

Hagerman Clipper Circuit

Origin and Development

The Hagerman Clipper is an innovative all-tube clipping circuit designed by Jim Hagerman, founder of Hagerman Technology (also known for Hagerman Audio Labs and Hagerman Amplification). Hagerman developed this circuit in the early 2020s as a novel solution for creating high-gain tube overdrive. He first announced it around 2021, describing it as a “new invention” intended as an alternative to the traditional cold-biased clipping stage used in many vintage high-gain amps (e.g. Dumble and Marshall designs). The Hagerman Clipper began appearing in commercial products by 2022, making its debut in Hagerman’s own guitar gear. In fact, Hagerman calls it the “world’s first all-tube symmetrical clipping stage,” incorporated as the high-gain channel of his PP12 amplifier (a 12W EL84 amp) and in pedals like the Thermionic Reinforcer and Overdrive Special. Jim Hagerman explicitly positioned the design to surpass earlier tube overdrive methods – for example, his Overdrive Special pedal was “not a copy or clone” of the Dumble Overdrive Special but a complete re-design using the new clipper circuit to achieve “superior performance”. Introduced commercially in 2022–2023, the Hagerman Clipper quickly became a defining feature of Hagerman’s line, offering a fresh approach to tube distortion that had “never been done before”.

Circuit Design and Operation

Technically, the Hagerman Clipper is an all-tube, symmetric clipping stage – meaning it clips both the positive and negative halves of an audio waveform using vacuum tubes (12AX7 triodes) rather than any solid-state components. No diodes or silicon devices are used for the distortion; it’s achieved entirely with tubes. This is unusual, because most traditional tube overdrive stages clip asymmetrically (one half of the waveform is clipped more than the other) or resort to diode networks for symmetry. Hagerman’s design, by contrast, produces symmetrical waveform limiting, effectively “flatten[ing] both top and bottom” of the signal peaks. In practice, this likely involves a clever dual-triode topology (such as a differential pair or push-pull arrangement of 12AX7 sections) biased such that one triode handles the positive swings while the other handles negative swings, yielding a balanced clipping on both polarities. The result is that as the input signal amplitude increases, both sides of the waveform are driven into saturation equally, creating a kind of tube-driven hard clipping analogous to what diodes would do, but with the natural compression and soft edges of tube gain. Jim Hagerman himself noted that this circuit is a direct tube adaptation of concepts he’d explored previously with transistors – (he had earlier designed

a “non-saturating differential transistor clipper” in his Distort and Gamma Radiation pedals) – now translated into the vacuum tube domain as the Hagerman Clipper.

Because it is a symmetric clipper, the circuit tends to generate a balanced distortion waveform. In ideal form this produces predominantly odd-order harmonic content (since the waveform remains symmetric), similar in principle to classic diode hard-clipping. However, being implemented with tubes, the clipping is not an abrupt square-wave chop but rather a softened flattening due to tube characteristics. Notably, Hagerman’s implementation avoids the harshness sometimes associated with hard-clipping. He carefully biases and tunes the stage so that the transition into clipping is gradual and well-controlled. In fact, the PP12 amplifier literature emphasizes that “each stage is fine-tuned” and that the clean-to-dirty transition is exceptionally smooth, without introducing harshness. The circuit runs at proper high voltage (on the order of 100–150V on the 12AX7 plates, thanks to internal DC–DC converters in his pedals), ensuring the tubes operate in their linear regions until pushed into genuine saturation. This high-headroom design means the Hagerman Clipper can stay clean for lower input levels and only clip when driven, behaving much like a mini tube output stage. (Hagerman mentioned that in the design, it remains clean up to around 1 Vrms input, after which clipping kicks in hard – indicating a deliberate threshold for distortion.)

In use, the Hagerman Clipper stage is often paired with preceding and following tone-shaping circuits to maximize its effectiveness. For example, Hagerman’s designs include a Contour control before the clipping stage (a tilt EQ that shapes the frequency balance going into distortion) and traditional Bass/Treble controls after clipping. Placing the Contour (or “Color”) control up front allows the player to “tighten” or tilt the input tone (much like using a Tube Screamer or Klon in front, but built-in) – this helps decide which frequencies hit the clipper hardest (e.g. reducing boomy bass before clipping for a tighter high-gain sound). After the clipper, the EQ can then fine-tune the distorted tone (brighten or darken as needed). These design choices reflect Hagerman’s philosophy of achieving a controlled, musically pleasing distortion: the clipper circuit itself provides the core distortion, and the surrounding network ensures it behaves well in the context of a guitar signal. Overall, the Hagerman Clipper circuit is a self-contained tube overdrive engine: by using a pair of 12AX7 triodes running at high voltage in a symmetric clipping configuration, it produces a proprietary form of tube distortion exclusive to Hagerman’s products.

