surfaces so that the depth dimension of the groove and the height dimension of the projection extend in said direction, said groove being open at at least one end thereof so that the frame can be inserted into a



from the magazine by sliding the transparency in the direction of the double-arrow P (Fig. 1). In the latter case, imparting sliding movement to the transparency to release the edge section 16 from the associated guide channel 8 pushes the tongue 22 securing the transparency in the stored position back into a recess 26 formed in the base plate 6. A rack with notch teeth 27 is defined on the lower surface of the base plate 6 in the area of the recess 26.

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As an alternative to the above examples wherein the partition walls 10 are parallel it is to be appreciated that the partition walls could radiate from the centre of a generally circular magazine.

It is to be understood that the transparency frames described above can be stored in conventional transparency magazines as well as the magazine shown in Figs. 1 to 4.

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transparency magazine with the shaped portion engaging a complementarily shaped region of the magazine to prevent removal of the frame in a direction perpendicular to the frame insertion direction.

2. A transparency frame as claimed in Claim 1, wherein said shaped portion extends over the full length of said one edge of the frame, but its projection terminates short of at least one corner of the frame so that said groove includes said open end at said one corner of the frame.

3. A transparency frame as claimed in Claim 1 or Claim 2, wherein identical shaped portions are provided at more than one edge surface of the frame.

4. A transparency frame as claimed in any preceding Claim, wherein the maximum thickness of the or each shaped portion is less than the thickness of the remainder of the frame.

5. A transparency frame as claimed in any preceding Claim, wherein the or each shaped portion is of generally T-configuration.

6. A transparency frame as claimed in any one of Claims 1 to 4, wherein the or each shaped portion is of dove-tail configuration.

7. A transparency frame as claimed in any one of Claims 1 to 4, wherein the or each shaped portion is of generally channel configuration with the groove being defined within the channel and inwardly projecting ribs being formed on the side walls respectively of the channel.

8. A transparency frame as claimed in any one of Claims 1 to 4, wherein the or each shaped portion is asymmetrical about the central plane of the frame.

9. A transparency frame as claimed in Claim 8, wherein the or each shaped portion is of generally L-configuration.

10. A transparency frame as claimed in Claim 8, wherein the or each shaped portion includes grooves formed in the opposite major surfaces respectively of the frame and located at different distances from the centre of the frame.

11. A transparency frame substantially as hereinbefore described with reference to and as shown in, Figs. 5, 6 and 9 or Figs. 7 and 8, or Fig. 10, or Fig. 11 of the accompanying drawings.

12. A transparency magazine into which a plurality of photographic transparency frames as claimed in Claim 1 can be slidably inserted in a direction parallel with said apertured major surfaces of each frame, the magazine including means engageable by a transport mechanism of a projector to allow the magazine to be successively advanced through the projector, and a plurality of guide members with or between which said frames can be slidably engaged, each guide member including at least one fixed projection and/or recess defining location means for a respective transparency frame, and each projection and/or

recess being engageable with the or one shaped portion of an associated frame to positively retain the frame against removal from the magazine in a direction perpendicular to the frame insertion direction.

13. A transparency magazine as claimed in Claim 12, wherein each guide member and its associated location means extend parallel to said frame insertion direction.

14. A transparency magazine as claimed in Claim 12, or claim 13, wherein the location means of each guide member includes at least one fixed projection which is slidably engageable in said at least one groove of a respective transparency frame.

15. A transparency magazine as claimed in Claim 14, wherein each guide member includes a pair of oppositely directed projections defining a generally T-configuration or dove-tail configuration end portion of the guide member.

16. A transparency magazine as claimed in any one of Claims 12 to 15 and including compartments for the individual frames, said guide members defining upstanding walls of said compartments.

17. A transparency magazine as claimed in Claim 16, wherein said location means is defined by a rib which is provided on at least one upstanding wall of each compartment and which is spaced from a frame carrier surface of the magazine by a distance approximately equal to the height of the projection of the or each shaped portion of each frame.

18. A transparency magazine as claimed in Claim 17, wherein each compartment is formed with respective ribs on the mutually presented surfaces of its upstanding walls, with the ribs of each compartment being spaced by different distances from said frame carrier surface.

19. A transparency magazine as claimed in Claim 17 or Claim 18, wherein the rib on said one wall of each compartment is spaced from the opposite wall of the compartment, or from a further rib on said opposite wall, by a distance slightly greater than the grooved region of the shaped portion of each frame.

20. A transparency magazine as claimed in any one of Claims 17 to 19, wherein the upstanding walls of each compartment project from said frame carrier surface by a distance approximately equal to the height of the or each shaped portion of the frame to be inserted in the compartment.

21. A transparency magazine as claimed in any one of Claims 17 to 20, wherein said frame carrier surface defines a base of the magazine.

22. A transparency magazine as claimed in Claim 21, wherein the compartments are in the form of guide channels closed at one end by a rear wall connected to, and extending perpendicular to, the base and the upstanding walls, the other end of each guide channel



being open.

23. A transparency magazine as claimed in Claim 22, wherein the base of each guide channel is open intermediate its ends.

5 24. A transparency magazine as claimed in Claim 22 or Claim 23, wherein resilient catches are provided on the base and extend into the respective guide channels to releasably retain transparency frames inserted in the
10 channels.

25. A transparency magazine as claimed in any one of Claims 22 to 24, wherein parallel ribs are formed on the surface of the rear wall presented to said channels, each rib
15 extending in the plane of a respective compartment wall so that each pair of adjacent ribs defines a gap for receiving part of a transparency frame inserted in the associated guide channel.

20 26. A transparency magazine as claimed in any one of Claims 23 to 25, wherein the projection and/or recess of each location means tapers towards the open end of its associated guide channel.

25 27. A transparency magazine into which a plurality of transparency frames as claimed in Claim 1 can be slidably inserted in a direction parallel with said apertured major surfaces of each frame, the magazine including means
30 engageable by a transport mechanism of a projector to allow the magazine to be successively advanced through the projector, a base wall, a plurality of parallel upstanding partition walls connected to the base wall at least
35 at one side of the magazine, adjacent partition walls defining guide channels for receiving respective transparency frames, and at least one fixed projection provided on each partition wall and spaced from the base wall, each
40 projection being engageable with the or one shaped portion of a transparency frame inserted, in use, in the associated guide channel to positively retain the frame against removal from the magazine in a direction perpendicular
45 lar to the frame insertion direction, and the means distance between adjacent partition walls being only slightly in excess of the maximum thickness of said transparency frames.

50 28. A transparency magazine substantially as hereinbefore described with reference to and as shown in Figs. 1 to 4 of the accompanying drawings.