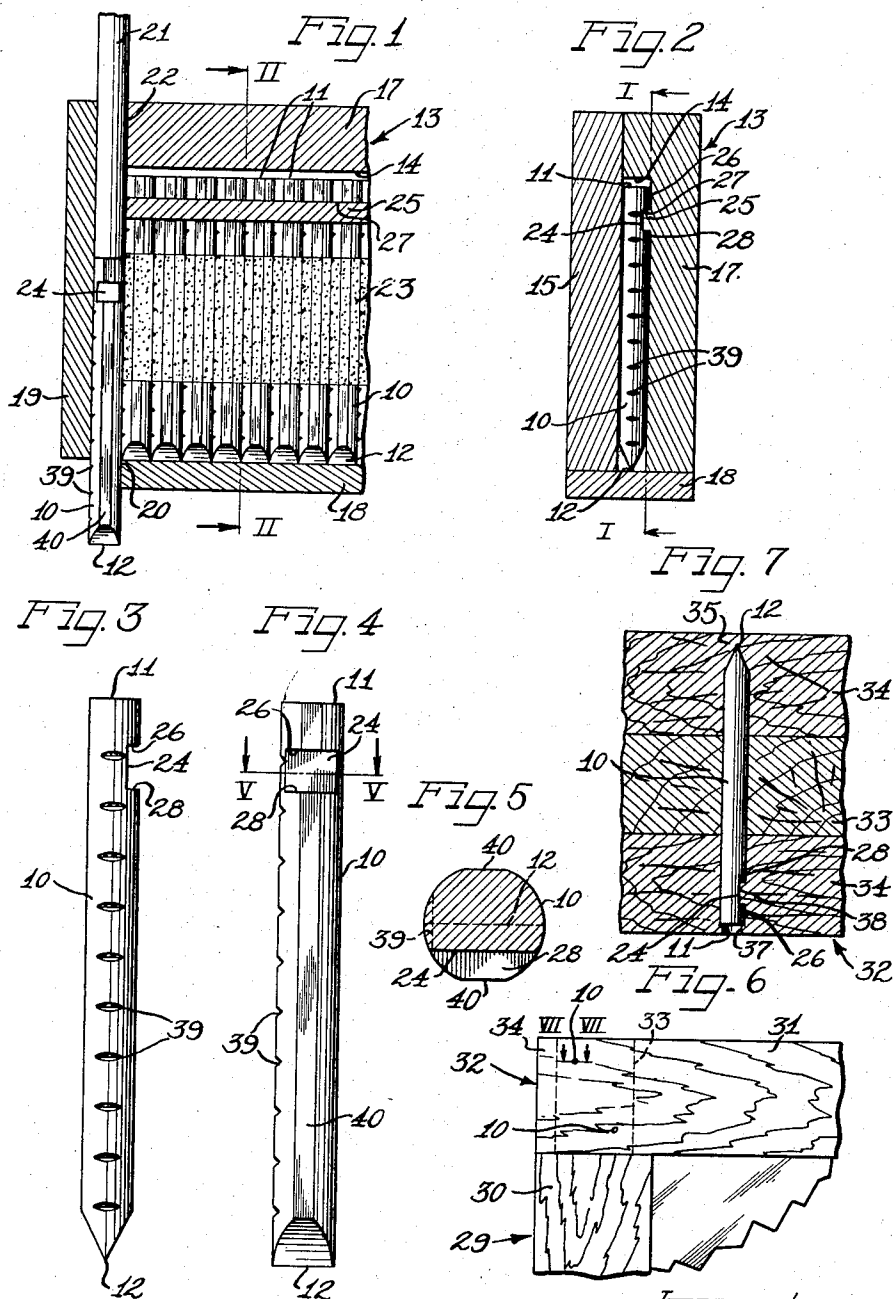


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SASH PIN WITH GROOVE TO RECEIVE SUPPORTING RAIL
AND MORTISE AND TENON JOINT UTILIZING SAME
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SASH PIN WITH GROOVE TO RECEIVE SUPPORTING RAIL AND MORTISE AND TENON JOINT UTILIZING SAME

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The present invention relates to improvements in sash pins and more particularly concerns improvements in pin-like fasteners which are arranged to be driven into an assembly of penetrable members such as the mortise and tenon joints of window and like sash for securing the assembly together.