(It’s worth noting that while the Hagerman Clipper is designed for perfectly symmetric clipping, in real-world use the two triodes will never be exactly identical. Minor component tolerances and tube differences mean a small amount of asymmetry can still occur. As discussed in user forums, “although the circuit is designed to clip symmetrically, there’s some inherent asymmetry due to inconsistencies in the tube triodes”. This slight imperfection can actually be beneficial, as it

introduces a touch of even-order harmonics alongside the odd, adding richness. Nonetheless, the overall behavior is very symmetric compared to standard tube stages.)

Sound Characteristics and Tone

The audio effect of the Hagerman Clipper is a distinctive high-gain tube overdrive with a smooth yet saturated character. Because it clips both halves of the waveform, the sound is rich in harmonic content and sustain, giving a compressed, “singing” distortion when driven hard. Users describe it as capable of everything from a mild tube grind to full-on fuzz-like saturation, yet it retains clarity and musicality even at high distortion levels. Hagerman’s Thermionic Reinforcer pedal, which uses this clipper, offers two modes – one being a “classic tube overdrive” (more traditional asymmetrical tube clipping) and the other the “novel high-gain symmetrical clipping circuit recently developed by Hagerman”. In symmetrical mode, the pedal delivers a more aggressive, modern distortion character. This mode has a tighter, heavier feel (great for modern rock/metal tones) compared to the looser, vintage feel of the asymmetrical mode. Premier Guitar noted that with the Hagerman clipper engaged, the Reinforcer pedal could go from “mild overdrive to blistering distortion”, covering a wide range of tones.

Despite the ability to clip very hard, the tone is kept smooth and refined. The PP12 amp’s high-gain channel (which is essentially the Hagerman Clipper) transitions into distortion gradually and “remains under control without introducing harshness”, even as it is pushed. Players can crank it up while maintaining tone and articulation – the distortion doesn’t collapse into fuzzy mush or shrill fizz. This smoothness is partly due to the soft-knee nature of tube clipping and partly due to Hagerman’s inclusion of the pre-clipping contour filter that removes brittle high frequencies before they can turn into harsh overtones. The result is a high-gain sound that is thick and saturated but still musical. Jim Hagerman has stated that his symmetric clipper yields “rounder edges” on the waveform and greater control, meaning the clipping isn’t an abrupt hard-edge cutoff but has a rounded waveform shape, avoiding the buzzy quality of some solid-state distortions. Many users liken the sound to a Dumble-style overdrive taken to a next level – in fact, the Overdrive Special pedal is explicitly voiced for Dumble ODS tones, and with the Hagerman clipper engaged it nails that fluid, violin-like lead tone. Thanks to the symmetric clipping, it can also achieve more “modern” high-sustain lead tones than a traditional ODS. One customer of the Overdrive Special remarked that it produces classic Dumble warmth but with even more responsiveness (he “absolutely love[s] this thing... waiting 30 years” for such a sound).

In summary, the Hagerman Clipper imparts a creamy yet potent distortion. Key sonic characteristics include: excellent sustain and compression, due to both halves of the waveform

contributing to saturation; a full harmonic spectrum (strong odd-order harmonics from symmetry, with a touch of even-order sweetness from the tube imperfections); and a lack of grating artifacts – the tone stays “warm, fat, crunchy, and rich” without the fizzy top-end that plagues some diode-based distortions. It excels at smooth lead tones and controlled crunch. When used in a preamp pedal format, it effectively adds an extra tube overdrive channel to any clean amp. Notably, Hagerman’s designs often allow the clipper output to drive a power amp directly (e.g. via an effects loop return), underscoring that the sound is amp-like in its own right – essentially behaving like the overdrive channel of a well-designed tube amplifier.

