HARDWARE FOR QUALITY KITCHEN CABINETS

Author Paul Levine makes final adjustments on the cup hinge of one of his custom cabinets

Innovative hardware simplifies installation and satisfies customers

by Paul Levine

If the case and face of a European-style cabinet are its skeleton and skin, the hardware is its heart. Seldom seen and less frequently adjusted, well-engineered hardware is what makes the system tick. Despite the fact that this hardware was developed hand-in-hand with the 32mm system of production, it is readily available to North American cabinetmakers. Whether or not you use the 32mm system, the hardware will be most useful.

The hardware I use is manufactured by several different companies, but they all share one critical feature—quality. Wherever it comes from, top-quality hardware will make your cabinets a pleasure to use, and will add greatly to their value.

Hinges

The concealed cup hinge (see Figure 1) is the key to the European-style cabinet. It is very strong and fully adjustable, and stays out of sight. No hinge knuckles poke out between doors.

If you recall that these hinges were designed for the 32mm mass production system, you will appreciate their rationale. The automated machinery that builds the cabinets may place a hinge mortise too high or too deep in the case. By simply adjusting the hinge (up, down, or sideways about 1/8 inch, and in or out as much as ¼ inch), such errors can be corrected. The custom cabinetmaker can work more carefully, but adjustability is still important. When I'm working on a project, I always anticipate the worst. If the cases aren't perfect, will the doors line up? If the walls aren't plumb, will the cases rack out of square? The concealed cup hinge accommodates these inaccuracies, and adjustment is so easy that I can show my customers how to do it in a few minutes.

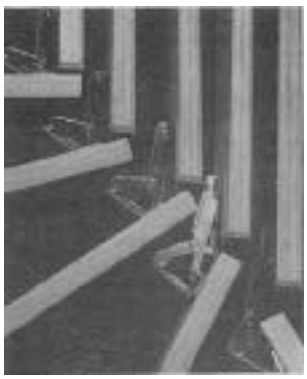

Figure 1. *The concealed cup hinge (in this case, a Grass # 1200 full-overlay hinge) moves smoothly on a series of pivots, and is adjustable in three planes.*

Compare this to mounting a door with a traditional leaf or butt hinge. Because the hinge is not adjustable, you must place it exactly or you'll have to move it. And moving the hinge is a real chore, particularly if the hinge is mortised into the door.

With this unique adjustability, you can mount all the doors at once and line them up perfectly in about 15 minutes—without removing any screws. If you have to make a gross adjustment that is beyond the capacity of the hinge, simply loosen one screw to remove the door. When you move the hinge you'll discover that the base plates on many hinges have two sets of mounting holes, so you needn't worry about wandering screws or drill bits.

If somebody claims he can mount a traditional hinge right the first time, ask him what he does when four-year-old Johnny swings on the door two years later and it starts to droop. Those non-adjustable hinges won't look so good then, and may be beyond repair. With cup hinges, you can pull out a screwdriver and be a hero.

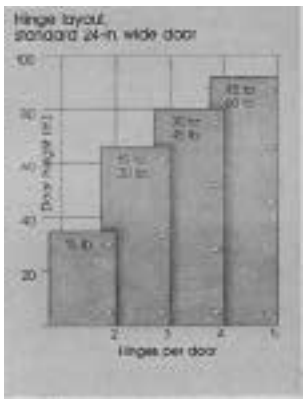

Figure 2. *The larger the door, the more hinges you'll need. Use two hinges for a standard 25 inch-high door, three hinges (or more) for doors over 38 inches high.*

Another advantage is that the cup hinge distributes the door's weight over the entire rim of the cup, a bearing surface of more than 4 square inches. Standard hinges put all the weight on two or three small screws. Although it's tough to get exact weight ratings for cup hinges, the manufacturers offer some rules of thumb (see Figure 1). The standard cabinet door (7/8 inch thick and up to 24 inches wide by 25 inches high)

requires two hinges. Doors larger than bout 39 inches high by 24 inches wide need a third hinge, centered between he first two.

The chart below shows the array of up hinges available from various manufacturers. The Grass #1200 full-overlay hinge (shown in Figure 1) is the one rely on the most. With a 176-degree swing, the #1200 is twice as expensive as most of the hinges on the chart, but the money is well spent. Standard cup hinges that open only 90 or 110 degrees an actually be dangerous in the kitchen. If you walk into an open cabinet door mounted on such hinges, the door may be ripped from the case-and it won't be good for you either.