An important object of the present invention is to provide an improved sash pin which is especially adapted for use with a portable magazine loading pin driving machine.

Another object of the invention is to provide an improved sash pin structure having novel means for efficient cooperation with magazine structure in a pin driving machine to maintain complete control of the pin until it is driven into the members to be secured together.

A further object of the present invention is to provide an improved sash pin having a novel construction for improving the driving and securing relationship of the pin to members to be secured together thereby, and more especially an assembly of wooden members with which the pin is to be utilized.

Still another object of the invention is to provide an improved sash pin which is constructed in several novel respects for affording positive control of the pin in a driving machine, for facilitating driving of the pin into members to be secured thereby, for effecting an improved securement of the members into which driven, and for enabling removal of the pin without excessively damaging the secured members when removal becomes necessary.

Yet another object of the invention is to provide an improved cooperative relationship between a sash pin and wooden members secured together by means of the pin.

A still further object of the invention is to provide improved means for handling and driving sash pins.

Other objects, features and advantages of the present invention will be readily apparent from the following detailed description of certain preferred structures and relationships embodying the same, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a more or less schematic, fragmentary vertical sectional view through a portable sash pin driving machine, taken substantially on the line I—I of Fig. 2 and showing a series of sash pins therein;

Figure 2 is a vertical sectional detail view taken substantially along the line II—II of Fig. 1;

Figure 3 is an enlarged elevational view of one of the sash pins;

Figure 4 is an elevational view of the sash pin as though looking toward the right side of the sash pin as shown in Fig. 3;

Figure 5 is a further enlarged transverse or cross sectional view taken substantially on the line V—V of Fig. 4;

Figure 6 is a fragmentary side elevational view of one corner of a sash utilizing the present sash pin; and

Figure 7 is an enlarged fragmentary sectional detail view taken substantially on the line VII—VII of Figure 6.

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A sash pin 10 according to the present invention comprises an elongated element with a cross-sectionally substantially uniformly round body straight throughout its length and having a blunt head end 11 and an opposite broad substantially sharp V-shaped edge penetrating tip or driving end 12. In practice, mass production of the pin 10 is effected by utilizing appropriate gauge wire stock. While sash pins according to the present invention may be made in various sizes to meet various requirements, a size especially suitable for use in securing together the mortise and tenon joints of window sash is about one-half the size illustrated in Figs. 1, 2 and 7 and one-fourth the size shown in Figs. 3 and 4 wherein substantial enlargement has been effected for purpose of illustration.

Sash pins are especially adapted for use in driving or setting machines. While such machines may be stationary so that the work must be brought to the machine for pinning, an important use is in portable driving or pinning machines.

A more or less schematic example of a pin driving machine 13 is shown in Figs. 1 and 2 and includes a body structure affording a pin magazine 14. The body structure of the machine may conveniently be constructed of a plurality of plates including a side plate 15 and a cooperating side plate 17, a bottom plate 18 and an end or stop plate 19. Either or both of the side plates 15 and 17 may be formed at their interfaces to provide the magazine chamber 14, but herein the side plate 17 is shown as recessed at its inner face to provide the magazine chamber.

A series of the sash pins 10 is disposed within the magazine 14 and is fed forwardly in any suitable fashion as by means of a spring urged plunger (not shown) at the rear of the series to drive the series of pins toward the end plate 19 serving as a stop to register the foremost pin 10 with a lower driving orifice or opening 20 at the forward base portion of the magazine 14. From this position the pins can be successively driven from the magazine 14 endwise through the driving opening 20 by means of a driving plunger 21 operating in a guideway 22 opening into and through the forward end of the magazine 14 in alignment with the lower guideway opening 20.

