

HUNG WINDOW DESIGN: CONCEALED SPIRAL BALANCE VS. WEIGHT & CHAIN

INFORMATION AT A GLANCE

For window units that require total historical authenticity, Weight & Chain configuration may be required.

While these units are more expensive and require the added space for weight boxes when compared to a similar concealed spiral balance unit, they require less physical force to operate. W&C hardware has been time tested to last over 100 years in some cases.

Concealed Spiral Balance units do not require the space for weight pockets and are less expensive than weight & chain windows.

Spiral balance windows do have some limitations however. While not a problem in standard sizes, a heavy sash can exceed the weight limitation of available balances. A concealed spiral balance window also requires more physical force to operate compared to a weight & chain unit.

Weight & chain window sashes should be perfectly balanced with the sash weights when they are shipped from the manufacturer. This allows operation where the only physical force required to operate the window is due to the weather-stripping and other components that contribute to the "break force." This becomes increasingly important as window sash weight increases.

2. Configuration Flexibility:

Weight and chain windows are generally the only choice for unique hung window configurations such as fully operating triple hung windows and hung windows that utilized a pocket in the header.

When originally invented to allow for easier sash operation, hung windows did not have a balance system.

Later, weight & chain hung windows were conceived to make raising and lowering the operating sash much easier. Today, hung windows are also available in concealed spiral balance configuration for single & double hung windows. Careful consideration will allow you to choose the best window for your project.

Weight & Chain Hung Window Information

Weight & chain windows have metal weights that are concealed in "weight boxes" outside of both the left and right sides of the window frame. The sash weighs are attached to a chain (or cord) that is then run through a pulley and attached to the operating window sash. See Fig 1. Operation can be thought of as similar to a playground See-Saw. They are also referred to as "weight & pulley" windows.

Historical buildings with hung windows were designed to accommodate the space required for weight pockets.

Additionally, for projects in a historically managed setting, weight & chain windows may be required for historic window replacements.



Fig 1: Window Pulley Circled Above

There are several advantages that weight & chain windows have compared to concealed spiral balance hung windows:

1. Operating Force:

3. Unit Size Flexibility:

Weight & chain windows are available in sizes that are typically not available as spiral balance units. Generally the size of the weights can be accommodated to match any window sash. This is useful in cases with large window sashes, and/or when heavy glass is used for STC/OITC (sound performance) as well as in hurricane impact and burglar resistant applications.

There can be cases where the weight of the sash combined with the width/height ratio of the window will result in a condition where the sash will not be able to "travel fully" as the weights will touch the bottom of the weight pocket prior to the sash completing its travel. Parrett Windows offers a super magnum unit with larger weights to avoid this issue.

4. Reliability & Maintenance:

Weight & chain windows can be considered easier to maintain and may provide more reliable performance. Due to the simpler technology behind these windows compared to spiral balance units, there is less that can go wrong with a weight & chain system.

The window manufacturer should ensure that units have been thoroughly tested prior to leaving the factory. Weight pockets of Parrett units are designed to be accessible in multiple locations once the window is installed as long as installation instructions are followed by the installing contractor.

(Note: Parrett spiral balance windows can also be easily serviced in the field)

Weight & Chain Disadvantages:

Price: *Price is higher than a comparable spiral balance unit due to the material costs of the weights, chains, and pulleys as well as the labor and material costs for the weight boxes.*

Installation Considerations: *As the units are heavier than comparable spiral balance units, installation may be more difficult for a contractor. Situations where units will be mulled together may also prove challenging due to the space required for each unit's weight boxes and will require "wider mulls."*

Concealed spiral balance window units represent an economical alternative to weight & chain hung windows. These windows are utilized in all types of applications including historical, depending on the exact criteria of the project.

Concealed Spiral Balance Hung Window Information

Concealed spiral balance hung windows similar to those provided by Parrett facilitate sash operation through sash balances that are hidden from view and installed in the side jambs of the window.

Typically these units are less expensive than comparable weight & chain hung windows. Concealed spiral balance windows also provide the following **benefits:**



Fig 2: Detail of Typical Concealed Spiral Balances

1. Less Space Required:

For projects such as new construction, and especially in cases where multiple units will be installed directly next to each other, spiral balance units allow for a much narrower mull joint compared to weight & chain windows as spiral balances have no weight pockets. This will allow more natural light into an area.

2. Installation Advantages

Spiral balance windows are lighter and will not require a contractor to transport and install weights, making the installation process easier in some aspects. Also, in projects where weight boxes would not be accessible for maintenance, spiral balance windows may be the best choice.

3. Durability Compared to Other Systems such as *Block & Tackle* or *Coil Balances*

Parrett chooses concealed spiral balances that are optimized for each window. Typical Parrett specified balances are rated for 5,500 cycles, ensuring a long lifespan and easy, efficient operation of the hung window system. Additionally, as the balances are concealed the window exhibits the warm look of wood.