An articulated hinge like the Grass #l200 moves on a sophisticated series of pivots. These allow the cabinet door to swing clear of the sides of the case, opening almost flat against the cabinet. If a cabinet door mounted on these hinges happens to obstruct your path, the collision will simply bump the door out of the way.

Specialty hinges. The Grass #1200 is my workhorse, but I also use several kinds of special-purpose hinges. Lots of my customers want their cabinets to include drawers or pull-out trays concealed behind a door, like those shown in Figure 3 (see opposing page). While most hinges leave the door obstructing the trays or drawers, the Grass #1203 moves the door out of the way when opened only 90 degrees to the face of the cabinet. This means that the trays can be made with little or no allowance for the door. In a situation like this you can get by with a hinge like the Grass #1200, but you'll have to shim the slides out l/8 to 1/4 inch, and reduce the width of the drawers or trays accordingly.

When you have to install hinges on an ordinary corner cabinet, you can save money by using a hinge that opens 90 to 110 degrees. Moreover, a complex hinge like the #1203 may be difficult to adjust if it cannot be opened more than 90 degrees (at 90 degrees, the adjustment screws are partially obscured).

There are also hinges designed to be mounted on a surface parallel to the door, a useful feature for blind-corner cabinets. In the typical configuration (see Figure 4) the cabinet that starts in a blind corner has no right-angle surface on which to mount the hinges. Julius Blum Inc. makes a blind-corner hinge that opens only 95 degrees, more than enough for a corner cabinet. Blum also makes a hinge for cross-corner cabinets (see Figure 5). The hinge can be mounted to a surface that lies at 135 degrees to the face. Neither of these hinges requires any special provisions for mounting.

Special hinges are also available for unusually thick or thin doors, solid-glass doors, and other special situations. Some of these are listed in the chart.

All concealed cup hinges are available in models to accommodate the three different installations shown in Figure 6. These are generally referred to as full overlay, half overlay and insert. I use only the standard full-overlay hinge, which is designed so that the door covers most of the exposed edge of the case. The half-overlay hinge is used where two doors are mounted to opposite sides of the same partition, a situation I don't encounter because I assemble my cabinet runs from individual cases. (The sides of adjacent cases are simply screwed together.) Inset hinges permit a door to fit inside the case, but for a number of reasons, I never use them. In the first place, I prefer not to interrupt the continuity of a run of well-matched doors with visible case sides. Also inset doors are much more limited in their adjustability.

You'll note from the drawing that the three types of hinges are identical, except for the thickness of the base plate. This means that if you decide to use either half-overlay or inset doors, there's no need to order a different hinge—simply glue a wooden shim behind the standard base plate and proceed as usual.

The great success of cup hinges has led to a curious phenomenon—they are now being made for face-frame mounting. The hinges are completely concealed, yet the cabinets retain the look (and all the construction features) of traditional face-frame cabinets. This is a mixed blessing. Cup hinges certainly facilitate installation and adjustment, but they can't correct the most serious flaw of the face-frame cabinet: The frames themselves still obstruct full access to the interior of the case. Another drawback is that the frame must be made even wider than usual to mount the cup hinge, which makes the cabinets that much less accessible.

Mounting cup hinges. All cup hinges mount in a similar fashion, though each has its idiosyncracies.

First, a 35mm-diameter hole is bored in the cup inside of the cabinet door. The hinge cup is pressed into this tight-fitting mortise, which holds it in place until the hinge is fastened with two small screws. Next, a base plate is screwed to the inside of the case. Then the hinge slides over the base plate, and a single screw locks it in place (see Figure 7.)

Adjusting the hinge is just as quick. Once the hinge has been screwed to the base plate, the door is aligned by eye. Its height is adjusted by one screw, its sideway orientation by another. This is where the Grass #1200 really shines. because the set screws provide direct adjustment. (Some other cup hinges have an additional screw that locks the set screws in place.) If the door binds, just loosen the appropriate set screw and adjust the hinge along its track, then retighten the screw. It may take a little practice at first to know exactly which way and how much to adjust the set screws, but after several doors you should get the hang of it.

If this process sounds simple, that's because it is. If you try it, I'll bet you won't go back to whatever hinge you're using now.

