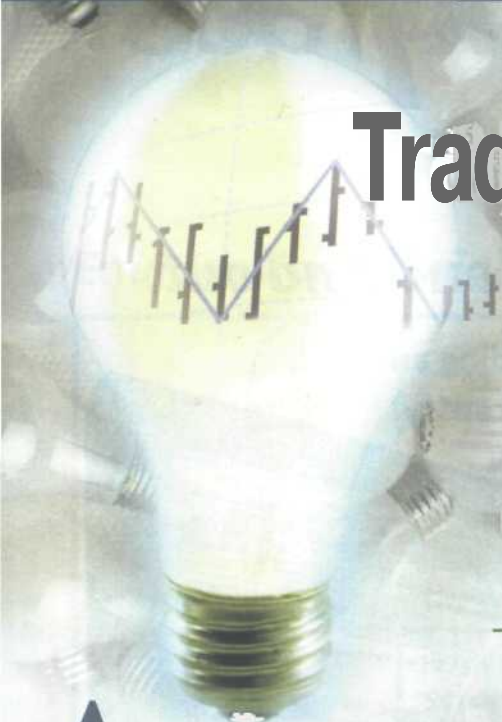


Trading the GARTLEY 222

Sometimes old trading ideas are the best ideas — if you can quantify them with modern analysis and testing procedures. Here, a "classic" chart pattern is defined mathematically and tested to see if it can produce profits.

BY AARON BEHLE AND MARK CONWAY

As an increasingly challenging market has weeded out traders over the past few years, many survivors in search of an edge are revisiting the works of the original technical analysis masters, including Richard Schabacker, J.M. Hurst, W.D. Gann and Harold M. Gartley.

Gartley wrote *Profits in the Stock Market* in 1935, and what makes the book striking is not that it shows how much technical analysis has advanced since then, but rather, how little it has changed. In many cases, "modern" patterns with catchy names are simply rehashes of price behavior observed long ago by people like Gartley.

One example is a pattern commonly known as the "butterfly," named for its resemblance to a pair of butterfly wings (see Figure 1, right). However, Gartley described this pattern in *Profits in the Stock Market* as the "Gartley 222," a reference to the page number on which the discussion occurred.

The Gartley 222 can be defined objectively by establishing specific proportions for the four price swings (XA, AB, BC and CD in Figure 1), or legs, that comprise the pattern, as well as by setting criteria to define the magnitude of the swing ("pivot") highs and lows — points A, B and C.

Percentage relationships

In his book *Profitable Patterns for Stock Trading,* analyst Larry Pesavento used certain ratios to define the butterfly pattern, measuring each price swing (from peak-to-trough or trough-to-peak) as a certain percentage of a preceding price swing. Pesavento required these percentages to be Fibonacci ratios: 0.618, 0.786, 1.00, 1.27 and 1.618.

The problem is that if you disregard those patterns whose price swings are not proportional using precise Fibonacci ratios, the Gartley 222 pattern is quite rare. Using a "tolerance percentage" (T%) that expands the range of acceptable price-swing ratios produces more pattern examples and, thus, more trade opportunities. For example, if T% = 10 percent, segment

FIGURE 1 THE GARTLEY 222

A 222 pattern is sometimes referred to as a "butterfly" because of the wing shape of the four price swings. Trade entry occurs at point D.

Source: TradeStation Platform by TradeStation Group

AB (the second price swing) can be between 51.8 percent and 71.8 percent of segment XA (the first price swing), rather than exactly 61.8 percent.

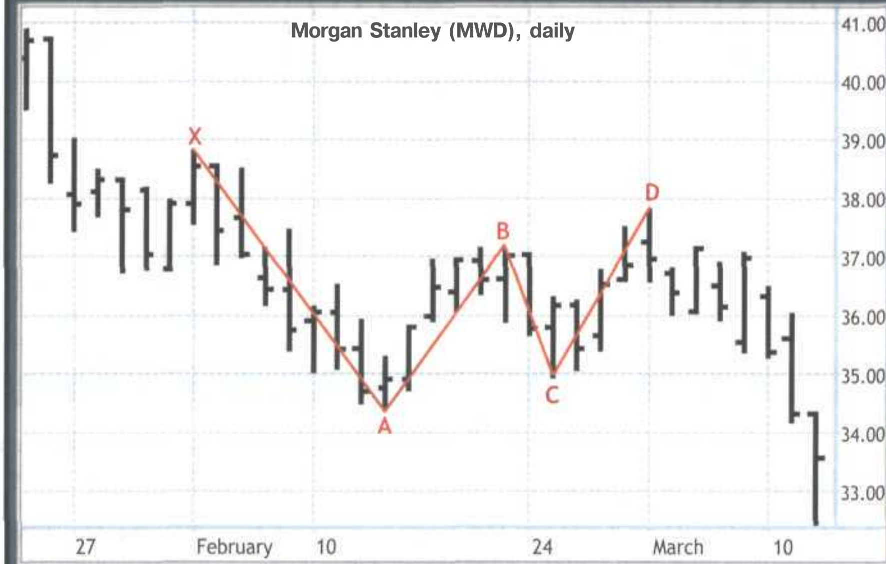
Another criterion that can be applied to the pattern is the "strength" of the pivot points. For example, a pivot high has a strength of 3 when the three bars preceding the high and the three succeeding it are all lower than the high; a pivot high with four preceding and succeeding lower highs would have a strength of 4. Each pivot in the 222 pattern must meet this strength requirement. As the pivot strength increases, so does the length of the pattern and the likely duration of a trade based on it. However, the higher the pivot strength, the fewer patterns that will qualify for trading, and the longer those patterns will be.