For the purpose of facilitating handling of the sash pins 10 for insertion into the magazine 14, the pins are adhered together in edge to edge relationship into "stick" form in a series of sufficient length or multiple of pins to provide a full charge when inserted into the magazine 14. A fairly heavy adhesive substance may be used for adhering the pins in series and may be applied in generous quantity as a band 23 intermediately across the row of juxtaposed pins. On solidifying the adhesive material holds the pins with adequate tenacity to withstand ordinary handling, and yields to release the successive pins for driving under the impact of the plunger 21. By preference, the pins are stuck with the V-points 12 in alignment and the heads 11 in substantially a common plane.

A considerable problem has been encountered in a tendency for the advanced pin of the series breaking loose from the stick, or already being loose for some reason, tilting in the forward portion of the magazine and thus not registering with the discharge opening 20 and the plunger 21 so that the plunger is caused to jam on driving against the misaligned pin. However, by the present invention this problem is entirely overcome by providing each of the pins 10 with a shallow transverse groove 24 along one side adjacent to the head 11 and arranged to ride a guide rail 25 in the magazine 14. While the rail 25 may be simply in the form of a rib on the magazine side wall of the plate 17, it may obviously

be formed as a separate strip or bar appropriately mounted in the magazine. It will be observed from Figs. 2 and 3 that the slot, notch or groove 24 is quite shallow and extends only a limited extent into the thickness of the pin shank and substantially less than half the thickness so that the upper or neck portion of the pin transversely contiguous the groove is of sufficient cross-sectional mass to withstand strong driving thrusts or impacts and compression forces without collapsing or bending. The depth of the groove 24 is, however, sufficient to provide an adequate overhanging lip or shoulder 26 which is preferably formed in a plane normal to the axis of the pin. That is, the shoulder 26 is preferably square so as to have free sliding cooperation with a complementary square shoulder 27 on the upper side of the rail 25 and which will minimize any frictional resistance or tendency toward transverse wedging action between the surfaces of the pins and the surfaces within the magazine 14. By preference the lower lip or ledge defining the groove 24 and identified at 28 is also substantially square. As a result of the cooperation between the rail 25 and the slot shoulders 26 and 28, tilting of the pins 10 is prevented even though any one or all of the pins are or become loose. Each pin is at all times under guided control up to the plunger guideway 22 wherein the foremost pin is, of course, released from the forward end of the rail 25 which stops at or short of the plunger guideway, and the succeeding pin which remains under firm guided control prevents any possibility of the foremost pin tilting relative to the plunger or the discharge opening 20.

An important use for the pins 10, and the use which characterizes their name is in securing together window, screen or like sashes. An example of such a sash, identified as 29 in Figs. 6 and 7 includes angularly related sash frame members 30 and 31 which are secured together right angularly at a mortise and tenon joint 32. As shown the end portion 33 has a male or tenon member while the member 31 has a female or mortise end portion 34. One or more of the pins 10 are driven transversely through the assembled mortise and tenon joint 32 to secure the same against separation.

In driving the pins for securing the joint 32, best results are attained by directing the pins with the V-points 12 thereof cross grain to the mortise portions 34. This avoids tendency toward splitting of the mortise portions.

The length of the pins 10 is properly selected with respect to the thickness of the joint 32 so that the pins can be driven fully into the joint assembly as best seen in Fig. 7, with the V-point extending to a position sufficiently short of the outer side of the mortise member 34 of the joint into which driven from the inside to leave a substantial thickness of uncut wood 35 intervening between the point and the adjacent outer side. On the other hand, the head 11 of the pin should extend into the surface of the opposite mortise member 34 into which the pin is driven from the outside so that the head 11 is countersunk to a substantial depth not only to permit sandpapering over the pin socket opening or hole as well as filling in the hole for finishing purposes, but also to provide for an interlocking relationship between the head and the wood defining the entry hole portion of the pin passage or socket outwardly from the countersunk head. Since the pin displaces the wood laterally as it is driven home and thus places the affected wood under compression, relief of compression on the wood outwardly from the head permits the wood to expand and thus tend to fill in behind the head as indicated at 37. This, in effect, locks the pin in place and prevents the same from working out due to vibrations, expansion and contraction, or the effects of weathering.