Drawer Slides

The second critical piece of hardware is the drawer slide, and, once again, quality is what you're after. The best slides roll on nylon wheels or polymer or steel ball bearings (steel bearings probably last longer, polymer bearings are quieter), and they have no sharp edges on any metal parts. The finest slides also have built-in bumpers to cushion the impact of the drawer front closing against the cabinet.

You can tell a good-quality slide just by comparing weights—the good ones are much heavier. And once the slide is in place, you'll notice how quietly they

Concealed cup hinges

	Full opening (about 180°) 3-way adjustability	Full opening minimal protection	Glass door	Cross corner
Manufacturer				
Blum:	90A610	90.750	98M410	98M350
Grass:	1200	1203 (full overlay)	1603	1106
Häfele:	345.47.665	345.56.619	345.49.614	332.95.500
Hettich:	Euromat Plus 3955	Euromat Plus 3944	Euromat Plus 3901	Euromat Plus W45
Mepla:	SSP65	SSP65 (full overlay)	SSP17	SSP05/45
	Blind corner	**Face frame**	**Thick door**	
Manufacturer:				
Blum:	98M950	33.360	90M950	
Grass:	1103	TEC 830	1806	
Häfele:	332.95.519	343.84.604	332.59.602	
Hettich:	Euromat Plus W90	ET 2045	Euromat Plus 3735	
Mepla:	SSP 05/90	ACC 150 Series	SSP 25	

Note: This chart has been greatly simplified for ease of comprehension. Many manufacturers offer an assortment of hinges in each category. These may be purchased with a metal or nylon cup, a screw-on or press-in mount, an adjustable or non-adjustable base and may be self-closing or free-swinging. And most cup hinges are avalable in full-overlay, half-overlay and inset models. Full catalogues are available from the manufacturers.

Base plates and mounting screws must be purchased seperately.

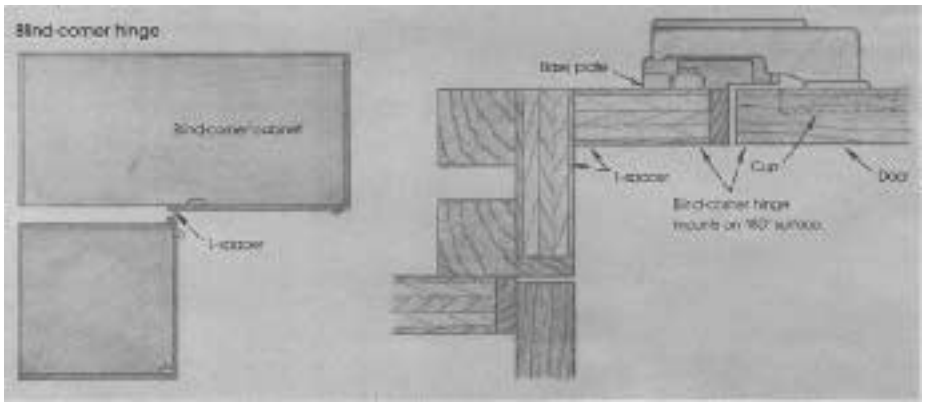

Figure 4. *Julius Blum Inc. makes a special hinge for blind-corner cabinets that opens to 9.5 degrees—more than enough for a corner cabinet.*

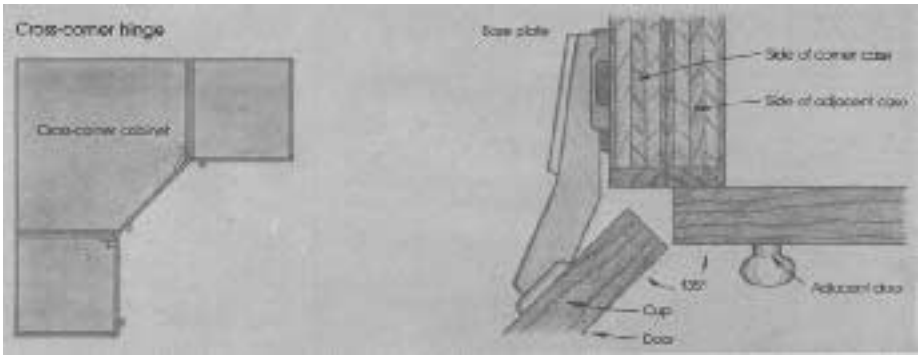

Figure 5. *Cross-corner cabinets can be improved by using a special hinge (Julius Blum Inc.) that can be mounted to a surface that lies at 135 degrees to the face of the door.*

work. Cheap slides rattle like skeletons on a tin roof. Finally, a drawer mounted on good slides will not droop.