Pivot strength can also be measured in percentage terms — e.g., a 2-percent swing from peak to trough on a 60-minute chart, or a 10 percent swing on a daily chart. These parameters should be appropriate to the time frame; price moves on an intraday chart will be proportionally smaller than those on daily or weekly charts. (With all these criteria, finding the pattern by scanning charts is difficult, at best. Accordingly, code for defining the pattern in both the TradeStation and Wealth-Lab analysis programs can be found at www.activetradermag.com/code.htm.)

Using objective criteria for defining price patterns allows you to build a consistent strategy for trading them. We will use specific Gartley 222 pattern parameters to enter both long and short trades on different time frames. Back-testing on the Nasdaq 100 stocks over the past several years will provide an indication of the strategy's potential.

FIGURE 2 BEARISH 222

The bearish Gartley 222 formation simply inverts the bullish pattern.



Source: TradeStation Platform by TradeStation Group

Defining the swing relationships

In Figure 1, which shows a bullish 222 pattern, low X to high A defines segment XA; high A to low B defines segment AB, and so on. The first thing to determine is how the size of these price swings should relate to each other.

Low B retraces a certain percentage of high A, but is higher than low X. Segment BC is an even smaller retracement of high A, but segment CD retraces all of segment BC but is above low X. Point D is the buy point.

To measure the retracements, we'll use the proportions defined in Appendix I of Pesavento's book:

AB should be 61.8 percent of XA
BC should be 61.8-78.6 percent of AB
CD should be 127.0-161.8 percent of BC
AD should be 78.6 percent of XA

Figure 2 (above) shows a bearish 222 pattern, which resembles the letter "W." Reversing the logic of the bullish pattern, peak X to trough A defines the segment XA, trough A to peak B defines the segment AB, etc.

High B retraces a percentage of trough A but is lower than high X. Again, segment CD retraces all of segment BC but does not reach the point X high. Point D is the sell short point.

The pattern lines in Figure 2 are based on the following criteria:

1. Pivot strength = 3
2. Maximum number of bars in pattern =100
3. T% = 10 percent

Gartley 222 strategy

A Gartley 222 setup should always have a minimum potential reward/risk ratio of 2:1. This system uses a stop-loss at Point X and a profit target equal to 61.8 percent of segment CD ("DT" in the following calculations). The profit target for a bullish butterfly will be equal to Point D + DT, and the short target for a bearish butterfly will be D - DT.

The calculations used are:

XA = | X - A |
AB = | A - B |
BC= | B - C |
D = A - (0.786 * XA) for bullish butterfly
D = A + (0.786 * XA) for bearish butterfly
C D = | C - D |
AD = | A - D |
DT = 0.618 * CD
Tolerance = T%

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FIGURE 3 SHORT TRADE

This trade had a highly favorable reward/risk ratio because the entry point (at D) was so close to the point X price level.

Source: TradeStation Platform by TradeStation Group

Entry rules

Bullish Gartley 222:

1. A > C and C > B and B > D and D > X

2. The pattern must be a trough-peak-trough-peak sequence

3. AB / XA > 0.618 - T% and AB / XA < 0.618 + T%

4. BC / AB > 0.618 - T% and BC / AB > 0.786 + T%

5. Repeat for CD / BC and AD / XA.

6. If the conditions above are true, then buy at price D with a limit order.

Bearish Gartley 222:

1. A < C and C < B and B < D and D<X

2. The pattern must be a peak-trough-peak-trough sequence

3. AB / XA > 0.618 - T% and AB / XA < 0.618 + T%

4. BC / AB > 0.618 - T% and BC / AB > 0.786 + T%

5. Repeat for CD / BC and AD / XA.

6. If the conditions above are true, then sell short at price D with a limit order.

Exit rules

Bullish Gartley 222:

1. Profit Target: D + DT

2. Stop Loss: X

Bearish Gartley:

1. Profit Target: D - DT

2. Stop Loss: X

Example 1

Figure 3 (left) is an example of a very favorable reward/risk ratio for a Gartley 222 trade. The stock twice closed within 10 cents of the pattern high. A short trade initiated at this level would have a profit target of at least 60 cents with risk limited to 10 cents - a 6:1 reward/risk ratio.