An additional important factor in preventing working loose or axially outward displacement of the driven pin 10 from its socket resides in the interlock which results from expansion of the wood of the socket into the trans-

verse notch or groove 24 adjacent to the head of the pin. This provides a strong interlock lug 38 cooperating with the opposite shoulders 26 and 28 to effect a strong retention of the pin 10 against axial displacement. In fact, by reason of the compression under which the interlock lug 38 remains even after expanding into the groove 24, there is permanent pin-retaining value in the lug. The arrangement whereby the groove 24 is disposed substantially parallel to the plane of the V-point 12 and thus receptive of the cut fiber or grain ends in the interlock lug 38, further assures a strong interlock because the grain ends can find and hug close against the surfaces of the pin within the groove 24 without any substantial restraint by tension from the adjoining fibers of the wood.

Further anti-displacement means are provided in the form of a series of transverse, longitudinally spaced notches 39 formed in at least one edge of the pin 10. By preference the notches 39 are disposed on axes transverse to the axis of the groove 24. Thus, in addition to the interlock lugs or shoulders 37 and the interlock lug 38 cooperating with the head portion of the pin 10, a series of small, but in the aggregate quite substantial, wood interlocking lugs will expand into the interlock or retention notches 39 throughout the shank portion of the pin. This assures that in addition to the normal frictional resistance to axial displacement of the pin, the pin is thoroughly retained by interlocking interengagement with each of the wooden elements of the joint assembly.

Yet, should it become necessary to drive the pin 10 out of the joint for replacement of one of the sash bars, or the like, this can be accomplished without any appreciable damage to the wooden elements. The reason for this is that the pin 10 is straight and has no laterally projecting lugs or head. A drive-out tool having a driving nose of no larger diameter than the pin applied to the head 11 of the pin may be used to drive the pin on through at least until the tip or point portion of the pin protrudes from the assembly whereupon the pin can be withdrawn. While this may, at least to some extent, disrupt and possibly damage the internal interlock lugs of the pin socket, that is not objectionable because not visible and when again pinned, the salvaged wooden member will have the replacement pin driven at a different point and if it contains the mortise portion of the joint, the holes left by driving out of the previous pin can be readily filled and finished off.

Another valuable feature incorporated in the pin 10 resides in the generally rounded cross section but with slightly flattened opposite sides 40 (Figs. 1 and 5). These flattened sides are substantially parallel to a plane through the axis of the pin and including the V-shaped edge or point 12 and substantially narrower than the width of the edge point 12. Hence, since the point is driven between the grain of the tenon member 33, the narrowest cross sectional dimension of the pin lies between the tenon grain with the flattened surfaces 40 engaging and spreading the grain or fibers of the thin male or tenon member. Then, by reason of the uniform circumferential roundness of the major circumferential and longitudinal surface areas of the pin intervening between the flattened areas 40 tear-through is avoided when a torque is put on the joint. Splitting of the tenon member is, of course, highly objectionable not only because of the weakening of the joint but also because of the liability of providing an opening at the corner of the frame which will allow moisture to enter with deteriorating effect into the joint. In manufacture, the pin 10 can be made from round wire which is flattened to provide the flat sides 40.

It will be appreciated that since the cross-sectional dimension between the flattened areas 40 is only slightly less than the cross-sectional dimension between the major peripheral rounded areas of the pin, the bending resistance of the pin body for practical purposes is sub-

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stantially the same through the flattened areas as through the rounded peripheral areas. That is, if there is any bending stress weakening through the flattened areas 40 it is so minimal as to be negligible in a practical sense. On the other hand, since the flattened areas 40 lie in parallel planes with the root surface of the chordal groove 24 and the V-edge 12, the flattened areas 40 cooperate with the grain of the wooden members to resist torque displacement of the members. That is, the spread grain of the tenon 33 is tensioned against the flat faces 40 while the severed grain ends of the mortise portions 34 press tightly against the flat areas 40 even more tightly than in the expansively partially recovered interlock lug 38, such tensioned grip and thrust of the grain against the opposing flattened areas 40 apparently affording an unusual resistance to torque displacement of the members relative to the pin.