Types of slides. I prefer full-extension slides because they install easily and they grant access to the entire drawer. But lots of other slides are available. Three-quarter-extension slides are cheaper and lighter, and I use them occasionally. You can also get slides that will permit greater than full extension. These are useful if a drawer has to be installed under a table or countertop with a wide lip. There are even pull-through slides that permit a drawer to be opened from either side, a great feature for a peninsula or island cabinet.

All slides are either corner mounted, side mounted, or bottom mounted (see Figure 8). These alternatives permit considerable flexibility in design and mounting. I like corner mounting best because the slides cradle the drawer, just as you would if someone handed it to you. But alas, the brand of slides I like best doesn't mount this way. So I use side-mounted slides. These may be positioned anywhere on the side of the drawer, but the closer to the bottom the better. If mounted too near the top, there won't be enough drawer stock above the slide to support the weight of the drawer and its contents, and the drawer side might split. If you make your drawers out of oak, allow at least 1/2 inch of wood above the screws that attach the slide to the drawer side. In a softwood like pine or a soft hardwood like poplar, allow 3/4 inch.

The bottom-mounted slide serves as a center rail beneath the drawer. Only one slide is needed for each drawer, which saves money, but this type of slide can be used only on a face-frame cabinet. At the front, a pair of rollers must be mounted to the face frame to keep the drawer from tipping, while the other end of the slide is attached to the back of the case. My cabinets don't have face frames, so I can't use bottom-mounted slides. It's no sacrifice, though, as they are not usually adjustable, and tend to be among the shabbiest on the market.

The finest slide I've found is made by Accuride in California. It runs on ball bearings and is the quietest on the market. The Accuride full-extension slide (C3017) has a load-bearing capacity of 150 lb. The sliding mechanism is attached to the case wall, and a mounting rail is attached to the side of the drawer. With the slide and rail installed, all you do is drop the drawer in place. A small steel catch holds the slide to the rail at the rear, and a flexible plastic tag grabs the rail in the front. By releasing the tab, the rail (and drawer) may be lifted off the slide.

This installation feature is important. Some slides mount in an odd way that requires clearance above the drawer. For these, you must first tip the front of the drawer up slightly to engage two sets of wheels—one on the drawer, and the other on the case. If the drawer is mounted near the top of the case, this means that the drawer sides must be made about 3/4 inch narrower than the opening (top to bottom), or the drawer can't be installed. And you may not discover this until after you've mounted the slide and rail and are ready to install the drawer.

Accuride slides also come with a detent (a curved nub in the metal stamping), which keeps the drawer from rolling open on its own, and built-in felt bumpers to eliminate the thud when the drawer is closed. They cost at least twice as much as the best European slides and four times as much as the cheaper American slides, but I think they're worth it. Once my customers have tried the slides, they always agree.

Accuride also offers a variety of specialty slides. There is an under-counter slide for computer keyboards and a TV slide that can be used in conjunction with a swivel. All of these souped-up slides look neat in the catalog, but I rarely use them. I find that the Accuride #C3017 does almost everything I need it to do, with only occasional shimming or modification required.

Grant makes two fine full-extension, ball-bearing slides (#555 and #527). I've used both and like them a lot. When I can't get the Accurides, I use the Grants.

Mounting drawer slides. The European slides, like the hinges described earlier, are designed for the 32mm system, but they can be mounted with ordinary No. 6 flat-head wood screws, or they can be purchased with dowel mounts. (The latter are simply pressed into pre-bored holes in the drawer sides and case—no screws or adhesive are necessary. Templates are also available to facilitate boring the holes for the European slides and hinges. Of course, these are used only when the case sides have not been prepared with the line-boring pattern of the 32mm system. You can make your own templates, or use none at all, which is what I usually do.

I begin by placing the finished drawer (without its face) on a flat surface. Holding the complete drawer-slide assembly against the side and flush with the front of the drawer, I pre-bore the holes for the screws. Then I separate the slide from the rail and screw one rail to each side of the drawer. Finally, I mark the position of the drawer on the inside of the case, and, with the bottom of the slide aligned with the mark for the bottom of the drawer, I install the slides.