Comparison to Other Clipping Circuits

The Hagerman Clipper stands out from other clipping or distortion circuits both in design and tone. Compared to the common cold clipper tube stage found in classic high-gain amps (which uses a single triode biased “cold,” so it clips one half of the waveform heavily), Hagerman’s approach is symmetrical. A cold-biased stage (as used in amps like the Soldano SLO or Dumble ODS) produces asymmetrical clipping, which tends to generate a lot of even-order harmonics and a somewhat softer onset of distortion on one half of the wave. While asymmetrical tube clipping can sound sweet and “musical,” it also can lead to imbalance and sometimes a raspy edge when overdone (since one half of the waveform is essentially flattening out completely). Hagerman’s symmetric clipper, in contrast, clips both halves evenly, yielding a more balanced distortion that can be pushed further into saturation without sounding lopsided or crashing into cutoff. In practical terms, his circuit can achieve higher gain levels with more stability: the distortion comes on smoothly and is easier to control with a single master volume or drive knob, since you’re not dealing with a drastically unbalanced waveform. By eliminating the severe bias offset of a cold clipper, the Hagerman Clipper also avoids issues like blocking distortion (where a tube overdrive stage can “choke” on strong signals). The result is a cleaner high-gain behavior – you get loads of gain, but the waveform symmetry means the distortion remains consistent and doesn’t suddenly dump a bunch of DC or cause weird recovery time, which can happen with asymmetrical clipping stages.

Another major point of comparison is with diode clipping circuits (as found in many guitar pedals and some hybrid tube amps). Traditional pedal distortions (e.g. Boss DS-1, MXR Distortion+) achieve symmetric clipping by shunting the signal through diode pairs that clamp the voltage. While effective, diode clippers have an inherently hard clipping threshold and a fast transition, which can introduce a buzzy or harsh character, especially with silicon diodes. Many tube-based pedals avoid high-voltage operation and simply stick diodes in the signal path for distortion. Jim Hagerman deliberately avoided this: his clipper uses “no silicon or diodes whatsoever”, relying

only on tube overload. This gives it a more organic, amp-like response compared to diode-based clippers. The softening effect of tube saturation means that even though the clipping is symmetric, it isn't as rigid-sounding as a solid-state hard clipper. In essence, the Hagerman Clipper manages to combine the best of both worlds – the fullness and smooth compression of an overdriven tube amp, and the aggressive symmetry of a dual-diode clipper – without the drawbacks of either. It's a more complex circuit (using multiple triodes and a high-voltage supply where a pair of diodes would be a simpler solution), but the payoff is a distortion that sounds “honest tube tone” even at extreme gain levels.

When comparing to other modern boutique circuits, the Hagerman Clipper is fairly unique. Few, if any, production designs use an all-tube, fully symmetric clipping preamp stage. High-gain tube amplifiers traditionally achieve distortion through cascaded asymmetrical stages or by adding diode networks; Hagerman's solution instead is a purpose-built clipping module. Some analogies can be drawn: for example, a push-pull tube power amp in full distortion will clip symmetrically (one output tube clips the negative swing while the other clips the positive). Hagerman essentially mimics that behavior in the preamp domain at lower signal levels. This is why his pedals like the Thermionic Reinforcer can emulate adding an extra overdrive channel to an amp – the topology is akin to a miniature push-pull saturating stage. In contrast, most tube pedals (like those using a single 12AX7) only distort on one half-cycle significantly, unless they incorporate additional tricks.

In terms of tonal comparison: Symmetric clipping generally yields a tighter, more compressed sound than asymmetrical clipping. It can sound a bit harsher or more “solid-state” if done with diodes or transistors, but done with tubes, it comes across as “more aggressive” yet still tube-like. Many players describe asymmetric tube overdrive as having a chewy, blooming quality (thanks to even harmonics), whereas symmetric clipping has a focused roar with lots of odd harmonics. Hagerman's design blurs this line because the tube compression and his careful EQ voicing bring back some sweetness and dynamics. He effectively proved that you can get a modern high-gain sound from tubes alone, without resorting to semiconductor clipping aids. This sets the Hagerman Clipper apart from most pedal designs on the market circa 2022, making it a point of interest for engineers and guitarists alike. In Jim Hagerman's own words, his high-gain tube channel “uses no diodes whatsoever” yet achieves a “modern high-gain sound” unlike the “traditional tube saturation” found in old circuits. For anyone seeking tube distortion that is both original in design and rich in tone, the Hagerman Clipper circuit stands as a remarkable achievement, marrying classic tube theory with inventive engineering.