It may also be noted that because of the fairly close cooperation of the longitudinal guide rail 25 not only with the upper and lower shoulders 26 and 28, respectively, of each of the pins 10 to retain the pins against any substantial tilting in the magazine chamber, but also cooperation of the inner or laterally projecting face of the cantilever rail 25 with the chordally straight root of the pin groove 24 in each instance, turning of the pins in the magazine is prevented so that each pin will always be presented in position under the driver 21 with predetermined front to rear orientation of the V-penetrating edge 12 for driving of the pin into the mortise and tenon joint 32 cross grain to the mortise and with the grain of the tenon as described hereinabove.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In combination in a wooden sash structure comprising a pair of right angularly related wooden sash members having a mortise and tenon joint wherein a tenon on one of the members is fitted into a mortise in the other of said members, a sash pin securing the tenon against separation from the mortise, said sash pin comprising an elongated straight substantially uniformly cross-sectioned body throughout its length with a sharp broad V-shaped cutting and penetrating edge tip at one end and a blunt opposite head end, said V-edge being disposed in severing relation cross-grain to the mortised member and with and in spreading relation between the grain of the tenon, said V-edge extending short of one outer face of the mortised member and the blunt opposite end being countersunk within the opposite outer surface of the mortised member, said pin having opposite narrow longitudinal flattened substantially parallel areas parallel to the edge of the V-edge and comprising substantially minor portions of the circumference of the pin so as to substantially avoid diminishing the bending resistance of the pin to bending forces imposed by the joint on said parallel areas as compared to such bending forces imposed on the round portions of the pin periphery, the flattened areas providing the narrowest cross-sectional dimension of the pin between the tenon grain and with the flattened areas engaging and spreading the grain of the tenon and cooperating with the grain of the wooden members to resist torque displacement of the members with the round portions of the pin acting to prevent tear-through during torque strains, said pin having a chordal groove across one of the flattened areas and adjacent to said blunt end and defined by oppositely generally axially facing shoulders and a radially outwardly facing root with said groove and said shoulders being located entirely within that portion of the mortised member within which said blunt end is countersunk so that the contiguous severed grain ends of the mortised member extend into the groove to provide an interlock lug of material of the mortised member interengaging with said shoulders to resist longitudinal displacement of the pin and coact-

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ing with said groove root in cooperation with the grain of the wooden members engaging said flattened areas to resist torque displacement of the members, the material of the mortised member outwardly of the countersunk blunt end interlockingly interengaging with said blunt end.

2. In combination in a wooden sash structure comprising a pair of right angularly related wooden sash members having a mortise and tenon joint wherein a tenon on one of the members is fitted into a mortise in the other of said members, a sash pin securing the tenon against separation from the mortise, said sash pin comprising an elongated straight substantially uniformly cross-sectioned body throughout its length with a sharp broad V-shaped cutting and penetrating edge tip at one end and a blunt opposite head end, said V-edge being disposed in severing relation cross-grain to the mortised member and with and in spreading relation between the grain of the tenon, said V-edge extending short of one outer face of the mortised member and the blunt opposite end being countersunk within the opposite outer surface of the mortised member, said pin having opposite narrow longitudinal flattened substantially parallel areas parallel to the edge of the V-edge and comprising substantially minor portions of the circumference of the pin so as to substantially avoid diminishing the bending resistance of the pin to bending forces imposed by the joint on said parallel areas as compared to such bending forces imposed on the round portions of the pin periphery, the flattened areas providing the narrowest cross-sectional dimension of the pin between the tenon grain and with the flattened areas engaging and spreading the grain of the tenon and cooperating with the grain of wooden members to resist torque displacement of the members with the round portions of the pin acting to prevent tear-through during torque strains, the material of the mortised member outwardly of the countersunk blunt end interlockingly interengaging with said blunt end.