It's easy to mount Accuride slides—and I do it with a minimum of measuring and marking. Even though the slides cannot be adjusted like the concealed cup hinges, flexibility is provided by the separate drawer face, which is attached after the drawer is installed. I can make up for slight errors in a drawer's location' simply by adjusting the position of its face.

Each brand of drawer slide mounts in its own peculiar way, so it's a good idea to obtain specific information from the manufacturer. But whichever slide you select, consider the orientation of the case before you mount the slide. I used to hunch over to install the slides in the upright case, dropping screws in dark corners. Now I lay the case on its side on my workbench to mount the slides (Figure 9). With gravity on my side, the job is much easier, and my back thanks me every night.

Figure 3. *Although the Grass #1203 hinge opens only 170 degrees, it swings the door out of the way, so it will not obstruct drawers or pull-out shelves.*

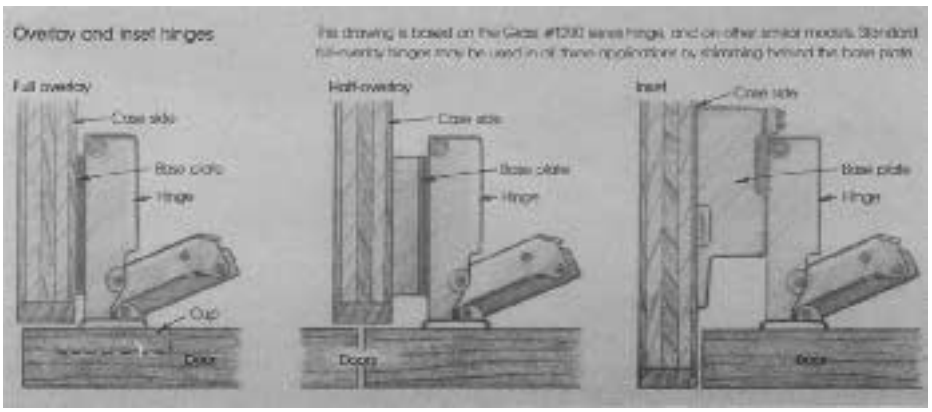

Figure 6. *The hinges used in the three applications shown—full overlay, half-overlay, and inset—are all from the Grass #1200 series, and are identical, except for the thickness of the base plate. You can use the full-overlay hinge for all three situations by gluing a wooden shim behind the standard plate.*

Figure 7. *Mounting cup hinges is simple: First, bore a 35mm-diameter hole on the inside of the cabinet door. Press the hinge cup into this mortise (left), which holds it tightly in place until the hinge is screwed in. Next screw a base plate to the inside of the case (center). Finally, slide the hinge over the base plate (right); a single mew locks it in place.*

Shelf Supports

Hinges and slides aren't the only hardware items you'll need for your cabinets. You'll also want some way to support and adjust the shelves inside.

Pilasters. The pilaster is the mainstay of shelf-support systems. A slender metal channel, the pilaster is attached vertically to each inside cabinet wall (two of them on each side), and small metal clips are snapped into slots in the pilaster to support a shelf. Although pilasters are not particularly attractive,