Note the two different lines denoting segment CD. In a bearish 222 pattern, D is the price level at which to short — e.g., it is based on the high of a bar satisfying the condition that segment CD retraces at least 127 percent of segment BD. If this condition is true, the pattern is drawn.

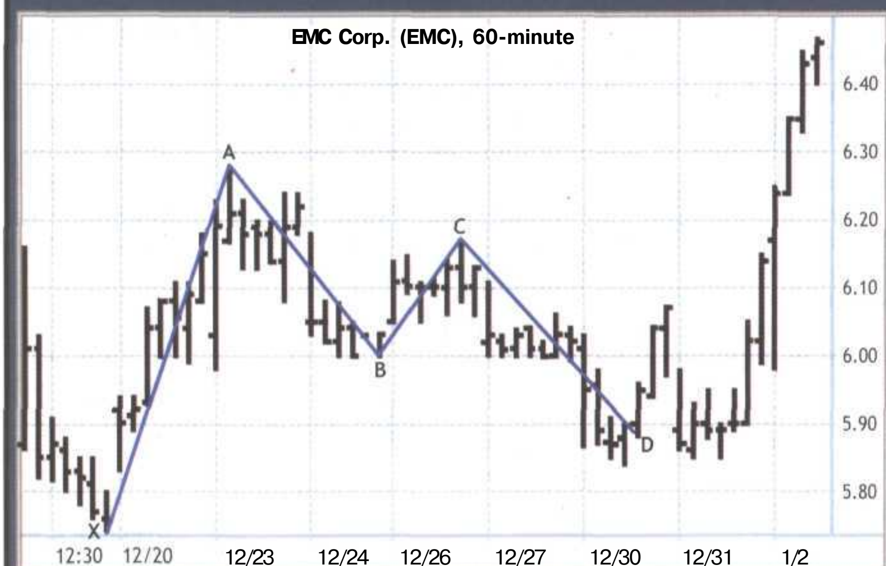
Now, suppose the next bar's high price is lower, and that segment CD now retraces only 125 percent of segment BD. This is not a valid Gartley pattern and no pattern is drawn. In this case, though, the second bar did have a higher high, so a new segment CD line is drawn. Although the strategy calls for entry at point D on the initial bar that completes the pattern, it is useful to keep tracking subsequent bars that fulfill the pattern criteria in the event you miss the first opportunity and need a second chance to enter the trade.

However, if the next bar's high is higher and comes back into the "Gartley range," the pattern will be drawn again. These "multiple" patterns tend to develop when price is trading in a range. The T% has been loosened to 20 percent in this case; the higher the tolerance, the more patterns that will occur. Although this is a modified version of the Gartley setup, we prefer to see all potential patterns as they take shape.

Varying the input parameters to reflect different swing proportions and pivot strengths will identify different kinds of Gartley setups. For example, higher pivot strengths will reveal setups that are developing over longer time frames. A higher-

FIGURE 4 INTRADAY TRADE

Shortly after the position was established, the stock pulled back to the entry point but did not fall below the stop level.



Source: TradeStation Platform by TradeStation Group

FIGURE 5 PATTERN SYMMETRY

The number of days in the pattern equaled the number of days it took the stock to reach its profit target.

Source: TradeStation Platform by TradeStation Group

parameters to your holding period. In this case, the pivot strength was set to 5 and the pattern developed over seven trading days. A trader may decide to hold a position over the same period for "time symmetry" - that is, sometimes the moves that spring from a Gartley setup are proportional to the original pattern length (in time).

Figure 5 (left) is a good example of time symmetry. The bullish setup develops over 16 trading days, and 16 days later EBAY had gained more than six points from the entry. Here, the stop-loss amount is less than one point, so even if you chose to exit the trade on the first up move, the trade's reward/risk ratio was at least 3:1.

As long as price stays in the zone between the troughs, the pattern is valid until price either breaks below the first trough or moves above the second trough.

strength pattern combined with a lower-strength pattern is a powerful combination for trading these setups. In some situations, a lower-strength (shorter-term) pattern will form within a higher-strength pattern, in which case you can enter a trade based on the shorter-term pattern and have the potential to capitalize on the longer-term pattern.

Intraday setups

These patterns can also be traded on intraday charts. A Gartley 222 setup on a 60-minute chart is suitable for a swing trade with an approximate holding period between one and three days.