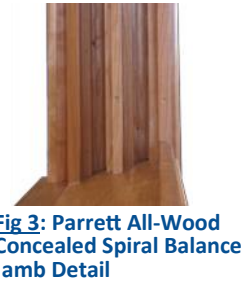


Fig 3: Parrett All-Wood Concealed Spiral Balance Jamb Detail

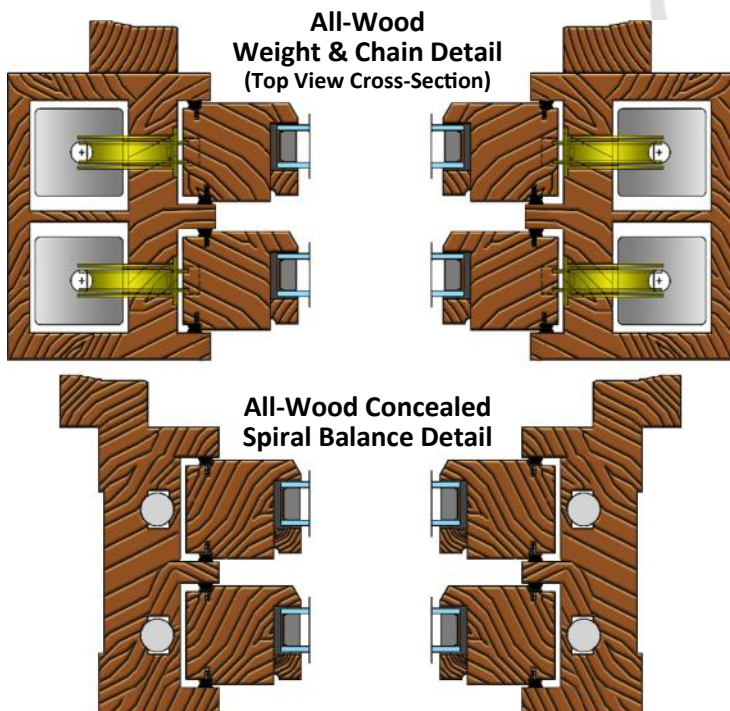
Spiral Balance Disadvantages:

Operational Force: Compared to a weight & chain window which has weights fully balanced to the window sash, spiral balance units require the user to account for approx. 30% (depending on balance type) of the lifting force. A 100 lb. sash will still require 30lbs or more force from the user accounting for this and the "break force" of the window.

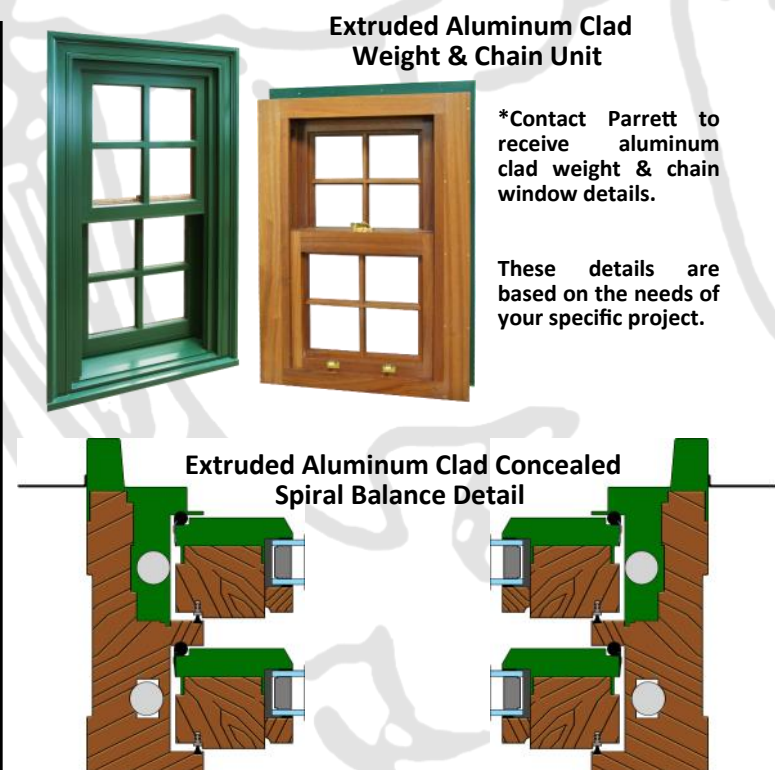
Size Limitations: Balance types each have an established limitation relating to window sash weights. Very large windows may be over 10 feet tall, and if heavy glass makeups such as laminated insulated glass is required, only weight & chain may be feasible.

Less Flexibility: Balances typically only allow operation in one direction, preventing spiral balance units from achieving the full operation required for unit types such as triple hungs, or double hungs where both sash can travel into a pocket above the jamb.

Less Historical Authenticity: Spiral balance units may not be acceptable for specific historical projects. Additionally, visual features such as metal weather-stripping are only available in a spiral balance unit if it has unique detail modifications. Lastly, spiral balance units will not provide the aesthetic appeal and the time-tested operation of a true weight & chain unit.



Standard weight & chain and spiral balance details with "daylight openings" aligned for comparison purposes.



*Contact Parrett to receive aluminum clad weight & chain window details.

These details are based on the needs of your specific project.