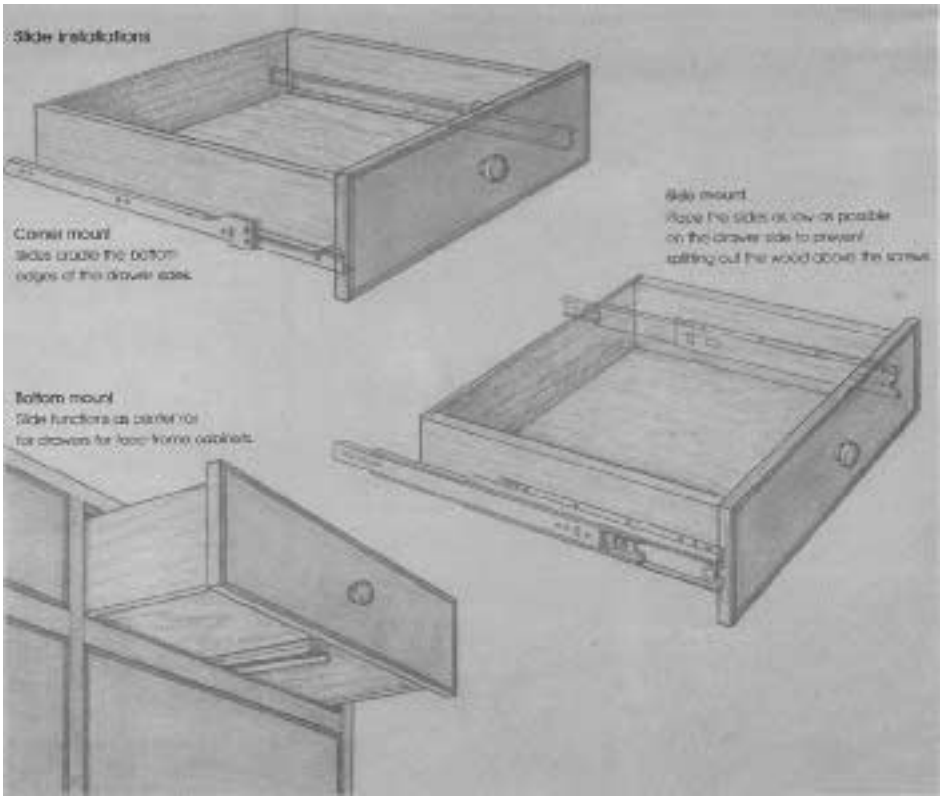

Figure 8. *Slides are either side-mounted, corner-mounted, or bottom-mounted. Corner mounting is preferable because the slides cradle the drawer and carry its weight well. If you're using side-mounted slides, mount them as close to the bottom of the drawer side as possible to avoid splitting. Avoid bottom-mounted slides if you can: They tend to be shabby.*

they have been popular for quite a while, and with good reason: They carry a lot of weight and are easily adjusted.

Shelf clips. Although my customers frequently request pilasters, I prefer to bore two lines of holes in each side of the case to hold any of a host of shelf clips. The shelf clips are a lot easier to install, and I find them less obtrusive. The most common ones are made to fit 1/4-inch-diameter holes. Another type includes brass sleeves, or tubes, that slip

Figure 9. *Place the case on its side to install the slides. It's much easier to work with gravity thun against it.*

into each hole before the clip is inserted, ostensibly to strengthen the hole and make it resistant to wear. (I think these are a waste of time, though. There's not much movement in a shelf clip installed in hardwood plywood, and consequently not much wear.) Whichever you choose, drill the holes every 1 1/2 inches vertically, and center the rows about 2 to 3 inches from the front and back of the case. You can mark and bore each hole by hand, but it's much faster to use a jig.

There are several support clips intended specifically for the 32mm system, the most popular being either entirely plastic, or plastic with a steel pin for the holes. I like the latter because the steel pin says "strong" to me. All the European-made clips require 5mm-diameter holes, but a standard No. 8 drill bit will do the job perfectly.

There is also a type of forked shelf support that pivots in the hole and has two "fingers," one above and one below the shelf. These compensate for small errors in hole alignment, and grip the shelf securely.

Accessories

There are lots of other goodies, that will allow you to customize your cabinets. Bumpers, if not built-in with the slides, are a good idea. I especially like the coated new wire accessories now available. My current favorite is a nifty wire mounting device for garbage bags that also provides space to store a continuous roll of bags. All kinds of useful storage items, including removable plastic trays, can make better use of cabinet space—and add value to the project. ■

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Major Hardware and Accessory Manufacturers and Suppliers

Accuride
12311 Shoemaker Ave.
Santa Fe Springs, CA 90670
213/944-0921

Amerock Corp.
4000 Auburn St.
P.O. Box 7018
Rockford, IL 61125
815/963-9631

Julius Blum, Inc.
Highway 16-Lowesville
Stanley, NC 28164
800/438-6788, 800/222-7551 (N.C.)

Fixture Hardware Mfg. Corp.
4116 First Ave.
Brooklyn, NY 11232
718/499-9422

Grant Hardware Co.
High St.
West Nyack, NY 10994
914/358-4400

Grass America, Inc.
1202 Hwy. 66 S.
P.O. Box 1019
Kernersville, NC 27285
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Hafele America Co.
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Archdale, NC 27263
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