3. In combination, a stick of adhered sash pins comprising a series of straight sash pins in side-by-side abutting relationship and with the opposite ends aligned, said pins being of substantially uniform cross-sectional area throughout their length except for a broad V-shaped penetrating tip edge at one end and a shallow straight-root square sided transverse groove in one side thereof adjacent to the opposite end in a plane parallel to the axis of the pin and said edge, the grooves being aligned with the sides of the grooves substantially coplanar to provide a channel opening from one side of the stick of pins, and means for supporting the stick of pins for driving successive pins from one end of the stick comprising a magazine having a chamber with side walls spaced just far enough apart to accommodate the stick of pins for free movement longitudinally through the magazine and having a pin supporting rail longitudinally adjacent the top of the chamber and projecting laterally cantilever fashion from one of said side walls in overhanging relation thereto and into complementary mono-rail supporting relation within said channel, said cantilever mono-rail being of a width to oppose the square sides of the pin grooves for retaining the pins against tilting fore or aft in said magazine chamber and the depth of the rail being correlated to the depth of the groove channel to coact with the straight roots of the pins and the opposing retaining wall of the magazine chamber to prevent turning of any pin in the magazine chamber so as to assure delivery of the successive pins from the rail in fore and aft orientation of the respective V-edges of the pins.

4. In apparatus for supporting for driving of successive pins therefrom a stick of adhered straight sash pins disposed in side-by-side abutting relationship and with the opposite ends aligned, said pins being of substantially uniform cross-sectional area throughout their length except for a broad V-shaped penetrating tip edge at one end and a shallow straight-root square sided transverse groove

in one side thereof adjacent to the opposite end in a plane parallel to the axis of the pin and said edge, the grooves being aligned with the sides of the grooves substantially coplanar to provide a channel opening from one side of the stick of pins: means comprising a magazine having a chamber with side walls spaced just far enough apart to accommodate the stick of pins for free movement longitudinally through the magazine, and a pin supporting rail carried longitudinally adjacent the top of the chamber and projecting laterally cantilever fashion from one of said side walls in overhanging relation thereto and into complementary mono-rail supporting relation within said channel, said cantilever mono-rail being of a width to oppose the square sides of the pin grooves for retaining the pins against tilting fore or aft in said magazine chamber and the depth of the rail being correlated to the depth of the groove channel to coast with the straight roots of the pins and the opposing retaining wall of the magazine chamber to prevent turning of any pin in the magazine chamber so as to assure delivery of the successive pins from the rail in fore and aft orientation of the respective V-edges of the pins.

5. A sash pin comprising an elongated cross-sectionally substantially uniformly round body straight throughout its length, one end of the body being blunt to afford a driving head and the opposite end of the body having a sharp broad V-shaped cutting and penetrating edge, diametrically opposite sides of the body being provided with longitudinally extending flattened areas throughout the length of the body substantially parallel to one another and to a plane through the axis of the pin and including said V-edge, said flattened areas being substantially narrower than the width of said V-edge and comprising but a minor portion of the circumference of the pin while the remaining major areas of the pin circumference between and at each side of the flattened areas are uniformly circumferentially rounded, and the cross-sectional dimension between said flattened areas being only slightly less than the cross-sectional dimension between said rounded areas so that the bending resistance of the pin body for practical

purposes is substantially the same through the flattened areas as through the rounded peripheral areas, the body adjacent to the head and across one of said flattened areas and running out at its ends through said major areas being provided with a transverse chordal groove extending to a substantially shallow depth less than half the thickness of the body and affording a neck portion transversely contiguous the groove of sufficient cross-sectional mass to withstand strong driving thrusts or impacts and compression without collapsing or bending of the body at the neck, said groove being defined by oppositely generally axially facing spaced shoulders and a radially outwardly facing root whereby to enable guiding of the pin by a cantilever guide rail in a driving machine and affording a surface cooperative with said flattened areas for torque resistance engagement by the fibers or grain of the members that may be fastened together by the pin, one of said major areas of the pin having a longitudinal series of transverse interlock notches spaced substantially apart and in series extending substantially throughout the extent of said one major area.

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