In Figure 4 (opposite page), the stock does not initially hit the profit target, but pulls back to the buy point. However, it stays above the stop-loss point at the bottom of the chart and, finally, the real move occurs two days later.

Remember to adjust the pattern

Some traders wait for a confirmation bar - a close above the open or a close greater than the previous close. However, if the reward/risk ratio is good, place a limit order close to the bottom of the pattern and let the price action do the rest.

Figure 6 (below) shows another intraday (five-minute bars) setup. Like the Figure 5 example, this pattern is time-symmetric, and the high occurs around one hour later. Also, this setup was based on a pivot strength of 4, and the pattern is 16 bars in length — referred to as a "4x4" because of its perfect symmetry and compact form.

Gartley 222 patterns can be traded on 1-, 2-, and 3- minute charts. The only caveat regarding these time frames is to be careful of a bullish setup that occurs after a run-up - you

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Additional reading

Professional Stock Trading: System Design and Automation
by Mark R. Conway and Aaron N. Behle.
(2003, Acme Trader LLC, Waltham, Mass.).

Profits in the Stock Market
by Harold M. Gartley
(1935, Lambert-Gann Publishing Co., Pomeroy, Wash.).

Profitable Patterns for Stock Trading
by Larry Pesavento
(1999, Traders Press Inc., Greenville, S.C.).

FIGURE 6 FIVE-MINUTE PATTERN

Like the Figure 5 example, this trade exhibited "time symmetry."

Source: TradeStation Platform by TradeStation Group

TABLE 1 GARTLEY 222 PERFORMANCE REPORT FOR THE NASDAQ 100

The following performance results are based on daily data from March 1, 2001, to March 1, 2003.

	All trades	Long trades	Short trades	Buy & hold
Starting capital	$100,000	$100,000	$100,000	$100,000
Ending capital	$135,367.30	$121,319.07	$114,048.22	$95,226.14
Net profit	$35,367.30	$21,319.07	$14,048.22	($4,773.86)
Net profit %	35.37%	21.32%	14.05%	-4.77%
Exposure %	14.37%	8.68%	6.35%	99.06%
Risk adj. return	246.15%	245.55%	221.31%	-4.82%
All trades	165	87	78	93
Avg. profit/loss	$214.35	$245.05	$180.11	($51.33)
Avg. profit/loss %	1.08%	1.26%	0.89%	-5.11%
Avg. bars held	4.69	4.98	4.37	999
Winning trades	72 (43.64%)	41 (47.13%)	31 (39.74%)	34 (36.56%)
Gross profit	$125,374.70	$78,861.49	$46,513.22	$25,701.80
Avg. profit	$1,741.32	$1,923.45	$1,500.43	$755.94
Avg.profit %	8.90%	10.00%	7.46%	70.77%
Avg. bars held	5.9	6.07	5.68	999
Max. consecutive	4	4	3	6
Losing trades	93 (56.36%)	46 (52.87%)	47 (60.26%)	59 (63.44%)
Gross loss	($90,007.40)	($57,542.43)	($32,464.99)	($30,475.66)
Avg. loss	($967.82)	($1,250.92)	($690.74)	($516.54)
Avg. loss %	-4.97%	-6.53%	-3.44%	-48.84%
Avg. bars held	3.75	4	3.51	999
Max. consecutive	10	13	10	11
Max. drawdown	-14.82%	-18.44%	-8.16%	-75.90%
Max. drawdown $	($16,211.47)	($19,477.32)	($9,457.74)	($228,486.72)
Profit factor	1.39	1.37	1.43	0.84
Standard error	$6,122.54	$6,664.87	$2,757.04	$50,154.02
Risk/reward ratio	0.84	0.29	1.16	-0.53

Source: Wealth-Lab

could be looking at an "M" top pattern. Similarly, a bearish setup after a mid-day correction may be a "W" bottom pattern.

Context is important for intraday patterns, so keep an eye on the longer-term time frames.

Test results

Table 1 (above) shows the back-testing results for daily Gartley 222 setups using the rules we defined earlier. The results reflect 165 trades in 100 stocks. In all the tests the profit factor (gross profit divided by gross loss) was consistently in a range of 1.4 to 1.5. These trades were not filtered in terms of their reward/risk ratios (that is, all setups were traded, not just those above a favorable threshold, such as 3:1).

The test reflects only one set of pattern parameters, in this case, a T% of 10 percent and a pivot strength of 7. One parameter set does not capture all the possible patterns that occurred over the three-year period.

The approach used here makes it possible to find price patterns using objective criteria, which in turn makes it possible to test trading ideas based on the pattern to see if they have potential.

For information on the authors, see p. 10.

Code for this pattern can be found at www.activetradermag.com/code.htm.